BJU International (2002), **90**(Suppl. 1), 1–72

Tuesday 25 June 10.30–11.45
Stones
Chairmen: N. Burgess and A. Joyce

016

Should the acute management of flank pain in the UK be changed?

R.L. Davies, S.M. Mason, R.A. Nakielney*, K.J. Hastie* and D.J. Rosario* *Northern General Hospital and *Royal Hallamshire Hospital, Sheffield*

Introduction The management of acute flank pain suggestive of urolithiasis is traditionally based on clinical assessment, urine analysis and standard radiography. Unenhanced spiral CT allows a rapid, noninvasive, accurate assessment of this condition, and can be undertaken in the accident and emergency department (A&E), but availability is limited. The aim of this study was to assess the accuracy of the current approach to acute flank pain with a view to evaluating the potential benefits of definitive imaging in A&E.
Patients and methods Emergency cards and hospital notes of patients admitted from A&E to urology between 1 April 2000 and 31 March 2001 were reviewed. Of 577 admissions, 331 (57%) were for suspected urolithiasis. Complete data were available in 258 (78%). Univariate and multivariate analyses were used to identify possible predictors of urolithiasis, including age, gender, dipstick haematuria results, duration of pain and requirement for opiate analgesia.
Results In all, 145 (56%) patients had confirmed urological pathology after investigation by a combination of urography, ultrasonography and spiral CT (93 with urolithiasis, 45 UTI and seven other); 24 (9%) had significant nonurological diagnoses requiring intervention including abdominal aortic aneurysm (three), appendicitis (two), pneumonia (three) and gynaecological disease (nine). Eighty-nine (35%) were discharged with no diagnosis after the symptoms resolved. The sensitivity and specificity for urolithiasis of male gender, age <50 years, dipstick haematuria, pain duration <12 h and opiate analgesia were 78% and 39%, 77% and 35%, 100% and 11%, 68% and 68% and 47% and 25%, respectively.
Conclusion Clinical criteria cannot reliably be used to predict urolithiasis nor exclude significant non-urological disease, leading to inappropriate urological admissions in 44% of these patients. These data make a compelling case for definitive imaging of acute flank pain in A&E.

017

Stone disease in the morbidly obese

M.F. Bultitude, B. Challacombe, R.C. Tiptaft and J.M. Glass *Guy's and St Thomas' Hospital, London*

Introduction The body mass index (BMI, weight/[height]^2, kg/m^2) is an objective measure of obesity. Morbid obesity is defined as a BMI of >40. Obesity presents several challenges in the treatment of urolithiasis, as in other surgical procedures. Specific difficulties in patients with urinary tract calculi include problems with imaging and treatment. Poor image quality with both X-ray and ultrasonography can result in a reliance on CT and plain films. ESWL is contraindicated in patients too heavy for the operating table. Difficulties in positioning the patient and an increased skin-to-stone depth can make percutaneous access challenging, resulting in early recourse to ureteroscopic intervention. We present our experience in 11 morbidly obese patients with stone disease treated in our unit over a period of 18 months.
Patients and methods The mean (range) weight of the patients was 144 (127–160) kg, with a mean BMI of 45. Six patients underwent flexible ureterorenoscopy and electrohydraulic or holmium laser fragmentation. Two patients had primary open procedures, one had stent insertion and removal, and one underwent percutaneous nephrolithotomy (PCNL); one patient was treated conservatively.
Conclusion Morbid obesity presents many problems for the urological surgeon. The introduction of flexible ureteroscopy provides an extremely useful first-line treatment of upper tract stone disease, as ESWL is not possible. The success of flexible ureteroscopy avoids the need for PCNL or open surgery where appropriate, and consequent complications associated with surgery in the obese, but expertise in all forms of stone surgery is required in this difficult patient group.

018

Percutaneous nephrolithotomy in the morbidly obese patient

G.J. Burtt, B.J. Koo, A. Haq and N.A. Burgess *Norfolk and Norwich University Hospital, UK*

Introduction The surgical management of morbidly obese patients (body mass index, BMI, >40 kg/m^2) with renal calculi presents unique challenges because of the increased operative and anaesthetic morbidity in this group.
Patients and methods We reviewed the records of eight morbidly obese patients and 16 consecutive patients with a BMI of <40 and undergoing percutaneous nephrolithotomy (PCNL) in our unit between November 1999 and April 2001. In the obese group the mean weight was 137.8 kg, with a mean BMI of 44.7 kg/m^2. In the normal group the mean weight was 75.4 kg and the mean BMI 25.7 kg/m^2. The operative duration, length of hospital stay, change in haemoglobin concentration and incidence of complications was compared between the groups.
Results For the obese and normal patients the respective mean (range) operative duration was 74 (50–97) and 74 (37–150) min, the mean postoperative haemoglobin change was -13 g/L and -14 g/L and the median hospital stay 5 and 4 days. In the obese group access was not achieved in one patient because of scarring from a previous PCNL. Of the obese patients, 85% were stone-free after surgery, compared with 94% of the normal patients. Complication rates were low in both groups.
Conclusion PCNL is feasible in the morbidly obese, with results that are comparable to those in normal patients. Morbidly obese patients should not be denied percutaneous renal surgery.

019

Holmium:YAG lasertripsy for ureteric calculi – is that stent really necessary?

M.S. Simms, M. Ashraf, R.J. Lemberger and M.C. Taylor *Kings Mill Centre for Health Care Services, Mansfield, UK*

Introduction Routine JJ stenting after holmium:YAG lasertripsy for ureteric calculi has been advocated by some institutions, although stents are associated with local discomfort and irritative LUTS. In our department we have avoided stenting wherever possible after stone fragmentation and we present our experience.
Patients and methods The notes and X-rays of patients undergoing ureteroscopy for ureteric calculi between 1995 and 2001 were reviewed. A 7.5 F Wolff rigid ureteroscope was used in all procedures and stones destroyed using a 20 W holmium:YAG

laser through a 365-μm fibre. Outcome measures included stone-free rates, number of repeat procedures and complications.
Results In all, 118 procedures were conducted in 107 patients (mean age 49.1 years); 102 patients were not stented and 16 had stents inserted after stone fragmentation. In the unstented group, follow-up was available in 98. There were 39 proximal, 13 mid and 46 distal ureteric calculi. Stone-free rates were 74%, 77% and 93%, respectively, and the number of patients who required repeat procedures in each group was six, none and one. In this group overall there was one ureteric stricture. In the 16 patients who were stented there were eight proximal, six mid and two distal ureteric calculi; six, three and two patients were rendered stone-free, respectively. There were two strictures overall in this group.
Conclusion It is clear that routine stenting is unnecessary after holmium lasertripsy for ureteric calculi.

020

Laparoscopic ureterolithotomy: technical considerations and long-term follow-up

D.D. Gaur, S. Trivedi, M.R. Prabhudesai and M. Gopichand
Bombay Hospital Institute of Medical Sciences, Bombay, India

Introduction Although laparoscopic ureterolithotomy has been reported in various studies the technical details and long-term complications have not been analysed. We report our 10-year experience of retroperitoneal laparoscopic ureterolithotomy.
Patients and methods Laparoscopic ureterolithotomy was undertaken in 108 patients between 1991 and 2001, all except one using the retroperitoneal approach. The mean (range) stone size was 16 (10–47) mm, and they were located in the upper ureter in 79, mid ureter in 13 and lower ureter in 16 patients. Twelve patients had more than one stone, with the maximum being six in a megaureter. Most stones were chronically impacted, the maximum period of impaction being 240 months.
Results Laparoscopic ureterolithotomy was successful in 101 patients. The overall average for urinary leak was 5.4 days, which was reduced to 3.2 days by stenting and suturing the ureter. The mean blood loss was 24.9 mL (range 5–100 mL) and the overall complication rate 10.5%. The incidence of ureteric stricture formation was 3.7%. No patient required morphine for pain relief and the mean for oral analgesics was 2.4 days. The mean hospital stay was 3.6 days and the mean for resuming work was 14.4 days.
Conclusions Laparoscopic ureterolithotomy is a fairly safe and reliable minimally invasive procedure, with acceptable long-term complications. The retroperitoneal approach should be the preferred access for these patients.

021

A 5-year experience of tubeless percutaneous nephrolithotomy

N.M. Harris, A.W. Wedderburn, S.G. Chiverton and B.H. Walmsley *St Mary's Hospital, Portsmouth, UK*

Objective To evaluate the safety and efficacy of undertaking percutaneous nephrolithotomy (PCNL) without placing a postoperative nephrostomy tube (PNT).
Patients and methods We retrospectively reviewed the notes of all patients undergoing PCNL at our institution, over the previous 5 years. The patients included three with transplanted kidneys and three with horseshoe kidneys. The size of stone and requirement for fragmentation, number of patients rendered stone-free, post-operative complications and length of hospital stay were analysed.
Results In all, 187 PCNLs were performed by two surgeons, of which 54 (29%) did not have a PNT. In the tubeless group the mean (interquartile range) stone size was 16 (12–20) mm, compared with 19 (15–21) mm in the PNT group. These differences were not significant ($P > 0.05$). In patients without PNT, 39 (72%) were rendered stone-free after a single PCNL, compared with 60% of patients with PNT. The mean (interquartile range) size of the residual fragments was 8 mm in both the tubeless group (4–12 mm) and the group with PNT (5–13 mm) ($P > 0.05$). Blood transfusion was required in three (5%) of the tubeless group and four (3%) in the PNT group. No patients developed sepsis or required subsequent placement of a nephrostomy tube for sepsis or obstruction. The mean hospital stay was 3 (2–3) days in the tubeless group and 4.8 (3–6) days in the PNT group ($P = 0.01$).
Conclusion The initial size of the stone, or of the residual fragments, did not appear to significantly influence the decision to place a PNT. The tubeless PCNL is a safe technique for the uncomplicated stone. It allows patients to be discharged home earlier and does not increase the incidence of postoperative sepsis or other complications.

022

Supracostal approach for percutaneous nephrolithotomy: a review of causes of pulmonary complications

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Objectives The supracostal approach during percutaneous nephrolithotomy (PCNL) gives good access to the upper calyx, renal pelvis, lower calyces and the upper ureter. Because it is anatomically close this approach has a potential risk of damage to the pleura and lung. This retrospective analysis was undertaken to quantify this risk and evaluate the causes of pulmonary complications.
Patients and methods Of the 850 PCNLs performed from September 1996 to July 2001, the supracostal approach was used in 302 patients (35.5%). Of these, 198 patients had a single supracostal tract while 104 had both a supracostal and an infracostal tract. All the patients had pulmonary evaluation before and after surgery to detect pleuroparenchymal damage. Sixteen patients developed postoperative pleural effusion; of these, seven needed a chest drain while others with a clinically insignificant pleural effusion were treated conservatively.
Results Patients who had a tract over the 10th rib, or were <18 years old, or had a malrotated kidney and medial tract were more prone to pleural effusion. There was no relation to the size of the nephrostomy tube or the number of tracts. None of these patients had major pleuroparenchymal pulmonary damage.
Conclusions A supracostal puncture is an indispensable method for the urologist for minimally invasive surgery. PCNL through a supracostal approach below the 10th rib accessed laterally in a normally placed kidney is safe and carries no undue risk to the lung and the pleural space.

Tuesday 25 June 14.00–15.30
Bladder Cancer
Chairmen: M. Wallace and H. Zincke

028

Discrepancies in the registration of bladder cancers

P. Crow and A.W.S. Ritchie *Gloucestershire Royal Hospital, Gloucester, UK*

Introduction The registration of malignancies allows the calculation of important epidemiological values, e.g. disease incidence and survival. Increasingly, funds are allocated and clinicians judged on this data. Discrepancies in the way malignancies are registered may introduce bias into values derived from cancer registries, both within the UK and internationally.
Methods Information on the way that bladder cancers are registered in the UK was sought from the UK Association of Cancer Registries (UKACR) and from the BAUS section of oncology. In Europe and the USA, the European Network of Cancer Registries (ENCR) and Surveillance, Epidemiology and End Results (SEER) were investigated, respectively. The findings were compared with the epidemiological values derived from the registries.
Results All regions of the UKACR have standardized their guidelines. They do not register pTa tumours, of any grade, or carcinoma *in situ* (CIS) as bladder cancers. Regions within the UKACR acquire their data differently; some use registry staff, others rely on hospital coding. The BAUS section of oncology includes pTa tumours and CIS as bladder cancers. Most European countries are members of ENCR and officially conform to the UKACR guidelines, but in practice the quality of data is variable. SEER includes both CIS and pTa tumours in its bladder cancer figures, under a noninvasive grouping.
Conclusion The registration of bladder cancers remains variable. The exclusion of CIS and pTa tumours from the UKACR may explain the lower incidence and higher mortality for bladder cancer in the UK than in the USA.

029

Is microscopic haematuria a urological emergency?

M.A. Khan, G. Shaw and A.M.I. Paris *Barts and The London NHS Trust, London, UK*

Introduction Recently, increased emphasis has been placed in the need to urgently review and investigate patients with a potential cancer. Considering this we retrospectively and prospectively assessed patients with microscopic haematuria attending the haematuria clinic, to determine the prevalence of urological pathology amongst these patients.
Patients and methods Between January 1998 and May 2001, 781 patients attended the haematuria clinic. Of these, 368 (47%) had a history of microscopic haematuria as detected by urine dipstick (median age 60 years, range 18–90). Each patient was investigated as follows: urine culture and cytology, renal ultrasonography, IVU, flexible cystoscopy, urea and electrolytes and PSA assay (where appropriate).
Results Urine cytology showed no malignant cells in any patient; in 143 patients (39%) it showed no red blood cells. All investigations were normal in these patients. Of the remaining 225 patients, IVU showed tumour in one (bladder), renal stones in 15 and an enlarged prostate in two. Renal ultrasonography detected no additional pathology. MSU detected only one case of UTI. Flexible cystoscopy revealed five patients with a bladder tumour (all with G1pTa), two urethral strictures, five bladder stones and enlarged prostates, six enlarged prostates alone and nine red patches in the bladder that showed one patient with CIS. No PSA level suggestive of prostate cancer was detected.
Conclusion These results show that nearly 40% of patients are referred with no cytological evidence of haematuria. Therefore, patients with dipstick microscopic haematuria should be confirmed by urine cytology before referral. Only six (0.02%) patients had a malignant pathology (all noninvasive). Hence, microscopic haematuria should be regarded as a separate entity to frank haematuria, and these patients do not need to be referred urgently to the haematuria clinic.

030

Serial isotope renography and GFR measurement identifies deterioration of renal function after urinary diversion

C.H. Briggs, J.A. Husain*, V.A.C. Ramani† and N.W. Clarke‡ *Hope Hospital, Salford Royal Hospitals Trust, *Christie Hospital NHS Trust, †Christie and South Manchester University Hospital NHS Trusts, and ‡Christie and Salford Royal Hospitals NHS Trusts*

Objective To establish the utility of serial isotope renogram/GFR measurements in predicting and preventing renal functional deterioration after urinary diversion.
Patients and methods In all, 190 patients undergoing urinary diversion for cancer-related pathology were reviewed; 132 (age range 38–90 years) were evaluable and records for 58 were incomplete or missing. Renal function was assessed 6–12 monthly by serial estimation of creatinine, diuresis renography/split function and isotopic GFR for a mean (range) of 9.4 (3–33) years. A decline of $>5\%$ in GFR was identified as a deterioration of renal function.
Results The mean (range) creatinine level before surgery, at 94 (41–141) μmol/L, did not change significantly afterward, at 106 (60–240) μmol/L. The mean GFR at 3 and 6 years was 67 and 64 mL/min/1.73 m^2, respectively. The GFR decreased in 38 (29%) patients. Of these, nine (23%) had an initial GFR of <50, compared with nine (10%) in the stable group. In the deteriorating group, 13 (34%) had urinary sepsis, 10 (26%) hypertension and three (8%) had both. Twelve (32%) had obstructed drainage to one or both kidneys. Of these, six underwent surgery for a uretero-ileal stricture and the deterioration stabilized after correction. There was no obvious cause for GFR deterioration in two patients (5%).
Conclusion Renal function deteriorates in a third of patients after ileal conduit urinary diversion; those with an initial GFR of <50, impaired upper tract drainage, hypertension and relapsing urosepsis are at increased risk. Regular isotope renogram/GFR surveillance increases the early detection of problems which, when corrected, may halt further deterioration.

031

The EMI study: a regional feasibility study for a randomized trial of adjuvant chemotherapy after definitive treatment for TCC of the bladder

M.G. Leahy, J. Brown*, W.G. Jones†, J.D.G. Kelly‡, S. Prescott§ and T. Roberts¶ *University of Leeds, *Northern and Yorkshire Clinical Trials and Research Unit, †Leeds Cancer Centre, ‡University of Newcastle, §Leeds Teaching Hospitals NHS Trust, and ¶Northern Centre for Cancer Treatment, Yorks, UK*

Introduction Cancer networks have the potential to contribute significantly to cancer research through collaborative studies. We conducted a feasibility study in the Northern and Yorkshire regions that attempted to recruit all eligible patients into a randomized trial of adjuvant chemotherapy after radical local treatment for muscle-invasive TCC of the bladder.
Patients and methods The target was to randomize 60 patients within 2 years. Consenting patients were registered at diagnosis; after primary therapy (cystectomy or radical radiotherapy, RRT), patients were assessed for fitness to start three cycles of MVAC chemotherapy within 12 weeks. If suitable, they were given further information and randomized if they consented.
Results The trial was activated in 20 hospitals with enthusiastic support; 354 patients were registered but 21% were unsuitable for RRT because they had metastatic disease or comorbidity. Of the remainder, half underwent cystectomy and half RRT. After cystectomy/RRT, 67%/81% were medically unfit for chemotherapy. Of the 15% eligible for randomization, 75% declined. The final number of patients randomized was six.
Conclusion This study shows that population-based cancer research within the NHS is feasible. In the present patient group there was a higher incidence of comorbidity than expected and many patients declined randomization. This experience is relevant to the development of the new National Cancer Research Network. The difficulty in recruitment in this area supports the recent decision by co-operative groups to collaborate in an international intergroup study to address the issue of adjuvant chemotherapy for bladder cancer.
Funding: NHS R&D Grant

032

Informed consent about options for diversion after cystectomy

D. Fawcett and E. Riddle *Battle Hospital, Reading, UK*

Introduction Counselling patients about to undergo cystectomy for invasive bladder cancer is a difficult task. There must be a balanced discussion about the types of urinary diversion or reconstruction.
Patients and methods In all, 74 patients underwent cystectomy carried out by one surgeon in the last 4 years. Most had full counselling by the surgeon on two occasions and by the nurse specialist on one. They therefore had three separate occasions to discuss the proposed surgery. Most were offered orthotopic reconstruction and an ileal conduit diversion. Ectopic reconstruction was discussed where appropriate.
Results Of the 74 patients, 21 (28%) chose orthotopic reconstruction. The reasons for the surgeon electing not to discuss orthotopic reconstruction were: insight and intellect; body habitus; social circumstances; co-morbidity; emergency cystectomy. The reasons for a patient rejecting orthotopic reconstruction were given as: perceived simplicity/historical robustness of ileal conduit diversion; operative duration/hospital stay; postoperative recovery/readmission/reoperation rate; fear of incontinence; others.
Conclusions Counselling patients about options after cystectomy is a very difficult and time-consuming task. The need for informed consent is paramount. Nevertheless, some patients are clearly only suitable for ileal diversion. Perhaps 25–30% of patients undergoing cystectomy will chose orthotopic reconstruction.

033

What is the role for routine abdominal and pelvic staging CT before radical cystectomy in invasive bladder cancer?

D. Dubey, P.J. Haslam, L.S.N. Murthy and D.J. Thomas *Freeman Hospital, Newcastle upon Tyne, UK*

Introduction To determine the accuracy of routine preoperative abdominal CT scans before radical cystectomy in patients with muscle-invasive bladder cancer.
Patients and methods The case records of 118 patients presenting with invasive bladder cancer between 1995 and 2000 were retrospectively reviewed. Details of radiological, operative and histopathological reports were recorded. The correlation between preoperative CT scan reports with intraoperative findings, bimanual examination and histopathological reports was evaluated.
Results Complete information was available in 101 of the 118 records examined. For patients who underwent radical cystectomy, the overall accuracy of CT staging for extravesical disease was 50%, with overstaging in 31% and understaging in 19% (sensitivity 43%, specificity 62%). The staging error remained similar, irrespective of the time interval between the CT and preceding transurethral resection. CT accurately detected lymph node metastasis in only one of 10 cases. Cystectomy was avoided in five (5%) patients in which CT showed evidence of advanced local (three)/distant (two) metastasis. However, all five patients had a fixed mass on examination under anaesthesia and were medically unfit for a cystectomy.
Conclusions In patients with muscle-invasive bladder cancer, routine abdominal and pelvic CT scans are of limited value in detecting extravesical tumour extension and lymph node metastasis. CT findings altered our line of management in a negligible number of patients.

034

Contemporary treatment of muscle-invasive bladder cancer in the UK – a snapshot

P. Whelan and S. Fowler* *Pyrah Department of Urology, St James's Hospital, Leeds and *Section of Oncology, BAUS, UK*

Methods The unedited data were recorded for 6 months in 1998 of $\geqslant$T2 bladder cancers. The outcome of treatment choices 18 months later was audited to give a 'snapshot' of contemporary UK practice.
Results Of 406 patients identified, 243 (59.9%) received definitive therapy for muscle-invasive bladder cancer; 138 were designated T2. Sixty-three received primary cystectomy and 40 were alive and free of disease at 18 months (63.3%); 75 received radiotherapy and 42 (56%) were alive and disease-free at 18 months. Forty-five patients staged as T3 underwent cystectomy; 26 (57.8%) were alive and well at 18 months, whilst 60 patients with T3 had radiotherapy, 19 of whom were alive and disease-free at 18 months (31.7%).
Conclusion The consistency of surgical outcome of patients with T2 and T3 bladder cancer is encouraging, and suggests a broadly uniform effective delivery of surgical therapy nationwide. Although only a 'snapshot' these values compare very favourably with single-institution reported series from Europe and North America, and question the received nostrums on numbers upon which the recent COG guidelines have been developed for this disease.

035

Radical cystectomy outcomes: the effect of delay on pathological stage and survival?

S. Masood, M.S. Naseem, H.R.H. Patel and G.R. Mufti
Medway Maritime Hospital, Kent, UK

Introduction We have previously shown that waiting for staging investigations and the actual surgical procedure delays radical surgery for urological cancers [*BJU Int* 2001; **88**: 16]. Radical cystectomy is one such operation that can be delayed in routine practice by these factors. However, the prognostic outcomes caused by this delay are unclear; this study attempts to address this question.
Patients and methods In all, 112 patients who underwent radical cystectomy for bladder cancer were analysed retrospectively. The indication for the operation, time from justification to surgery, clinical/pathological staging, follow-up, disease recurrence and mortality data were obtained from the case notes.
Results There was a median delay of 6 weeks from justification until surgery. Sixty patients underwent cystectomy within 6 weeks of the decision to operate (Group A), whereas 52 waited for >6 weeks (Group B). The stage distribution between the groups was similar. After cystectomy, 38% from Group A and 47% from Group B were pathologically up-staged. The difference between the two groups was not statistically significant ($P>0.5$). The cancer survival between the groups was also not significantly different, at 54/60 (A) and 49/52 (B); $P>0.07$.
Conclusions These results show that significant up-staging of disease occurred between preoperative staging to specimen staging, independent of the degree of delay. However, the delay in undertaking radical cystectomy did not appear to influence survival in the two groups.

Tuesday 25 June 14.00–15.00
Imaging
Chairmen: U. Patel and H. Whitfield

036

Magnetic resonance urography: a problem-solving tool for unexplained hydronephrosis

R. Chahal, J. Spencer, I. Eardley and S.N. Lloyd *St James's University Hospital, Leeds, UK*

Introduction Magnetic resonance urography (MRU) avoids radiation exposure and provides detailed noninvasive imaging of the upper urinary tract. We outline the clinical indications for MRU as a problem-solving tool for unexplained hydronephrosis.
Patients and methods Over a 2-year period, 17 patients were evaluated using HASTE-MRU (half-Fourier acquisition single short turbo spin-echo) and high-resolution thin-section T2-weighted imaging. Indications for MRU were (i) hydronephrosis or suspected upper tract pathology but with contraindications to IVU or CT; (ii) failed or equivocal retrograde contrast studies.
Results The pathologies identified on MRU were: intraluminal (calculi in pregnancy, two; ureteric tumour, four); mural (benign stricture, one); extraluminal (endometriosis, three; ectopic ureter into seminal vesicles, one; perivascular fibrosis, one; pericolic fibrosis (Crohn's) in one; uterine pressure, one). No pathology was detected in three patients, which helped to exclude ureteric pathology, noninvasively.
Conclusion MRU is a useful investigation when standard techniques are contraindicated or results are equivocal. It is particularly useful in patients with contrast-medium allergy, pregnancy or poor/absent contrast excretion. Access to MRI remains limited, and it is best reserved as a problem-solving tool. The high-quality images produced and the improved diagnostic potential promise a key role in diagnostic imaging of the upper urinary tract.

037

Unenhanced helical CT vs IVU for detecting ureteric calculi in patients with acute flank pain

N. Oakley, V.J. Nataranjan, D. White, M.C. Collins, R. Nakielny and E. van Beek *Royal Hallamshire Hospital, Sheffield, UK*

Introduction This study aimed to compare the sensitivity and specificity of unenhanced helical CT and IVU in the diagnosis of ureteric calculi causing acute flank pain.
Patients and methods The study was a prospective, blinded, paired-sample trial. Non-contrast spiral CT was undertaken immediately before IVU in patients attending as an emergency with acute flank pain. These were reviewed 3 months after entry into the study, while unaware of the clinical outcome, by consultant radiologists who reported both the presence or absence of ureteric calculus and upper tract changes. Patients were regularly reviewed by a consultant urologist and their clinical stone status recorded. The data were analysed statistically using McNemar's test.
Results Accrual has closed and complete data are presently available on 121 patients, of whom 64 had a diagnosis of ureteric calculus. For the diagnosis of upper tract abnormalities both IVU and CT had similar sensitivity (89% and 90%, respectively) and specificity (90% and 91%). However, for the specific diagnosis of ureteric calculus, CT had a significantly higher sensitivity (88% vs 57%, $P<0.01$) with no loss in specificity (97% vs 100%). Of those patients with no ureteric colic, CT identified significant pathology not seen on IVU, including ovarian malignancy, perirenal haematoma, diverticular disease and aortic aneurysm.
Conclusion IVU is unlikely to miss significant ureteric pathology but it does not provide the same accuracy of diagnosis as spiral CT, especially for calculus disease. This, in addition to its ability to identify other pathology with its logistical benefits, confirms unenhanced spiral CT as the gold standard investigation for acute flank pain.
Funding: Pilot grant, Central Sheffield University Hospitals

038

Re-asking the question: renal ultrasonography in the prostate-assessment clinic – is it necessary?

Y.Z. Almallah, R. Das, R. Manns*, R. Orme, S.W.V. Coppinger and C.J.M. Beacock *Royal Shrewsbury Hospital and *Princess Royal Hospital, Telford, Shropshire, UK*

Introduction Imaging of the upper urinary tract in patients presenting with LUTS is controversial, with reported wide variation in practice in different centres across the UK. The aim of this study was therefore to determine whether routine renal ultrasonography is necessary in evaluating patients with LUTS.
Patients and methods Between June 1999 and May 2000, new routine referrals from GPs to the prostate clinic of patients with LUTS were assessed retrospectively. All patients (median age 66 years, range 54–93) had the following tests: PSA, serum urea and creatinine, urine analysis, flow-rate studies, plain X-ray and ultrasonography of the urinary tract, postvoid residual (PVR) volume and IPSS questionnaires.
Results In all, 268 consequent patients with LUTS were identified; 161 (60%) patients had an entirely normal urinary tract on ultrasonography and 223 (83%) an entirely normal upper urinary tract scan. If simple renal cysts were considered as normal variation, 254 (95%) of the patients had a normal upper urinary tract scan. Six patients (2.2%) had pelvicalyceal dilatation (one mild, two moderate, three severe), five (1.8%) had asymptomatic kidney stones and three (1.1%) were diagnosed with asymptomatic RCC. All patients with severe hydronephrosis had a raised serum creatinine, while all those with mild to moderate hydronephrosis had a PVR of >500 mL. Four of the five patients with renal stones had microscopic haematuria. Patients with asymptomatic RCC had no microscopic haematuria.
Conclusion Apart from RCC, upper tract pathology can be identified with simple tests in the prostate-assessment clinic, with no need for renal ultrasonography.

039

Sensitivity and specificity of ultrasonography for testicular malignancy: analysis of 1528 examinations

R.W.A. Jones, B. Patel, M. Nelson, M. Calaway, J. Kabala and R.A. Persad *Bristol Royal Infirmary, Bristol, UK*

Introduction and objectives Reports of the diagnostic accuracy of ultrasonography (US) for testicular tumours have varied, particularly in specificity. We aimed to determine the sensitivity and specificity of US for testicular tumours in current practice.
Materials and methods The reports from all testicular US undertaken over a 2-year period at a tertiary hospital were analysed retrospectively and cross-referenced with the local pathology database for the histological diagnosis of testicular tumour. Where the US report indicated testicular tumour, clinical details were reviewed.

Results Of 1528 cases in which US was used for varying indications, 22 were a US diagnosis of testicular tumour (1.4% of scans). Of these, the histology was malignant in 19 and benign in three cases (atrophy, fibrosis, congenital malformation). Twenty-three patients were identified with the histological diagnosis of testicular malignancy over the same period, 20 of whom had been correctly diagnosed on preoperative US (one before the study period) and three of whom had not undergone preoperative US. The sensitivity and specificity of US for testicular malignancy was 100% and 99.8%, respectively. Clinical details were available for 20 of the 22 patients with positive US reports; a palpable abnormality had been found in all cases before US.
Conclusions Testicular malignancy was diagnosed in 1.4% of 1528 consecutive testicular US examinations, with a sensitivity of 100% and specificity of 99.8%. No tumours were identified in a palpably normal testis. US currently achieves nearly complete diagnostic accuracy for testicular malignancy, higher than previously reported.

040

The use of ^{11}C-choline for PET in early prostate cancer

L.E.F. Moffat, A. Welch, F. Chilcott and M. Brooks *Aberdeen Royal Infirmary NHS Trust, Aberdeen, Scotland*

Introduction Conventional methods of PET imaging involve ^{18}F-deoxyglucose as a tracer. Because early prostate cancer has a relatively low metabolic rate there have been difficulties in distinguishing benign from malignant tissue. We have developed a ^{11}C-choline tracer, as described previously [*J Nucl Med* 1997; **39:** 990–5].
Methods ^{11}C-choline was synthesized by passing $^{11}CO_2$, prepared in a cyclotron, into a solution through a standard methyl iodide synthesis unit and then through a choline-preparation cartridge. ^{11}C has a half-life of 20 min and the injected radiation dose of 370 MBq gives an exposure of 1.4 mSv. The preliminary transmission scan takes 10 min and the full study a further 20 min.
Results After verifying the scan in three patients, and accruing at the rate of one patient per week, we confirmed that ^{11}C-choline allows the prostate to be identified, and visualizes malignant areas, as defined by malignancy in TRUS biopsy and abnormality on MRI. Urinary activity was low, allowing easy interpretation. This method may also quantify tumour activity and metabolism, as the standardized uptake value can be calculated.
Conclusions This is an exciting new method of delineating prostate tumours and may add to conventional staging methods, as we will demonstrate with multiplanar images with 3-D projection.
Funding: Aberdeen Royal Infirmary Endowment Fund

Tuesday 25 June 15.15–17.00
Testis Cancer
Chairmen: D. Kirk and T. O'Brien

041

Audit reviewing the management of testicular tumours

M.C. Gupta, A. Haq*, S.J. Wood†, P.J. Donaldson* and A. Doble *Addenbrooke's Hospital, Cambridge, *The Ipswich Hospital, and †Norfolk and Norwich Hospital, UK*

Introduction Before the advent of cisplatin chemotherapy early diagnosis and immediate orchidectomy for testicular tumour was paramount. More recently, with the survival rate being >95%, there has been a tendency to treat these patients as less of an emergency. The NHS 2-week deadline and COG guidelines of referral of patients to specialist testicular MDTs within 24 h of surgery has highlighted the need for expedient diagnosis and specialist treatment. This retrospective audit of 72 patients with testicular cancer traces the patients' journey from the time of first consultation with a medical practitioner to definitive therapy.
Patients and methods We reviewed the hospital records of 72 patients in three large centres in one region, who underwent surgery for testicular cancer, most before the advent of the 2-week NHS deadline. The time intervals from onset to GP consultation, referral to urology appointment, appointment to orchidectomy, orchidectomy to staging and further oncological therapy were noted.
Results The results show a delay in patients seeing their GP after the onset of symptoms. The patients' journey through urology was short, with expedient outpatient review and subsequent orchidectomy. A significant proportion of time was spent awaiting staging investigations. The median (range) intervals in days were:

	Centre (n)			
Delay	*1*	*2*	*3*	*Total*
Number	25	25	22	72
Onset to GP	28 (0–360)	60 (6–1800)	30 (1–360)	30 (0–1800)
OPA	7 (1–90)	6 (0–59)	3 (0–30)	6 (0–90)
OD	7 (1–150)	13 (3–116)	4 (1–42)	8 (1–150)
Staging	14 (1–35)	16 (2–239)	30 (1–90)	15 (1–239)
Treatment	21 (4–90)	24 (6–53)	14 (3–60)	21 (3–90)

Conclusion Most patients with testicular tumours are seen and operated upon within 2 weeks. Significant improvement in the delivery of treatment requires an enhancement in diagnostic facilities. Patients are still delaying in presentation to primary care and this stresses the need for continued patient education.

042

Is the 2-week rule for cancer referrals working for testicular cancer?

C.J. Luscombe, A.P. Doherty, A. Elves and D.M.A. Wallace *University Hospital, Birmingham, UK*

Introduction Since 1 December 2000 patients referred from primary care with suspected testicular tumours should be seen by secondary care within 2 weeks. Does this policy accelerate the diagnosis of testicular cancer?
Patients and methods Since 13 July 1995 all patients referred to our institution with testicular abnormalities have been seen at a dedicated clinic, and assessed by clinical examination and scrotal ultrasonography. The time from referral to diagnosis of testicular tumour at this clinic was compared before and after 1 December 2000.
Results In all, 2292 patients were assessed between 13 July 1995 and 30 November 2001. Before 1 December 2000 the median delay before assessment of all patients was 16 days, and 8 days for the 67 patients diagnosed as having testicular tumours. After that date, patients referred as 'urgent' were seen at a median of 9 days (97 patients) and 57 days for 'routine' referrals (258 patients). However, only two tumours were identified in the 'urgent' group, compared with 11 in the 'routine' group. Thus, in the year after the introduction of the 2-week rule, the time to diagnosis of testicular tumour increased significantly ($P = 0.001$), to a median of 37 days. The tumour detection rate remained static (3.8% vs 3.7%). Logistic regression analysis failed to identify significant predictors of cancer which could aid prioritization.
Conclusions Paradoxically, the diagnosis of testicular tumours has been delayed by the 2-week rule. Inappropriate prioritization forces the wrong patients to be seen urgently. Consequently, patients referred routinely, including most patients with testicular tumours, now wait longer for assessment.

043

Does handling a malignant testicle disseminate cancer?

G.H. Rix, R.G. Mason, Z. Abbasi, G.S. Stones, M.A. McIntyre and T.B. Hargreave *Western General Hospital, Edinburgh, UK*

Introduction It is traditional to clamp the base of the spermatic cord before surgically exploring suspected malignant testicular tumours. The theory is that this prevents iatrogenic dissemination of malignancy, although no proof exists for this practice. We compared the cord fluid of a control group of cords isolated before orchidectomy with a that in a standard radical orchidectomy group, to see if clamping prevents malignant dissemination.
Patients and methods Patients undergoing orchidectomy for testicular cancer had a soft clamp applied to the proximal cord before mobilizing the testicle. A further soft clamp was applied to the distal cord just above the testicle, to isolate the cord and its contents, either before (isolated group) or after a standard radical orchidectomy (standard group). Cord fluid was examined to identify malignant cells.
Results To date, 23 tumours have been assessed; nine in the isolated group and 14 in the standard group. Fifteen patients had seminomas and of these seven had tumour cells detectable in their cord blood (five in the standard and two in the isolated group). The eight teratomas (three standard and five isolated) had no tumour cells in cord fluid ($P = 0.04$). The numbers of cells found in positive cord fluid for both standard and isolated groups were similar.
Conclusions Tumour cells are continuously being shed into the lymphovascular system. Seminomas are significantly more likely to shed tumour cells than teratomas. The numbers of tumour cells are similar whether the cord is isolated or not, so it appears that clamping the cord before testicular manipulation does not significantly influence tumour seeding.

044

Testicular pain as the initial presentation of testicular neoplasms

J.R. Wilson and G. Cooksey* *York District Hospital, York and *Princess Royal Hospital, Saltshouse Road, Hull, UK*

Introduction Testicular neoplasms reportedly present with testicular pain in 0.01–10% of patients. The diagnosis of tumour may

therefore not be considered immediately with this mode of presentation, leading potentially to delays in diagnosis and poorer prognosis, or scrotal exploration for suspected torsion.
Patients and methods A retrospective casenote analysis was undertaken of 122 patients undergoing radical inguinal orchidectomy over an 11-year period in a large district hospital. Data on presenting symptoms, histology, clinical stage and long-term outcome were collected.
Results Overall, 54% of patients histologically had seminomas, 21% teratomas, 13% mixed seminoma/teratoma, 6% lymphomas and 6% miscellaneous tumours. The age ranges of the patients for each neoplasm were as reported elsewhere. Twenty-seven of 115 (23%) of patients presented initially to their GP or local accident and emergency department with testicular pain, but this was not statistically significant ($P>0.05$) for either the histological subtype or clinical tumour stage at presentation.
Conclusion Testicular neoplasms should be considered earlier in patients presenting with testicular pain, as this may be more common than previously reported.

045

High-frequency colour Doppler ultrasonography of focal testicular lesions: crossing vessels ('criss-cross') pattern identifies primary malignant tumours

S. Sriprasad, L. Bushby, W.H. Choi, P.S. Sidhu and G.H. Muir *King's College Hospital, London, UK*

Introduction Technological developments in ultrasound probes have improved both B-mode and colour Doppler imaging, allowing a more detailed evaluation of intratesticular lesions. We evaluated the vascularity of intratesticular lesions, to identify patterns of malignant vascularity.
Patients and methods Over a 2-year period, 2032 consecutive patients underwent scrotal ultrasonography (US), examined using a 15L8w multifrequency (8–13 MHz) linear array probe (Acuson, CA, USA). If a focal testicular lesion was identified, the abnormality was re-examined using colour Doppler mode (7–14 MHz). The US diagnosis of the abnormality was correlated with histology.
Results In all, 43 focal abnormalities were identified; there were 31 testicular tumours, three arterio-venous malformations, four testicular infarcts, two epididymal abscesses, and three were manifestations of a 'two-tone' testis. Twenty-seven patients had primary testicular tumours (seminoma and teratoma). Of these, 26 patients had a disordered 'criss-cross' pattern of vascularity ('criss-cross' sign). The four testicular tumours that did not have this vascular pattern were diagnosed histologically as a Leydig cell tumour, secondaries from adenocarcinoma of the prostate and myeloid leukaemia. For the diagnosis of common testicular tumours (seminoma and teratoma) this vascular sign has a sensitivity and specificity of 100%.
Conclusion The presence of the 'criss-cross' vascular pattern allows a confident diagnosis of primary testicular tumours, although not differentiating seminomas from teratomas. With improvements in probe technology, the vascularity of testicular tumour is an important differentiating feature.

046

Does retroperitoneal lymphadenectomy require a different approach in the presence of a horseshoe kidney?

C.P. Evans, A. Saffarian, H. Tunuguntla, T. Thompson and C.G. Wood* *University of California, Davis School of Medicine and *University of Texas, MD Anderson Cancer Center, USA*

Introduction Horseshoe kidney is the most common of renal fusion anomalies. An aberrant and sometimes unpredictable arterial supply of horseshoe kidneys demands meticulous modifications to conventional surgical technique. We present two approaches to retroperitoneal lymph node dissection (RPLND) in the presence of a horseshoe kidney, in two patients.
Case reports Case 1: a 24-year-old man with a T2N2M0 mixed germ cell tumour and with an incidental horseshoe kidney was managed with three cycles of cisplatin-etoposide-bleomycin (PEB) chemotherapy. A CT angiogram revealed four arteries (one main artery to each kidney and two to the isthmus) supplying the horseshoe kidney. A transmesenteric complete RPLND was performed for residual peri-aortic teratoma. Case 2: a 22-year-old man with an incidental horseshoe kidney and a T1N2M0 non-seminomatous mixed germ cell tumour was managed with three cycles of PEB followed by complete bilateral RPLND for residual teratoma. He underwent complete mobilization of the mesentery and retroperitoneal exposure on both sides.
Results The CT angiogram was critical for surgical planning in both cases. Isthmus division was not necessary in either patient. The surgical approach varied based on CT findings.
Conclusions RPLND needs individual innovative modifications in the presence of a horseshoe kidney for it to be safe and effective. Division of the isthmus is not recommended in the presence of functional and vascular isthmic parenchyma. Proper preoperative evaluation of vascular anatomy by CT angiogram with 3D-reconstruction is extremely useful for vascular mapping and safe surgery.

047

Late relapse after orchidectomy for non-seminomatous germ cell tumours: the worse prognosis may be a result of more adverse histology in the postchemotherapy RPLND specimen

M.C. Hayes, A. Norman, D.P. Dearnaley, R.A. Huddart, W.F. Hendry and T.J. Christmas *Royal Marsden Hospital, London, UK*

Introduction Relapse late after orchidectomy for non-seminomatous germ cell tumours (NSGCT), either on surveillance or after platinum-based chemotherapy, is said to carry a worse prognosis than early relapse. Our aim was to determine if there are histological differences in postchemotherapy retroperitoneal lymph node dissection (PC-RPLND) specimens between late and early relapse patients that might explain this.
Patients and methods A database of 668 men who underwent PC-RPLND by two surgeons between 1976 and 2001 was used to compare the histology of those having PC-RPLND within 2 years of orchidectomy (early relapse) or later (late relapse). The histological diagnosis was in four groups: necrosis/fibrosis (NEC), differentiated teratoma (TD), malignant teratoma undifferentiated (MTU) and carcinoma/sarcoma (CAR/SAR). Data were analysed by Fisher's and chi-squared tests.
Results The table shows the values for histology (% in brackets).

Group	*Early*	*Late*	*Total*
NEC	133 (24.8)	16 (12.1)	149 (22.3)
TD	313 (58.4)	57 (43.1)	370 (55.4)
MTU	81 (15.1)	44 (33.3)	125 (18.7)
CAR/SAR	9 (1.7)	15 (11.4)	24 (3.6)
Total	536	132	668

There was a significantly greater incidence of both MTU and CAR/SAR (both $P<0.001$) in the late relapse group. The CAR/SAR group had a bad prognosis, with a mortality of nine/24 (37.5%).
Conclusions This study highlights the potential dangers of late relapse of testicular NSGCT. Dedifferentiation to MTU or CAR/SAR is more likely to occur late after orchidectomy. Although MTU may produce high tumour marker levels, CAR/SAR does not. It is therefore important to maintain long-term surveillance with both tumour markers and scans to identify relapse in men with NSGCT.

Tuesday 25 June 15.45–17.00
Andrology
Chairmen: I. Eardley and D. Ralph

048

Severe distress in men with erectile dysfunction: what is the cost?

P. Tirukonda, S.N. Lloyd, J. Cartledge, D. Allwood and I. Eardley *St James University Hospital, Leeds, UK*

Introduction Prescribing regulations for men with erectile dysfunction (ED) were introduced in 1998. Apart from men treated before September 1998 and men with a variety of specific causes for their ED, only patients with 'severe distress' were entitled to NHS prescriptions.
Methods In our trust a semiautomated system for the provision of repeat prescriptions for men with 'severe distress' was instituted in November 2000. Patients in this scheme were assessed after 12 months by telephone questionnaire and a review of case records.
Results In all, 123 men had been diagnosed as having severe distress and had been stabilized on effective treatment. Fourteen received intracavernosal alprostadil and 109 received sildenafil. At the time of follow-up, 108 men continued to receive regular prescriptions from the Trust. Reasons for stopping include illness of the patient or partner and lack of efficacy. For those on continuing therapy, none has purchased 'extra' supplies via private prescription. Of the patients using sildenafil, 28% had minor complications. In the first year, 1728 tablets of sildenafil 50 mg, 1512 tablets of sildenafil 100 mg and 408 alprostadil injections were prescribed. The total prescribing cost was >£25 000.
Conclusion The drug costs to our Trust in the first year of a semi-automated system for providing repeat prescriptions to patients with 'severe distress' has been >£25 000. Added to this have been the costs for consultations and follow-up. With time such costs may place a considerable burden upon urological budgets.

049

Vasectomy reversal – his problem or theirs? – current practice of UK urologists in assessing and counselling patients before vasal reconstruction

A. Thompson and S.R. Payne* *Stepping Hill Hospital, Stockport and *Manchester Royal Infirmary, UK*

Introduction The Royal College of Obstetricians & Gynaecologists Guidelines suggest that infertile couples should be assessed and counselled together. This study examines whether men seeking vasectomy reversal are managed according to this evidence-based guidance.
Methods A postal survey was undertaken of 544 UK urologists, exploring individual practices regarding the assessment and counselling of couples before vasovasostomy.
Results In all, 312 questionnaires were returned (58%); 42 urologists did not undertake vasovasostomy and four were discarded, leaving 270 evaluable responses. Most surgeons preferred to see both partners, but only 7.4% insisted on it; 28.5% expressed no wish to see the woman. Assessment of the women's factors influencing the couple's fertility was poor; 13.3% of surgeons failed to ascertain the woman's age, 51% made no enquiry about either her menstrual cycle or previous pelvic inflammatory disease and 30% did not ask about her previous surgical history. Only 40% of respondents gave full counselling about alternative methods of parenting; 44.4% held a brief discussion and 15.6% avoided the issue; 92.6% talked about *in vitro* fertilization techniques but artificial insemination and adoption were discussed by only 60.7% and 48.1% of surgeons, respectively. Although 84.4% of surgeons requested postoperative semen analysis, only 25.6% quoted their audited success rates before undertaking vasovasostomy.
Discussion There is tremendous variation in the practice of UK urologists when evaluating and counselling couples presenting for vasectomy reversal. In particular, they are poor at assessing female factors that might influence the outcome from this surgery and giving advice about alternative methods by which the couple might become parents.

050

Percutaneous epididymal sperm aspiration (PESA) after vasectomy: do patient age and interval since sterilization affect the characteristics of retrieved sperm?

S. Islam, D.C. Shackley, D. Falconer* and S.R. Payne *Manchester Royal Infirmary, and *Manchester Fertility Services, Manchester, UK*

Introduction PESA can be offered to men who have had a failed vasovasostomy to provide sperm for use in an *in vitro*-based reproductive technique. This study evaluated the effect of various factors on the characteristics of the sperm obtained.
Patients and methods Fifty-six azoospermic patients (median age 43 years, range 30–75) who underwent PESA between 1997 and 2001 after previous vasectomy/failed vasovasostomy, were assessed. One urologist undertook all sperm retrieval, which was followed by analysis of the concentration/motility of the fresh (and subsequent post-thaw) specimens by an embryologist. The patient age and time since initial vasectomy were assessed, with patients being analysed in 10- and 5-year cohorts, respectively.
Results All patients had motile sperm extracted from one or both epididymides, with the median (range) number of needle passes/side being 1 (1–3). The mean sperm concentrations (per mL) in extracted fresh PESA fluid were: (i) related to patient age (years): 11×10^6 (30–39); 19×10^6 (40–49), 15×10^6 (50–59) and 20×10^6 (>60); (ii) relating to the interval since vasectomy (years): 14×10^6 (1–5), 15×10^6 (6–10), 21×10^6 (11–15), 14×10^6 (16–20), 12×10^6 (21–25) and 10×10^6 (>26). There was no apparent trend in progressive sperm motility in either analysis. In addition, the post-thaw sperm characteristics were similar in all groups.
Conclusions After vasectomy neither patient age nor length of time since sterilization affected the concentration or quality of sperm extracted by PESA. Motile sperm were extracted in all cases.

051

Preliminary results of a South-Thames regional penile cancer audit

C. Kouriefs, B.G. Chappell*, P. Thomas* and N.A. Watkin† *St Helier Hospital, Carshalton, *Royal Sussex County Hospital, Brighton, and †St George's Hospital, London*

Introduction Penile malignancies are very rare; the reported incidence (Department of Health) is 0.9–1.2/100 000/year. In the absence of randomized control trials the management of these tumours is controversial. We report the preliminary results of a regional audit of the management of penile malignancies.
Methods The medical notes and histology reports of 132 cases of penile carcinoma were reviewed retrospectively. Most (91.7%) were primary penile malignancies (105 squamous cell carcinomas,

seven verrucous carcinomas, two sarcomas, two melanomas, five carcinoma *in-situ*) with only 11 (8.3%) penile metastases.
Result The median age at presentation was 66 years. Balanitis xerotica obliterans was found in 20.9% of cases; 29 cases (25.9%) had clinical lymphadenopathy at presentation, of which 75% were confirmed to be malignant and 25% reactive. Only 9% of patients with clinically negative lymph nodes had malignant lymphadenopathy. Two-thirds of the patients were treated with penile-preserving therapies (PPT) and a third with surgical amputation. At a mean (range) follow-up of 42.8 (1–210) months, the overall local recurrence and regional/distant progression rates were 31.4% and 21%, respectively. The local recurrence rate after PPT (40.5%) was statistically higher than after penile amputation (8.1%), whereas the regional/distant progression rates were 18.9% and 21.6%, respectively ($P>0.05$). Local recurrences after PPT were, surgically or otherwise, salvageable and did not alter patient survival.
Conclusion Penile amputation carries immense psychosocial morbidity; most clinicians therefore favour PPT. These therapies are associated with a higher local recurrence rate, but with appropriate case-selection and close follow-up they appear to be effective, with significantly lower morbidity.

052

Organ-sparing surgery for T1N0M0 penile squamous cell carcinoma

J.S. Kalsi, M. Arya, R. Rees, S. Minhas and D.J. Ralph *The Institute of Urology, London*

Introduction Radical treatments for T1N0M0 squamous cell carcinoma (SCC) of the penis includes total or partial penectomy and radiotherapy, all of which can lead to a considerable cosmetic, psychological and functional deformity, with resultant erectile dysfunction. The aim of this study was to assess the outcome of the conservative therapy of glans excision with split skin grafting in the treatment of early penile carcinoma.
Patients and methods Between 1999 and 2001, seven patients (mean age 55 years, range 43–74) underwent glans excision and penile reconstruction with a partial thickness skin graft. Preliminary biopsy of the lesions and preoperative MRI confirmed T1 disease in all patients. All patients underwent postoperative MRI and were asked about the cosmetic appearance of their penis after surgery. Six months after surgery their erectile function was assessed using the International Index of Erectile Function – 5 questionnaire.
Results The tumour was completely excised in all cases, with negative surgical margins. The histology of the tumour was G1 carcinoma in two patients, G2 in three, mixed G2/G3 in one and G3 in one. No local recurrences were found clinically or on MRI at a mean follow-up of 17 months. The cosmetic results were excellent in all patients and six of the seven were potent and having satisfactory sexual intercourse. The remaining patient had erectile dysfunction which was successfully treated with sildenafil.
Conclusion Glans excision and reconstruction with a split skin graft for T1N0M0 SCC of the penis is effective in managing the primary tumour whilst providing excellent cosmesis and maintaining erectile function.

053

The insertion of a penile prosthesis for erectile dysfunction and the management of complications: a review in 447 patients

J.S. Kalsi, A. Minervini, R. Rees, S. Minhas, D.J. Ralph and J. Pryor *The Institute of Urology, London*

Objective To evaluate the long-term results of penile prosthesis surgery in the management of erectile dysfunction, and to further analyse the management of the complications arising from inserting penile prostheses.
Patients and methods In all, 447 men (mean age 52 years, range 21–78) had 504 penile prosthesis implanted between August 1975 and December 2000; 404 were primary implants and 43 secondary; 393 were malleable, 81 were three-piece inflatable and 30 were inflatable self-contained devices. The outcome was assessed from the medical records, with a mean (range) follow-up of 50 (1–297) months. In particular, the complications arising from prosthesis insertion, and the associated predisposing factors were analysed. The management and outcome of patients with complications was recorded.
Results Twenty-two patients were lost to follow-up and 26 (5.8%) had their prosthesis removed and not replaced. The success rate of the primary operation was 90.8%, which decreased to 80.5% for the first revision and to 62.5% for second. Eight patients developed a penoscrotal haematoma and all were managed conservatively; 25 had a superficial wound infection but none required removal of the prosthesis. Thirty-three had delayed deep infection and all required prosthesis removal. Of the prostheses which became infected, 17 (4.7%) were malleable, 10 (16.4%) were three-piece inflatable and six (24%) were self-contained. Thirteen patients went into urinary retention after surgery but all subsequently passed a trial without catheter. Sixteen developed erosion of the prosthesis, and all had their prosthesis removed and replaced. After cavernosal erosion, 11 prostheses were malleable (4.4%), four were three-piece inflatable (6.6%) and one was self-contained (4%). There was no correlation between diabetes and the rate of prosthesis infection.
Conclusions Most patients (84.7%) who undergo penile prosthetic surgery are extremely satisfied with the result. The surgery is associated with a low complication rate and a good long-term outcome. Diabetes does not predispose the patient to a higher risk of prosthesis-related infection. However, the type of prosthesis (self-contained or three-piece) is associated with a higher risk of infection. Penoscrotal haematoma with no evidence of infection may be managed without inserting a drain. Deep infection and cavernosal erosion should be treated by removing the prosthesis, whereas superficial infection is adequately managed with broad-spectrum antibiotics.

Wednesday 26 June 10.30–11.45
BPH
Chairmen: C. Chilton and R. Pocock

059

Transurethral holmium laser enucleation of the prostate (HoLEP) compared with conventional TURP for prostates of <100 g: a randomized prospective clinical study with a 1-year follow-up

S. Ahyai, K. Lerhich, E. Kilic and R.M. Kuntz *Auguste-Viktoria-Hospital*

Introduction The effectiveness and outcome of HoLEP and TURP were investigated in a randomized prospective trial comprising 100 patients in each group. The results are presented only for those patients who have completed the 1 year follow-up assessment.
Patients and methods To date, 124 urodynamically obstructed patients have completed the 1-year follow-up assessment (62 randomized to HoLEP and 62 to TURP). HoLEP was performed with a high-power holmium:YAG laser at 80–100 W (2.0 J, 40–50 Hz) and 550 nm bare laser fibres. The AUA symptom scores, peak urinary flow rates and postvoid residual urine volumes were evaluated before and at 1, 6 and 12 months after treatment; all complications were recorded.
Results The results were:

*Mean (range) or *median*	*HoLEP*	*TURP*	P†
Age, years	68.9	68.1	NS
Prostate weight, g	54.5 (20–92)	51.2 (20–99)	NS
Resected tissue, g	34.6 (11–88)	37 (12–80)	NS
Operation time, min	93.7	76.2	<0.001
Haemoglobin loss, g/L	13	27	<0.05
Catheter time, h	24*	48*	<0.001
Hospital stay, h	48*	72*	<0.001
Complications, n			
Arterial bleeding	1 (1.6)	1 (1.6)	
Blood transfusion	0	2 (3.2)	
Re-catheterization	0	2 (3.2)	
Apical resection	0	3 (4.8)	
Urethral stricture	1 (1.6)	0	
Bladder neck contracture	2 (3.2)	0	
Stress incontinence (grade III)	1 (1.6)	1 (1.6)	
Total	5 (8)	9 (14.5)	

†Mann–Whitney *U*-test.

Both HoLEP and TURP resulted in lasting pronounced and significant improvements of AUA symptom scores, peak urinary flow rates and postvoid residual urine volumes, but the differences between the HoLEP and the TURP group were not significant.
Conclusions HoLEP seems to be an alternative to TURP, with equally good functional results, a longer operation time, but less blood loss, a lower complication rate and a shorter catheter time and hospital stay.

060

Holmium laser resection of the prostate (HoLRP) vs TURP: results at 4 years

P.J. Gilling, A. Westenberg, K. Kennett and M.R. Fraundorfer *Tauranga Hospital, Tauranga, New Zealand*

Introduction The durability of recently introduced less-invasive alternatives to TURP is often questioned primarily because there are few data. To date only 2 years of results have been reported for HoLRP. A randomized trial with all patients treated >4 years previously is presented to assess the durability of both HoLRP and TURP.
Patients and methods In all, 120 urodynamically obstructed patients were initially randomized (1 : 1) to HoLRP or TURP. AUA scores, maximum flow rate (Q_{max}), quality of life (QoL) scores, continence, potency and adverse events were assessed before and at 1, 3 and 6 months, and 1, 2 and 4 years after treatment.
Results Seventy-three patients were available for review; over the 4-year period there were also 11 deaths (four HoLRP and seven TURP) and 13 re-operations, with five after HoLRP (three bladder neck incisions, BNI, one re-operation, one stricturotomy) and eight after TURP (three BNI, four re-operations and one AUS placement). The additional 23 patients could not be located or refused follow-up. The mean (range) values at 4 years for the AUA score, Q_{max} and QoL score were respectively: HoLRP (42); 5.2 (0–21), 22.3 (5–58) mL/s and 1.1 (0–4); TURP (31); 6.6 (1–20), 18.5 (3–44) mL/s and 1.4 (0–5). There were no significant differences between the groups. Continence and potency were similar.
Conclusions HoLRP is as effective and durable as TURP when both procedures are assessed at 4 years.
Funding: Pub Charity Inc.

061

Interstitial laser ablation of the prostate – a randomized prospective study and 4-year follow-up

P. Chandrasekar, F. Kapasi and J. Virdi *Princess Alexandra Hospital, Harlow, England*

Introduction A prospective study was conducted to evaluate the safety and efficacy of interstitial laser therapy (ILC; diode laser 830 nm) to produce coagulation necrosis of prostatic adenomas of ⩽60 g, against standard TURP.
Patients and methods From January 1997 to September 2001, 138 patients with BPH entered the study (mean age 68.5, range 52–85; mean prostate weight 35.6 g, range 20–60); randomization was 2 : 1. Ninety-two patients were treated by ILC using the Indigo 830e™ laseroptic system and 46 underwent standard TURP using a continuous irrigating resectoscope. Variables assessed were the IPSS, QoL, maximum uroflow (Q_{max}), postvoid residual volume and TRUS findings; biochemical variables were PSA and serum creatinine.

Results The mean (SD) values during the follow-up were:

	ILC (92)			*TURP (46)*		
Follow-up	*IPSS*	*QOL*	Q_{max}	*IPSS*	*QOL*	Q_{max}
Before	20.3 (5)	4.1 (1)	8.4 (2)	20.4 (5)	3.8 (1)	18.4 (2)
6 weeks	10.8 (6)	2.6 (1)	16.4 (6)	7.7 (6)	1.6 (1)	20.8 (8)
1 year	6.8 (6)	1.6 (1)	17.6 (6)	5.7 (5)	1.1 (1)	19.2 (8)
2 year	6.8 (5)	1.8 (1)	17.6 (7)	6.4 (5)	1.1 (1)	16.6 (7)
3 year	5.6 (4)	1.4 (1)	17.5 (7)	5.1 (4)	1.1 (1)	20.8 (9)
4 year	8.3 (7)	1.8 (1)	18.5 (5)	7.2 (7)	1.2 (1)	17.2 (5)

*$P < 0.001$.

Retrograde ejaculation was recorded in 41% of patients after ILC, compared with 72% after TURP. No blood transfusion was recorded for ILC, compared with 8.7% for TURP. Irritative symptoms lasted for 6 weeks after ILC in 10.8% and in 2.2% after TURP. The catheter-free trial at 48 h failed after ILC in 8.7% (three patients required endoscopic desloughing) and in 2.2% after TURP. In the ILC group, 3.3% (one each at 6 months, 2 and 3 years) required TURP. The mean hospital stay was 1.5 days with ILC and 3.5 days with TURP.

Conclusions At the 4-year follow-up both ILC and TURP produced equal improvements in IPSS, QoL, Q_{max} and postvoid residual. ILC produced irritative symptoms in 11% and failure in three patients. TURP required a longer hospital stay, and resulted in stricture of the urethra in one and bladder neck stenosis in one patient.

062

Efficacy of KTP/Nd:YAG hybrid laser prostatectomy: does it last long enough? – a long-term follow-up of 143 patients

S. Bhargava, R. Chahal, N.K. Gogoi and S.K. Sundaram
Pinderfields General Hospital, Wakefield, UK

Introduction In this prospective study we aimed to establish the long-term efficacy and durability of KTP/Nd:YAG hybrid laser prostatectomy for treating symptomatic BOO, in terms of re-operation rate, uroflowmetry outcome, IPSS, patient satisfaction score (PSS), BPH Impact Index (BII) and quality of life score (QoL).

Patients and methods The study included 143 patients treated with hybrid laser prostatectomy between August 1994 and March 1996. All patients were assessed before, and at 1, 2 and 5 years after surgery with peak urinary flow rate (Q_{max}), IPSS, PSS, BII and QoL. Patients with an abnormal DRE and PSA level of >4 ng/L were excluded.

Results Sixteen patients were lost to follow-up, eight had died (none related to the procedure) and 28 (22%) patients underwent re-operation for recurrent BOO. The mean symptom scores and voiding outcome before and at the 2- and 5-year follow-up were:

Follow-up	Q_{max}, *mL/s*	*IPSS*	*QoL*	*BII*	*PSS*
Before	9.3	16.1	3.6	3.8	–
At 2 years	17.3	7	1.9	2.9	1.9
At 5 years	14.3	11	2.2	3.2	2.1

Conclusions KTP/Nd:YAG hybrid laser prostatectomy provides poorly sustained benefits in the long-term for both subjective and objective outcomes in patients with symptomatic BOO caused by BPH. These patients have a higher risk of re-operation than after standard TURP.

063

A multicentre comparative study of the Gyrus Plasmakinetic™ bipolar electrosurgical system and conventional monopolar loop TURP in BPH

S.N. Lloyd *St James's University Hospital, Leeds, UK*

Introduction Monopolar loop resection of the prostate produces a cavity and relieves BOO. The symptomatic and flow rate improvement are unparalleled, but against this are balanced the potential complications of resection using glycine, and of haemorrhage. This study compares the short- and long-term outcomes of using the Gyrus plasmakinetic™ bipolar electrosurgical system for plasmakinetic vaporization of the prostate (PKVP) with TURP. PKVP produces consistent tissue vaporization on electrode contact with tissue in a saline medium.

Patients and methods The study included 176 patients from eight centres randomized 2 : 1 to PKVP or TURP. The purpose of the study was to assess the comparability of PKVP and TURP. The primary objective was the time to removal of the catheter with successful voiding, and secondary objectives were safety, symptoms (IPSS and QoL), flow and voided volume data at 3 and 12 months.

Results Results during and after surgery show PKVP to be equivalent to TURP, with an advantage in time of catheter removal in favour of PKVP. The operative time and safety data were similar. The 3-month results for all patients and 12-month results for most patients have been collected and will be presented. The final statistical analysis has yet to be conducted but preliminary evaluation suggests equivalence.

Conclusion This multicentre trial has shown PKVP to be equivalent to TURP in terms of safety and efficacy. The overall complication rates were low, but theoretical advantages in favour of PKVP have been realised.

Funding: Sponsored by Gyrus Medical Ltd

064

Long-term outcome and patient satisfaction after transurethral vaporization of the prostate: results of a prospective longitudinal study

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*University Hospital of Wales, Cardiff and *Ysbyty Gwynedd, Bangor, UK*

Introduction Transurethral electrovaporization of the prostate (TUVP) is one of the many minimally invasive procedures to treat BPH with promising initial results reported. This study was conducted to assess the efficacy and durability of TUVP in the long term.

Patients and methods Between 1994 and 1995, 93 patients underwent TUVP for BPH. All patients fulfilled the conventional criteria for a prostatectomy. The patients were reviewed at 1, 4, 8, 12 and >60 months, and symptom scores, flow rate, postvoid residual and patient satisfaction were assessed. Any secondary procedures and complications were also noted.

Results Of the 93 patients, 23 died at >60 months of follow-up; of the remaining 70, 16 were lost to follow-up and thus 54 patients completed the long-term assessment. Of the 54 patients, seven underwent TURP within a few months of TUVP because of persistent symptoms. The remaining 47 patients had a significant and sustained improvement in mean AUA score (24.8 before vs 10.9 after), maximum flow rate (8.8 vs 13.8) and postvoid residual urine (141 vs 56 mL). Overall, 36 patients were pleased or mostly satisfied, nine had mixed feelings and two felt unhappy about their quality of life as a result of their urinary symptoms. Eight patients were operated as day cases. Complications and secondary procedures will be reported.

Conclusions TUVP has advantages; the long-term outcomes suggest that the overall results are slightly inferior to those from TURP, but when symptoms are improved, this improvement is durable.

065

Prostaject™ ethanol injection therapy for BPH: an Anglo/French study

J.H. Palmer, P. Ballanger*, P. Grise†, K. Subramonian†, M. Keen† and H.R.H. Patel† *Medway Maritime Hospital, Kent, UK, *Hospital Bordeaux, Bordeaux, and †Hospital Charles Nicolle, Rouen, France*

Objective To assess the safety and efficacy of alcohol injection of the prostate using the Prostaject™ device for LUTS in patients with BPH.

Patients and methods Forty-five patients awaiting prostatic surgery for LUTS were treated by injecting absolute ethanol into the prostate urethrally using the Prostaject device, under either general or local anaesthesia, as day cases. They were catheterized for 72 h and reviewed after 3 days, 4 weeks, 3, 6 and 12 months. Toxicity was assessed by liver function tests and alcohol levels were monitored throughout the procedure. Peak flow rate (Q_{max}), postvoid residual urine (PVR), IPSS, quality of life (QoL) and TRUS-estimated prostate volume (PV) were used as assessments. Differences were assessed statistically using Student's *t*-test between the values before treatment and at 12 months of follow-up.

Results There was good symptomatic relief and a reduction in prostatic volume, but there was no significant improvement in flow rate or residual urine.

Follow-up, months	*Median (95% CI)*				
	IPSS	*QoL*	*PVR, mL*	Q_{max}, *mL/s*	*PV, mL*
Before	21 (19–23)	5 (4.8–5.2)	60 (40–80)	10 (9–11)	40 (34–46)
1	10 (7.5–2.5)	3 (2.5–3.5)	48 (35–61)	11 (9–13)	ND
3	8 (6–10)	2 (1.5–2.5)	56.5 (28–84)	3 (11–15)	22 (17–27)
6	8 (6–10)	2 (1–3)	54 (36–72)	15 (13–17)	31 (25–37)
12	7.5 (5–10)	2 (1.5–2.5)	81 (59–103)	13 (10–16)	29 (24–34)
P	<0.001	<0.001	0.22	0.036	0.001

The early complications were septicaemia (one) and haematuria (one), whereas the late complications were bladder necrosis (seven) requiring local resection (six) and urinary diversion (one).

Conclusion Whilst this is a simple, quick and reproducible technique, the risk of bladder necrosis has not yet been overcome.

Funding: American Medical Systems

Wednesday 26 June 14.00–15.15
Prostate Cancer: Diagnosis
Chairmen: C. Evans and M. Johnson

077

MRI is insensitive for lymph node metastases in 'high risk' patients with clinically localized prostate cancer

N.C. Borley, S.S. Sriprasad, P.M. Thompson, J. Poulsen and G.H. Muir *King's College, London, UK*

Introduction There is no consensus on how to stage 'high risk' patients with prostate cancer before radical radiotherapy or surgery. We compared the current standard imaging (pelvic MRI) with laparoscopic pelvic lymph node dissection (LPLND) in patients at high risk of locoregional metastases before radical radiotherapy.
Patients and methods Forty consecutive patients at high-risk of locally advanced disease (PSA >20 ng/mL and or predominant Gleason pattern 4 or worse on biopsy, normal ^{99}Tc bone scan) had both pelvic MRI and subsequent LPLND. Preoperative staging by MRI was compared with the histology of the lymph node specimens obtained. The LPLND was as described previously.
Results Of the 40 patients, 11 (28%) had pelvic lymph node metastases confirmed by LPLND. Of these, MRI identified three and missed eight. However, all suspicious lymph nodes on MRI were confirmed histologically. The chi-squared test showed a higher sensitivity for LPLND ($P=0.03$) than for MRI. The groups with histologically positive and negative nodes had similar and not significantly different mean ages (64.3 vs 66.0 years), Gleason score on TRUS biopsy (7.4 vs 6.5) and PSA level (38.5 vs 42.4 ng/mL).
Conclusions The presence or absence of lymph node metastases has critical implications for the prognosis and treatment of patients with prostate cancer. MRI misses many lymph node metastases in 'high-risk' patients. LPLND allows significantly more accurate staging. While positive MRI seems likely to indicate nodal metastases, its low sensitivity in high-risk patients seems unacceptable if treatment decisions are to be based on accurate staging, and LPLND offers an alternative.

078

Do all prostate cancers at presentation need a staging bone scan?

T.R.L. Griffiths, K. Neelagiri, V. Smith, N. Sheikh, P. Johnson and D.R. Greene *Department of Urology, Sunderland Royal Hospital, Sunderland, UK*

Introduction The European Association of Urology Guidelines (2001) for staging prostate cancer suggest that urologists can limit bone scans to men with a prediagnosis serum PSA level of >10 ng/mL, those with symptoms suggestive of skeletal metastases, and those with poorly differentiated cancers. We evaluated these recommendations in the local population who predominantly present with LUTS.
Patients and methods Between 1996 and 2001, 652 Caucasian men (mean age 72 years, range 52–93) with newly diagnosed untreated prostatic adenocarcinoma were identified retrospectively to have undergone a bone scan within 3 months of histological assessment, and a serum PSA level evaluated <2 months before diagnosis.
Results Bone metastases were detected in 125 men (19%) at presentation; 104 had positive bone scans, and a further 21 had equivocal bone scans but plain radiographs confirming bone metastases. Bone metastases were detected in 10 men with a serum PSA of <20 ng/mL, in seven with <15 ng/mL, in three with <10 ng/mL, but in none with <5 ng/mL. The negative predictive values were 97%, 97%, 97% and 100%, respectively. None of those with bone metastases and a PSA of <15 ng/mL had skeletal symptoms; they all had an abnormal DRE or Gleason sums of 7–10.
Conclusion In the staging of prostate cancer, a bone scan may be omitted in those with a serum PSA of <15 ng/mL, provided there are no skeletal symptoms, the DRE is normal, and the Gleason sum is <7.

079

Is MRI useful for staging before radical prostatectomy?

J.L. Lewis, B.G. Conry and T.F. Ford *Kent and Sussex Hospital, Tunbridge Wells, Kent, UK*

Introduction The best method for staging patients with clinically localised prostate cancer remains controversial. This paper gives the results of a retrospective audit of MRI scanning before radical retropubic prostatectomy.
Patients and methods In all, 199 patients were staged using MRI before undergoing radical prostatectomy. The MRI scans used a body coil and a low field strength magnet, and were interpreted by one radiologist. Unconfined disease was defined as bulging or breaking of the prostate capsule. The MRI results were correlated with histology.
Results Six patients had nodal metastases on histology, only one of which was detected on MRI. There were no false-positive scans. The sensitivity for N1 disease was 0.2, with a specificity of 1.0. Eighty-three patients had pT3a disease on histology, 20 of whom were identified on MRI. There were 13 false-positive and 63 false-negative scans. MRI had a sensitivity of 0.24 and a specificity of 0.89 for detecting pT3a disease. Sixteen patients had seminal vesicle infiltration on histology, seven of whom were correctly identified on MRI. There were 12 false-positive and nine false-negative scans, giving a sensitivity of 0.44 and a specificity of 0.93 for detecting pT3b disease.
Conclusion Low field-strength MRI using a body coil has poor sensitivity and high specificity for detecting extracapsular spread, seminal vesicle infiltration and nodal metastases. The overall accuracy was poor. There is therefore no justification for using MRI in the routine staging of patients with localized prostate cancer who are being considered for radical prostatectomy.

080

The role of MRI staging in localized prostate cancer

R.G. Hindley, R.D. Brierly, G. Rottenberg, S. Rankin and R. Popert *Guy's Hospital, London, UK*

Introduction The use of MRI in staging prostate cancer before radical treatment is controversial, although the recent NICE guidance states that this is the investigation of choice. However, surgical experience shows that the pathological TNM staging seldom correlates with clinical MRI staging.
Patients and methods Forty consecutive patients underwent MRI before radical retropubic prostatectomy (RRP) (1.0 T/1.5 T superconducting magnet with pelvic array coil). MRI was used to detect low-signal lesions in the prostate, extracapsular penetration and seminal vesicle involvement (SVI). The MRI assessment was compared with the corresponding histological findings.
Results Of the 40 patients, 39 had cancer confirmed after RRP; MRI was able to identify the tumour in 37 and correctly staged 26 of the 40 cases (65%). MRI detected extensive extracapsular disease (T3a)

in three of five cases with a sensitivity of 60% and a specificity of 96%, and for SVI (T3b) identified two of four cases (sensitivity 50% and specificity 100%). In one of the 19 low-risk patients (PSA < 10 ng/mL, Gleason score 2–6 and clinical stage T1/T2) MRI correctly identified extracapsular penetration and this was confirmed after RRP. The remaining 18 in the low-risk group had apparent organ-confined disease on MRI. This was confirmed histologically in all except one with focal capsular penetration and four of the 18 had focal positive margins.
Conclusion MRI is reliable at differentiating clinical T3 disease from T1/2 disease but cannot reliably identify microscopic disease. MRI is a useful adjunct to Partin's probability tables when counselling patients before radical treatment, particularly in high-risk disease. A positive MRI in low-risk disease would be a cause for concern.

081

Quality-of-life effects of hormonal medications for prostate cancer: a randomized controlled trial

R.A. Gardiner, H. Green, K. Pakenham, J. Yaxley*, D. Nicol† and P. Mactaggart‡ *University of Queensland, *Royal Brisbane Hospital, †Princess Alexandra Hospital, and ‡QEII Hospital, Brisbane, Australia*

Introduction Although quality of life (QoL) is a significant issue in the management of prostatic cancer, few randomized treatment studies have investigated QoL effects of androgen-suppression treatments. For example, there have been conflicting reports about whether hormonal treatments improve or impair patients' subjective emotional and physical well-being.
Patients and methods Eighty-two men with extraprostatic prostate cancer were randomly assigned to receive goserelin, leuprorelin, cyproterone acetate or close observation. These patients undertook medical, psychosocial and cognitive assessments before and after 6 and 12 months of treatment. QoL assessments included EORTC QLQ-C30, EORTC supplementary module, DASS-21, satisfaction with life scale, contextual questions, threat appraisal and self-efficacy, and cope scale, together with detailed lists of all medication.
Results Men receiving hormonal manipulation reported impaired sexual function compared with baseline and men assigned to close observation and cyproterone acetate reported increased emotional distress over time, although this was not clinically significant. Groups did not differ in existential satisfaction, physical symptoms or social role functioning.
Conclusions These results showed that different treatments were associated with differential QoL outcomes and have implications for treatment decisions in the management of prostatic cancer.
Funding: Queensland Cancer Fund

082

Long-term outcome results in patients with prostate cancer managed with intermittent androgen suppression

T.M. Lane, W. Ansell, G. Williams, F. Chinegwundoh and R.T.D. Oliver *St Batholomew's Hospital, London, UK*

Introduction Increasingly, animal and clinical studies suggest that intermittent therapy may improve the duration of hormone dependence in patients with prostate cancer. However, there remains uncertainty as to the optimal duration of treatment and the level of PSA before treatment is re-started. The relative lack of long-term outcome data only adds to the dilemma.
Patients and methods Patients who were in complete PSA remission after hormone therapy for metastatic or locally advanced prostate cancer were initially included in the study. Further patients were recruited from those groups who had failed to gain a durable PSA response to radical treatment and had subsequently been re-started on androgen deprivation therapies because of a rising PSA level. After an initial period of 9 months (on-period) and a PSA response to <4 ng/mL (if asymptomatic), hormone ablation ceased and PSA was measured monthly. After a subsequent rise in PSA to >20 ng/mL (or a return of symptoms) androgen deprivation was re-started.
Results In the 6 years since the start of this study, 75 patients have been examined; 86% remain alive with a median (range) survival of 134 (10–244) months since initial diagnosis. Of the 34% of patients recruited with locally advanced and metastatic disease, nearly a third have continued to a third cycle of androgen deprivation; 80% of these remain well, with a median survival of 46 months since diagnosis.
Conclusion These long-term values suggest that it is clearly safe to consider patients with M0 and M+ prostate cancer for intermittent androgen suppression, and should provide further support for formal randomized control studies.

Wednesday 26 June 15.30–16.30
Bladder Dysfunction
Chairmen: P. Abrams and W. Artibani

093

Medium- to long-term results of a randomized trial comparing two techniques of tension-free autologous fascial sling for female stress incontinence

V. Logan, S.J. Emery, T.P. Stephenson*, K. Wareham, W.Y. Cheung† and M.G. Lucas *Swansea NHS Trust, *University Hospital of Wales, and †University of Wales, Swansea, UK*

Introduction We report the medium-term results of a randomized controlled trial (RCT) comparing two techniques of tension-free autologous fascial sling for the primary and secondary treatment of genuine stress incontinence in women, comparing the clinical efficacy and morbidity.
Patients and methods In all, 168 women with urodynamically confirmed stress incontinence were recruited to a RCT comparing full-length rectus fascial sling (group A) with a modified, suspended, short-sling technique (group B); 27% had undergone previous surgery. Independent evaluations (before, 3, 6 and 12 months after surgery) included pad testing, pain and symptom scores, and validated quality of life (QoL) questionnaires (UDI and IIQ). The longer term follow-up was by postal and telephone questionnaire using the same QoL tools.
Results The relevant outcomes in the medium and long-term follow-up were:

Outcome	*Group A*	*Group B*
Number	74	70
Mean (range) follow-up, months	42 (34–60)	42 (34–60)
Dry with mild activity, %	75	77
'improved dry', %	85	81
Change from before surgery in:		
mean activity symptom score	2.8–0.8	2.7–0.75
mean urgency score	2.7–1.9	2.5–2.0
Urge syndrome before, %	83	87
Urge syndrome after, %	52	40
Self-catheterization, *n*	4	9

Conclusions The previously reported early success of both operations was maintained for up to 2.5 years and there was no difference in the efficacy of the two procedures (95% CI). There was no evidence of deterioration at 5 years. These results continue to support the use of this modified short-sling technique as our preferred operation for stress incontinence.
Funding: Welsh Office of R&D

094

Effect of previous anti-incontinence surgery on outcome after a pubovaginal sling

O.J. Clyne, O. O'Sullivan, C. Bannon and H.D. Flood *Midwestern Regional Hospital, Limerick, Ireland*

Introduction To determine the effect of previous anti-incontinence surgery on the outcome after a pubovaginal sling procedure (PVS).
Patients and methods Between January 1996 and January 2001, 208 patients underwent PVS for stress urinary incontinence (SUI); all data were accrued prospectively. Before surgery each patient had a full history taken, a physical examination, urine analysis and urodynamic studies. The outcome after surgery in those patients who had previous anti-incontinence procedures (group 1) was compared to that for the group in whom the PVS was the first anti-incontinence procedure (group 2). All patients had a rectus fascia PVS. After surgery each patient was assessed at 6 weeks and 6 months.
Results All 208 patients were included in the study (mean age 40.8 years); 41 patients (19.7%) had undergone a total of 56 previous anti-incontinence procedures. For the remaining 169 patients the PVS was the first anti-incontinence procedure. Preoperative urodynamics revealed type II SUI (ALPP >60 cmH_2O) in 122 (55.6%) patients and type III SUI (ALPP <60 cmH_2O) in 86 (41.3%). Sixteen patients also had detrusor instability. At 6 weeks, 87.8% of group 1 were dry compared to 96.6% of group 2, and at 6 months 85.3% of group 1 were dry compared to 95.5% of group 2. This difference in continence rates was statistically significant ($P<0.05$).
Conclusions We conclude that a history of previous anti-incontinence surgery has a significant effect on the outcome after PVS, with patients in this category achieving lower continence rates than those who have had no previous anti-incontinence surgery.

095

The effect of pubovaginal sling surgery on female sexual function

T. Nambirajan, V. Mahendra, S. Woolsey, S.M. Donnellan*, A.R. Stone* and I.K. Walsh *Belfast City Hospital, Belfast, UK and *University of California, USA*

Introduction Whilst the surgical dissection involved in transvaginal pubovaginal sling surgery (TVPVS) may adversely affect vaginal sensation, the resolution of stress urinary incontinence (SUI) should enhance self-esteem and quality of life. These mechanisms would have opposing effects on sexual function. We therefore prospectively investigated the effect of TVPVS on female sexual function.
Patients and methods Twenty sexually active female patients (mean age 61.1 years) underwent TVPVS for types 2 or 3 SUI. All patients completed validated voiding and sexual activity questionnaires (urogenital distress inventory, incontinence impact questionnaire, Fallowfield sexual activity questionnaire) before and at 4 months and 1 year after surgery. Patients were also asked about changes in vaginal sensation.
Results All patients remained monogamous throughout the study period. Four (20%) patients reported reduced vaginal sensation at 4 months and one (5%) did so at 1 year. Postoperatively, sexual activity scores were 3.1% worse at 4 months ($P=0.4$) and improved by 3.4% at 1 year ($P=0.4$). Incontinence during intercourse was present in nine (45%) patients before and in none after surgery ($P=0.001$). Resolution of incontinence during intercourse had the strongest correlation with improved sexual activity scores, and reduced vaginal sensation with worsened scores. Improvements in the severity of urinary leak, subjective improvement or overall satisfaction had less effect.
Conclusion TVPVS significantly improves SUI but does not adversely affect sexual function, despite a temporary reduction in vaginal sensation. Resolution of incontinence during sexual intercourse appears to have the greatest positive effect on sexual function.

096

Long-term clinical outcome of a new AUS with conditional occlusion for genuine stress incontinence: optimal cuff pressures for continence

M.D. Craggs, A.R. Mundy, N. Dunglison, J. Susser and S.L. Knight *Institute of Urology & Nephrology, London, UK*

Introduction Implanted in one piece, a new AUS has a stress-relief facility which adds transient abdominal pressure rises to a bulbar cuff operating at a relatively low baseline pressures to achieve continence. Regulated baseline pressure is adjustable (0–70 cmH_2O) by injecting sterile saline through a self-sealing port in the base of the pump unit. The effects of baseline pressure settings on long-term outcome for improving continence are described.
Patients and methods Six patients with genuine stress incontinence (GSI) after radical prostatectomy received the new AUS and were monitored for up to 1 year. Baseline pressure adjustments using urethral pressure profiles through the cuff (PUcuff) were made 2–4 weeks after implantation and tailored to optimize continence in each patient. Continence was assessed using standardized stress leak-tests and voiding diaries. Patients weighed their pads daily to measure leakage and this was expressed as a percentage of total urine output, to assess improvements in continence.
Results In five of six patients, continence was improved by a mean (range) of 87 (71–100)% with a mean (range) PUcuff of 42 (28–58) cmH_2O. Improvement and PUcuff were directly related. Stress tests showed that conditional occlusion worked well. No patient had detrusor instability and flow rates were unchanged. Overall, patients rated these improvements highly. One patient had no benefit because of a faulty cuff fixing.
Conclusions The new AUS performed well over the longer term and at relatively low regulated pressures. Such low pressures, achieved by incorporating the conditional occlusion facility, should help to reduce the risk to urethral tissues from pressure-induced atrophy.
Funding: Government Link Medical Implants Programme & Bibby-Sterilin Limited, UK

097

Six-year experience of an S3 neuromodulation service within the NHS

S.J. Symons, M. Williamson, J. Barnecott and S.C.W. Harrison *Pinderfields General Hospital, Wakefield, Yorks, UK*

Introduction The Medtronic S3 neuromodulator has been shown to be of potential benefit to patients with detrusor overactivity and women with urinary retention. The experience derived from establishing and running a service within the NHS is described.
Patients and methods Since January 1996 a heterogeneous group of 29 patients with severe LUTS received S3 neuromodulator implants. Patients were selected on the basis of clinical presentation, urodynamic assessment and failure to respond to conservative management (23 female and six male, mean age 45 years, range 16–73).
Results One patient died from causes unrelated to the neuromodulation. The mean (range) follow-up for the remaining 28 patient is 2.96 (0.25–6.08) years, representing 85.83 patient-years of follow-up. Half the patients received both subjectively and objectively good surgical results (average implant 3.1 years), while 24% derived no benefit from their implant (average implant 3.6 years). The remaining 21% experienced inconsistent results requiring increased programming support from the Medical Physics team. The surgical implant procedure is straightforward and well tolerated. However, problems with loss of stimulator benefit (thought to be caused by CNS accommodation) and generator-site pain have led to a 28% re-operation rate. One patient has had the neuromodulator explanted.
Conclusions S3 neuromodulation is capable of dramatically improving the quality of life in some patients. A successful service requires careful patient selection and significant ongoing patient support. Development of regional services may be appropriate.

098

Formation of a 'deflation cuff' on the urinary catheter: clinical and *in vitro* analysis

J. Parkin, M. Wooley*, D. Grover*, A. Evans* and R.C.L. Feneley* *Southmead Hospital, Bristol and *University of the West of England, Bristol, UK*

Introduction At our institution there have been several incidences of all-silicone catheters that were difficult to remove. Examination after removal revealed that the deflated balloons had formed a 'cuff'. We have audited the incidence and tested quantitatively the formation of a 'cuff' when deflating catheter balloons.
Patients and methods We audited problems that occurred in the community when removing urinary catheters, including the nature of the problem and type of catheter. In the laboratory, catheters were stored with inflated balloons in saline at 37°C for 6 weeks. These were then tested using a previously validated instrument for measuring the retention forces along a suprapubic tract.
Results Questionnaires were returned from 154 patients; 55% of catheters were used urethrally and 44% suprapubically (83% hydrogel-coated, 13% all-silicone and 3% PTFE-coated). There had been problems with catheter removal in the previous 12 months in 14.3%, 68% of the problems being with all-silicone catheters. Formation of a cuff was documented in 60%. In the laboratory, 10 of 12 balloons formed a 'cuff' on deflation, but there was variability in the effect this had on the retention force (Bard hydrogel 1 N, Bard all-silicone 4.5 N, Rusch all-silicone 2 N and Simpla all-silicone 3.5 N).
Conclusions All-silicone and suprapubic catheters accounted for most of the problems with catheter removal in the community. Suprapubic profilometry confirms the increased resistance of a 'cuff' formed on deflation of the balloon of all-silicone catheters. This suggests that the first-choice material for long-term catheterization should be hydrogel-coated latex.

Thursday 27 June 10.00–11.00
Prostate Cancer: Treatment
Chairmen: R. Kirby and G. Williams

113

Laparoscopic radical prostatectomy: 100 consecutive cases

T. Adams, B. Montgomery*, E. Palfrey*, H. Naerger*, M. Dauleh and C. Eden *The North Hampshire Hospital and *Frimley Park Hospital, Surrey, UK*

Introduction The feasibility of laparoscopic radical prostatectomy (LRP) is no longer in question. Its place will depend upon its reproducibility and performance against open radical prostatectomy (ORP) assessed in many patients.
Patients and methods A hundred consecutive patients with clinical stage T⩽3aN0M0 prostate cancer underwent LRP by one surgeon.
Results The mean (range) operative duration was 245 (155–600) min (with one conversion to open surgery) and the mean blood loss 313 (50–1300) mL (three patients transfused). The mean postoperative hospital stay was 4.2 (3–13) nights and the mean catheterization time 8.4 (0.8–21) days. There were seven complications: ulnar nerve palsy; rectal injury; postoperative bleeding and premature drain removal, both of which required re-operation; two bladder neck stenoses; and a port site hernia. All but the last of these complications occurred in the first half of the series. The positive margin rate was 18.8%. All patients had a PSA level of ⩽0.1 mg/L at 3 months. At a mean (range) follow-up of 7.7 (1–18) months, 84% of patients were pad-free, 45% who had both neurovascular bundles preserved had erections, and there were no biochemical recurrences.
Conclusion Once the surgeon is experienced LRP offers patients the same oncological and continence outcomes as ORP but with the generic advantages of laparoscopic surgery and a greatly reduced likelihood of blood transfusion. Potency data remain too immature for reliable interpretation. A randomized controlled trial with ORP is now needed.

114

A positive apical margin after radical prostatectomy is not a predictor of syndrome progression

B. Khoubehi, J.M. Adshead, A.P. Doherty, G.L. Smith, H. Mitchell and T.J. Christmas *Hammersmith Hospitals NHS Trust, London, UK*

Introduction A positive apical margin (PAM) is reported in 7–16% of radical prostatectomy (RP) specimens. In many patients there is no discrete threshold between the apices of the prostate and the rhabdosphincter. It has been suggested that PAM alone is not a prognostic indicator after RP [*J Urol* 1997; **158**: 2176–9]. The aim of this study was to evaluate the effect of PAM in disease progression after RP.
Patients and methods Patients had to have a follow-up of >18 months to be included in the study. Of the 285 consecutive men who underwent RP between 1993 and 2000, 226 had adequate follow-up and complete data collected. Disease progression in patients with PAM in the absence of extracapsular disease or positive margins elsewhere was compared with those with organ-confined disease. Disease progression was defined as three consecutive ultrasensitive PSA rises (lowest range <0.01 ng/mL).
Results Of the 226 patients, 32 (14%) had PAM with the disease otherwise apparently confined to the prostate, and 68 (30%) had organ-confined disease. At a median follow-up of 56 months, biochemical disease progression in patients with organ-confined disease and PAM only was 31% (21) and 28% (nine), respectively. The rate of disease progression in these two groups was not significantly different.
Conclusion Biochemical disease progression for patients with isolated PAM was comparable with those with histologically prostate-confined disease. A positive surgical margin confined to the apex alone does not seem to be a predictor of worse prognosis after RP.

115

Positive margins after radical prostatectomy. What now?

M.H. Winkler, J.S.A. Green, M. Sugiono*, R. Persad†, D.B. Boustead and D.A. Gillatt* *Lister Hospital, Stevenage, *Bristol Urological Institute, Southmead Hospital, and †Bristol Royal Infirmary, Bristol, UK*

Introduction We analysed the outcome of all patients with margin-positive disease after radical prostatectomy (RP), to identify predictive factors and assess PSA recurrence rates.
Patients and methods Data were collected on 368 patients undergoing RP. Patients with neoadjuvant treatment, adjuvant treatment before PSA relapse or with a follow-up of <1 year were excluded. Kaplan–Meier PSA recurrence-free survival estimates were calculated. Cox and logistic regression models were constructed to predict PSA recurrence and margin positivity.
Results From the remaining cohort of 313 patients, PSA (odds ratio, OR 1.03, 95% CI 1.0–1.06) and biopsy grade (1.3, 1.09–1.56) were identified as significant predictors of positive margins after RP (logistic regression). The median PSA survival time for 126 men with positive margins was 17.5 (13.2–21.8) months and mean (SD) Kaplan–Meier PSA recurrence-free survival probabilities at 1, 3 and 5 years were 0.57 (0.04), 0.33 (0.05), 0.26 (0.05), respectively. The clinical recurrence-free survival estimate was 64% at 5 years. PSA (relative risk 1.03, 95% CI 1.01–1.05) and biopsy grade (1.3, 1.09–1.540) were identified as preoperative predictors of biochemical recurrence in this group (Cox regression). Survival analysis showed a median PSA recurrence-free survival time for biopsy Gleason grade 2–6 and 7–10 of 24.3 (11.6–37.0) and 4.7 (2.4–15.5) months, respectively (log rank hazard ratio 0.43, 0.21–0.84).
Conclusions PSA and clinical recurrence-free survival for patients with positive margins after RP is poor (25% and 64% at 5 years, respectively) confirming that every attempt should be made to identify these patients preoperatively. Early adjuvant treatment may be justified in particular for patients with a high Gleason grade, preferably in a trial setting.

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Comorbidity as a prognostic factor after radical prostatectomy

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Introduction Patient selection for radical prostatectomy (RP) presently mainly depends on individual clinical experience and attitudes. The aim of this study was to identify men with a high risk of early comorbid death who are unlikely to benefit meaningfully from radical surgical treatment of early prostate cancer.
Patients and methods Between December 1992 and December 1998, 444 men consecutively underwent RP. The preoperative comorbidity (ASA Physical Status Classification, New York Heart

Association Classification of Cardiac Insufficiency (NYHA), Classification of Angina Pectoris of the Canadian Cardiovascular Society (CCS), diabetes, hypertension, history of thrombembolism, chronic obstructive pulmonary disease (COPD), was assessed using premedication records, patient charts and preoperative ECGs under the surveillance of a senior anaesthesiologist with no access to outcome data. Death from causes other than cancer (15) was the study endpoint. Follow-up information was available for all patients (mean follow-up 4.7 years, range 2.09–8.56). Kaplan–Meier time-event curves were estimated for comorbidity-specific survival and compared using the log-rank test. Hazard ratios were estimated with the Mantel–Haenszel method.
Result Patients with an NYHA >0 ($P<0.001$), ASA 3 ($P<0.001$), CCS >0 ($P<0.001$), or COPD ($P<0.01$) had an increased probability of early comorbid death in univariate analysis. Significantly increased hazard ratios were estimated for men with ASA 3, NYHA 2, NYHA 3, CCS 2, or COPD. There was no significant relationship between patient age and early comorbid mortality.
Conclusion In patients with ASA 3, NYHA 2, NYHA 3, CCS 2, or COPD, nonsurgical treatment for prostate cancer should be preferred.

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Cancer control, continence and potency after radical retropubic prostatectomy – a UK series

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Introduction Radical retropubic prostatectomy (RRP) is commonly used to treat localized prostate cancer. The incidence of complications quoted are mainly taken from series in the USA. We report the cancer control, continence and potency after RRP at a single centre in the UK.
Patients and methods A self-completed questionnaire incorporating elements of the Short-Form (SF)-36, International Index of Erectile Function (IIEF) and ICS-male questionnaires was sent to all patients who had undergone RRP by one surgeon between January 1994 and July 2001. PSA levels and responses for the questions about erectile function and continence are reported.
Results In all, 322 patients responded (mean age 61 years, range 45–76; mean follow-up 30 months, range 2–89). In 308 men the PSA decreased to <0.2 ng/mL; of these, 18.5% had a subsequent PSA relapse (>0.2 ng/mL). All patients whose PSA nadir was >0.2 ng/mL subsequently relapsed. After 3 months of follow-up, 117 (38%) had no stress incontinence, 49 (49%) occasional, 29 (9.5%) sometimes and nine (3%) leaked most of the time. At 1 year, 92% were pad-free and only one patient found incontinence a serious problem. At 18 months, 60 (29%) patients who were able to achieve an erection sufficient for intercourse before RRP were able to do so afterwards. Of these, 41 (68%) had required $\geqslant 1$ year to regain potency; 10% of men rendered impotent after RRP found this a serious problem.
Conclusions Cancer control and continence results are similar in this series to those in other larger studies. Potency rates are less but this may reflect the older population. Most patients did not regard impotence after RRP as a serious problem.
Funding: AstraZeneca/British Urological Foundation Scholarship

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^{125}Iodine prostate brachytherapy: selection strategies and early outcome

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Objective We report results from our first 145 consecutive patients undergoing ^{125}I brachytherapy, including early complications and PSA outcome, and the ability to predict these before implantation.
Patients and methods Patients were assessed prospectively using uroflowmetry, IPSS questionnaires, physical examination and TRUS; 79 patients received a full urodynamic assessment. The IPSS and PSA were recorded at 3-monthly intervals after treatment and events including acute urinary retention (AUR) and rectal symptoms recorded prospectively. The mean follow-up was 13 months.
Results No patients were incontinent after treatment. There was a temporary deterioration in IPSS in 96% of patients. Peak symptoms occurred at 6 weeks and a statistically significant deterioration in IPSS persisted for 9 months, but continued to improve throughout the follow-up. AUR affected 10% of patients, with a further 20% using CISC for symptoms. Two patients required surgery for BOO. Urodynamically unobstructed patients did not require catheterization and had a significantly lower IPSS at 6 weeks (ANOVA $P<0.05$) than patients in the equivocal or obstructed groups. By 2 years after implantation the mean IPSS was better than before implantation. Eight patients had mild transient proctitis. The mean PSA level at 1 and 2 years was 0.7 and 0.5 ng/mL, and was not significantly different amongst patients treated with or without antiandrogens. One patient had local recurrence.
Conclusion Urodynamic evidence of obstruction seems to be helpful in predicting the risk of AUR and LUTS. Prostate brachytherapy may be delivered safely to patients in the UK, with excellent early PSA progression-free survival and symptomatic outcome.
Funding: Grant from the PPP Foundation

Tuesday 25 June 10.30–11.30
Poster Session 1. Basic Science: Physiology
Chairmen: C. Wu and J. N'Dow

P001

The effects of mechanical stretch and hypoxia on renal tubular epithelial cells

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Introduction Ureteric obstruction (UO) results in apoptosis of renal tubular cells. Applying mechanical stretch to renal tubular cells has recently been used as an *in vitro* model of UO. Genetic analysis shows heat shock protein 70 (hsp-70) as a candidate gene for altered apoptotic susceptibility in this model. We postulated that mechanical stretch, hypoxia and inflammation contribute to the cellular change and loss that occurs as a result of UO, and is mediated through altered hsp-70 expression.
Materials and methods Human proximal tubular cells (HK-2) were subjected to mechanical stretch (elongation 20%, six cycles/min). Cells were also subjected to 1% hypoxia. Apoptosis was assessed by propidium iodide DNA staining with flow cytometry, and hsp-70 expression assessed by Western blotting.
Results Stretch induced apoptosis in HK-2 cells, with mean (SD) values of 15.6 (4.6)% (48 h), 12.2 (4.4)% (24 h), and 7.1 (2.2)% (control; $P=0.002$, $P=0.026$, respectively; $n=5$). Stretch had no effect on cell viability and 1% hypoxia did not affect spontaneous apoptotic rates or cell viability. Interestingly, hsp-70 expression increased over 48 h in response to mechanical stretch.
Conclusion Apoptosis represents a significant pathway leading to tissue loss in UO. Mechanical stretch results in up-regulation of hsp-70 expression. However, this cell stress response maybe insufficient to prevent the direct induction of apoptosis. Altered expression of hsp-70 shows a novel pathway which may contribute to renal tubular cell apoptosis and the potential for progression to renal failure. Therapeutic manipulation of these stress proteins may represent a new treatment strategy.

P002

T-type Ca^{2+} channel in detrusor smooth muscle

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Introduction The involvement of L-type Ca channels in detrusor contraction is well recognized. T-type Ca channels, that operate at more negative membrane potentials, close to the resting membrane potential, have also recently been detected, although their physiological function is unclear. L-type channels are preferentially blocked by verapamil, whilst T-type channels are blocked by low (200 μmol/L) concentrations of $NiCl_2$. In this study the relative effects of $NiCl_2$ and verapamil were determined at varying membrane potentials that would emphasize any role of the two Ca^{2+} channels.
Materials and methods Isometric tension was evoked by field stimulation using superfused strips of guinea-pig detrusor and the effect of 200 μmol/L $NiCl_2$ and 20 μmol/L verapamil measured. Membrane potential was varied by altering the extracellular [KCl] between 2 and 8 mmol/L and values determined by patch electrode recordings.
Results $NiCl_2$ and verapamil reduced electrically stimulated contractions by 17 (6)% and 65 (10)%, respectively, at 4 mmol/L KCl. As the [KCl] was reduced, inhibition with 200 μmol/L $NiCl_2$ increased ($r=0.997$, $n=4$, $P<0.05$) whereas the inhibition with 20 μmol/L verapamil decreased ($r=0.970$, $n=4$, $P<0.05$). Membrane potential varied between -42.7 (4.0) and -65.1 (4.0) mV in this range.
Conclusions $NiCl_2$ was used at concentrations specific to inhibit T-type Ca channels. In contrast to verapamil, $NiCl_2$ was increasingly effective at more negative membrane potentials when T-type Ca-channel opening would be enhanced. These results are consistent with the hypothesis that T-type and L-type Ca channels determine force development in guinea pig detrusor smooth muscle.

P003

Barrier function of tissue engineered human urothelium

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Introduction If tissue-engineered products using *in vitro* propagated cells are to have a role in future reconstructive procedures, it is desirable to show that cultured urothelial cells can develop normal functional properties. In this study we evaluated the barrier properties of *in vitro* generated human urothelium.
Materials and methods Normal human urothelial cell cultures were established and propagated in different media. Ionic permeability was determined by measuring the transepithelial electrical resistance (TER). Urothelial permeability to urea and water was determined by a radioisotope tracer technique. The morphology and phenotype of the urothelial cultures was assessed by immunohistology and electron microscopy.
Results When cultured in low-calcium serum-free medium urothelial cells formed monolayers and did not form intercellular tight junctions; the mean (SD) TER was 16.6 (2.1) $\Omega.cm^2$, and permeability to urea $11.8\,(4.8)\times10^{-5}$ cm/s, and to water $4.7\,(3.1)\times10^{-4}$ cm/s. Increasing the exogenous calcium concentration resulted in urothelial stratification, expression of tight junctions and a significant increase in TER, to 43.0 (3.7) $\Omega.cm^2$ ($P<0.01$) and decrease in urea and water permeability to $3.0\,(1.4)\times10^{-5}$ cm/s and $2.2\,(0.8)\times10^{-4}$ cm/s, respectively ($P<0.01$). The stratified urothelial cells grown in serum-supplemented medium had the greatest electrical resistance, with a TER of 2567.1 (475) $\Omega.cm^2$ ($P<0.01$) and a urea and water permeability similar to that in the unsupplemented cultures, at $12.4\,(7.6)\times10^{-5}$ cm/s and $5.5\,(4.8)\times10^{-4}$ cm/s.
Conclusions We show for the first time that is possible to produce a functional human urothelium that can be used for transplantation and studies of urothelial pathophysiology.
Funding: British Urological Foundation, The Ralph Shackman Trust

P004

Correlation of nerve-evoked extracellular electrical activity with tension generation in guinea-pig detrusor smooth muscle strips

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Introduction A detrusor smooth muscle EMG has been experimentally recorded from the whole guinea-pig bladder, an organ expressing both purinergic and cholinergic neuromuscular transmission, using suction electrodes. Here we describe the relationship

of the signal to contractile events in detrusor strips, a preparation more suitable for direct tension measurements.
Materials and methods Mucosa-free detrusor strips (3×10 mm) were prepared from male (300–500 g) guinea-pigs killed under Home Office License, physiologically superfused, attached to a pressure transducer and electrically stimulated (0.1 ms pulses). Electrical signals recorded using a bipolar reversible (Pt/PtCl) suction electrode were processed and recorded simultaneously with changes in strip tension. The effect of superfusion with α,β-methylene ATP (α,β-MA) 10–100 mmol/L and atropine (1 mmol/L) on electrical and mechanical events was determined.
Results An electrical signal, with a mean (SD) amplitude of 222 (238) mV, a duration of 236 (139) ms, and time to maximum depolarisation of 43 (16) ms, was consistently recorded, was sensitive to graded reduction in [$CaCl_2$] of the superfusate, indicating its biological origin, and abolished by solutions containing tetrodotoxin (1 mmol/L) ($n=7$). The signal was abolished by α,β-MA in association with an attenuated contraction ($n=12$), but not significantly reduced in amplitude ($P=0.8$) despite a significant reduction in tension of 75 (13)% of the control ($P<0.01$, $n=10$) in the presence of atropine.
Conclusion Electrical activity evoked by nerve-mediated stimulation of guinea-pig detrusor strips can be recorded extracellularly, correlated with tension changes, and is coupled to purinergic but not to cholinergic detrusor contractile activation. Provided the mechanisms of neuromuscular transmission in animal and human detrusor are similar, this technique may enable electrophysiological evaluation of the pathological purinergic neurotransmission that can emerge, and may be expressed in addition to normal cholinergic mechanisms, in detrusor originating from dysfunctional human bladders [*J Urol* 1999; **162**: 1833–39].
Funding: UCLH Special Trustees

P005

Changes in cholinergic and purinergic neurotransmission in the diabetic rabbit bladder

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Objectives Alterations in bladder function are well recognized in diabetes mellitus (DM). There is increasing evidence that changes in purinergic signalling might have a role in the pathogenesis of altered detrusor function. We evaluated the cholinergic and purinergic neurotransmission in the DM rabbit bladder and compared it with control.
Materials and methods DM was induced with alloxan in adult male New Zealand white rabbits. At 6 months, detrusor and bladder neck muscle strips were mounted in organ baths. Transmural nerve electrical field stimulation (EFS) was administered in the presence of 1 μmol/L atropine and/or α,β-methylene ATP (10 μmol/L), and after adding tetrodotoxin. Purinergic and cholinergic components were calculated and compared with those from controls.
Results EFS induced frequency-dependent contractions in both normal and DM detrusor and bladder neck strips. A plot of increasing EFS (0.5–20 Hz) vs detrusor contractility showed a decrease (ANOVA $P<0.001$) in the cholinergic nerve-mediated responses, and an increase (ANOVA $P<0.001$) in the purinergic nerve-mediated responses in the DM detrusor compared to the control. The overall EFS- and KCl-induced responses were unaltered in the DM group compared to control. Exogenously applied acetylcholine- and ATP-induced contractions of detrusor strips were similar in the two groups. There was no difference in the response in strips from the bladder neck and detrusor.
Conclusion These results suggest a dominance of purinergic neurotransmission in the diabetic rabbit bladder. This may have a pathophysiological role in the development of a failing diabetic detrusor.

P006

The urodynamic effects of intravesical high potassium concentration and nitric oxide scavengers on the bladder before and after resiniferatoxin

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Introduction Both high intravesical potassium concentrations [*Eur Urol* 1985: 127–130] and the presence of the nitric oxide (NO) scavenger oxyhaemoglobin [*J Urol* 2000; **164**: 545–550] cause an increase in bladder activity in rodents. It has been suggested that these effects may be mediated by C-fibres. We performed similar comparative urodynamic studies in normal pigs before and after C-fibre desensitization with resiniferatoxin.
Materials and methods Six female Large White pigs had tunnelled vesical, peritoneal and central venous catheters implanted. Cystometry was performed under light sedation using a continuous intravenous infusion of propofol. Several separate studies were conducted: (i) five repeated fills with 154 mmol/L NaCl to assess the reproducibility of cystometry; (ii) comparative cystometry, 154 mmol/L NaCl vs 154 mmol/L KCl; (iii) the effects of intravesical NO scavengers, 154 mmol/L NaCl alone and the in the presence of 10 μmol/L oxyhaemoglobin. The animals then had 100 mL of 100 nmol/L resiniferatoxin (in 10% ethanol) instilled intravesically for 30 min; 3 days later experiments ii and iii were repeated.
Results Repetitive saline cystometry is reliable and reproducible. Filling with high [KCl] solution and with oxyhaemoglobin both caused a significant reduction in cystometric capacity. Acutely, resiniferatoxin caused minimal detrusor activity and had no adverse effects. Three days after resiniferatoxin administration cystometric capacity had increased significantly but filling with either high [KCl] solution or with oxyhaemoglobin did not affect the cystometric variables.
Conclusions The urodynamic effects of high potassium and oxyhaemoglobin are abolished by resiniferatoxin, confirming that these effects are C-fibre mediated. Resiniferatoxin increased the cystometric capacity in these animals, suggesting that C-fibres are perhaps not so 'silent' in the normal bladder.
Funding: Royal College of Surgeons of England, Interstitial Cystitis Association

P007

Reactive urothelial phenotype in a model of composite cystoplasty

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Introduction It is suggested that stromal–epithelial interactions at the interface of urothelium and nonurological tissues in bladder augmentations may induce phenotypic changes in the urothelium. This has significant implications for tissue-engineered models of bladder reconstruction in terms of both urothelial function and development of long-term procedure-related complications. We report in detail the phenotypic characteristics of the epithelial components of a composite uterocystoplasty in a porcine model.
Materials and methods Autologous urothelial sheets, propagated from open bladder biopsies, were seeded onto 10×8 cm de-epithelialized, de-tubularized uterine segments in 30 kg female minipigs. The uterine segments were configured into augmentation cystoplasties. After death the cystoplasties were fixed in formalin, and processed for histology and immunohistochemistry using a panel of antibodies against cytokeratins and differentiation-associated antigens.
Results Histological analysis showed that in four of five cystoplasties, the neo-urothelium was stratified and had a transitional

morphology, although coverage was incomplete. Immunohistochemical analysis showed evidence of reactive squamous changes in both native and augmented segments. In the final case, where insufficient urothelium was applied, the augmented segment was lined with a nonstratified columnar uterine epithelium. There were residual endometrial glands and evidence of acute inflammation present in all cases.
Conclusions This study shows the feasibility of transplanting *in vitro*-propagated urothelium onto a heterotypic stroma in a model of composite cystoplasty, where uterus acts as an aseptic surrogate for intestine. However, technical considerations such as infection and incomplete de-epithelialization may influence the outcome.
Funding: Ethicon, UK; Action Research

P008

Mitogen-activated protein kinase activation and cellular proliferation by muscarinic M_2-receptors in primary human prostatic stromal cells

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Introduction Muscarinic receptors belong to the G-protein coupled family of receptors, which can regulate mitogen-activated protein (MAP) kinase pathways responsible for cellular growth. Muscarinic M_2-receptors couple Gi/o protein and inhibits cAMP formation. In prostate stroma, the subtype and role of muscarinic receptors are poorly defined. We aimed to address these questions using a human prostate stromal cell (HPSC) culture model.
Materials and methods Primary cultures of HPSC were grown from TURP tissue. Inhibition of forskolin-induced [^{3}H]-cAMP accumulation by carbachol (muscarinic agonist) was measured and dose–response curves obtained with and without selective antagonists: pirenzipine (M_1); methoctramine (M_2); 4-DAMP (M_3); darifenacin (M_3) and after pertussis toxin (PTX) treatment. Antagonists affinities (pA_2) were calculated. Western blot was used to detect activated p42/44 MAP-kinase after stimulation with carbachol with and without methoctramine and PTX. The Vybrant-MTT assay was used to measure proliferation after incubation with carbachol (48 h).
Results Carbachol caused a significant and dose-dependent inhibition of forskolin-induced [^{3}H]-cAMP accumulation, with a mean (SD) IC_{50} of 1.7 (0.5) μmol/L. This was competitively antagonized by methoctramine (pA_2 8.7, SD 0.2); 4-DAMP (pA_2 8.7, 0.2) and darifenacin (pA_2 8.2, 0.2). PTX completely inhibited this response. Pirenzepine had no effect. These results are consistent with functional muscarinic M_2-receptors. Western blot showed activation of p42/44 MAP-kinase by carbachol which was inhibited after preincubating with methoctramine and PTX. Carbachol led to a 54 (6)% increase over baseline in cellular proliferation.
Conclusion We conclude that muscarinic M_2-receptors coupled to Gi/o protein are present in prostatic stromal cells. Our results suggest that they activate MAP-kinase cascades and cellular proliferation. They may therefore have a role in the pathophysiology of BPH.
Funding: British Urological Foundation and Royal College of Surgeons England

P009

The role of Rho kinase inhibitors in the treatment of erectile dysfunction

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Introduction Noradrenergic neurotransmission is important in regulating cavernosal smooth muscle tone. It is now known that noradrenergic contraction in the cavernosal smooth muscle cells involves activation of the rho-kinase pathway, which is a calcium-sensitizing mechanism. Inhibition of rho-kinase causes relaxation of the smooth muscle, particularly in organs with high basal tone. We aimed to investigate the presence and the activity of this pathway in cavernosal smooth muscle, and examine the effects of a specific rho-kinase inhibitor (y-27632), on contractions in human and rabbit penile corpus cavernosum.
Materials and methods A primary culture of smooth muscle cells from human and rabbit penile corpus cavernosum was developed. The presence of rho-kinase was investigated by indirect immunofluorescence and Western blotting. The activity of the immunoprecipitated protein was determined using a nonspecific kinase assay. The effect of an inhibitor of rho-kinase, y-27632, on the contractions elicited by noradrenergic nerve stimulation and by phenylephrine was investigated in the human and rabbit penile corpus cavernosum *in vitro*.
Results The cells in culture displayed characteristic myocyte morphology and α-actin immunoreactivity. There was positive immunostaining for rho-kinase in the perinuclear space. Western blotting showed positive bands corresponding to rho-kinase in human and rabbit material. Y-27632 inhibited in a concentration-dependent manner the kinase activity of the protein immunoprecipitated with anti-rho-kinase antibody. In both human and rabbit corpus cavernosum, y-27632 inhibited electrical-field-stimulated-induced noradrenergic contractions in a concentration-dependent manner (IC_{50} 3.3, SD 0.25 mmol/L) in human tissue), and caused concentration-dependent relaxation of tissues precontracted with phenylephrine (EC_{50} 2.2, SD 0.25).
Conclusions These results suggest that rho-kinase is involved in the noradrenergic contractile pathway in the cavernosal smooth muscle of the penis. Cavernosal smooth muscle cells can provide a cellular model for studying enzymes involved in Ca^{2+}-sensitizing pathways regulating cavernosal smooth muscle tone. Rho-kinase antagonism represents a potential therapeutic use for the treatment of erectile dysfunction.

P010

Streptozotocin-induced diabetes increases superoxide production in rat corpus cavernosum, *in vitro*

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Introduction The superoxide anion (O_2^-) has been implicated in impaired nitric oxide (NO)-dependant vascular relaxation in diabetes mellitus. The free radical status of the corpus cavernosum in diabetes is unknown. We aimed to establish whether cavernosal O_2^- production is greater in the diabetic rat than in controls, and if the response to homocysteine and copper (known to enhance O_2^- generation in vascular tissues) is altered in diabetic animals.
Materials and methods Cavernosal segments were obtained from 4-week streptozotocin-induced diabetic and control rats (12 in each group). Tissues were incubated in homocysteine (10 and 100 μmol/L) and copper (100 nmol/L and 1 μmol/L), in the presence and absence of superoxide dismutase (SOD, 300 U/mL). Cytochrome c (20 μmol/L) was added and spectrophotometry performed. A change in photometric absorbance occurs when ferricytochrome C is oxidised to ferrocytochrome C by O_2^-.
Results Basal O_2^- release was markedly and significantly greater in diabetic cavernosal tissue segments than in controls (mean 86.45 vs 14.70 nmol/mg tissue/ h, $P<0.001$). Furthermore, while incubation with homocysteine and copper (alone and in combination) further enhanced diabetic cavernosal O_2^-, more limited effects were seen in control segments, particularly at low concentrations (10 μmol/L and 100 nmol/L, respectively).

Conclusions Cavernosal tissue O_2^- production was significantly higher in streptozotocin-induced diabetic rats than in controls (five-fold increase). Diabetic cavernosum also appeared more susceptible to enhanced O_2^- release when incubated with homocysteine and copper, even at near-physiological concentrations. Increased O_2^- levels in diabetic corpus cavernosum may be of considerable significance, given the potential properties of this radical.
Funding: The Ralph Shackman Trust

Tuesday 25 June 10.30–11.30
Poster Session 2. BPH 1
Chairmen: M. Emberton and P. Gilling

P011

Better guidelines mean fewer tests: a review of guidelines on BPH and LUTS

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Introduction Guidelines are the optimum method of introducing an evidence-based approach to patient care. Their purpose is to reduce variation in practice and improve care by setting agreed standards. In clinical areas where numerous guidelines exist there is considerable variation in the recommendations they make.
Materials and methods An electronic search (complemented by a hand-search) was used to identify web-based national and supra-national guidelines on BPH and LUTS. Two independent assessors undertook content analysis and methodological appraisal of the guidelines using a validated instrument. (http://www.sghms.ac.uk/phs/hceu/form.htm), which comprises 37 items addressing the rigour of development, clarity of presentation and implementation.
Results Eight guidelines were identified. All agreed that patient history and physical examination (including a DRE) should be undertaken in all symptomatic men and that patients' symptoms should be assessed using a validated symptom score, e.g. the IPSS. There was much variation in the number of diagnostic tests recommended. Guideline score and number of recommended tests:

Guideline origin	*Appraisal instrument score (max 37)*	*No. tests recommended*
Australia	30.5	2
AUA	28.5	3
International Consensus Committee (WHO)	11.5	7
European Association of Urology	11.0	4
UK	10.5	5
Germany	9.5	7
Malaysia	9.0	4
Singapore	5.0	7

Guidelines with low scores (indicating poor methodological quality) were more likely to recommend more tests. There was general agreement among the guidelines on the treatment of BPH and the importance of patient involvement in making management decisions.
Conclusion For men with BPH and LUTS, better quality guidelines recommend fewer diagnostic tests. Guideline quality was independent of local health resources and publication year.
Funding: The Royal College of Surgeons Research Fellowships

P012

Bladder volume and urinary constituents in LUTS

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Introduction Urinary sodium, via a urothelial channel [*BJU Int* 1999; **84**: 235–42], may cause aberrant stimulation of sub-urothelial receptors, leading to the sensation of urge at small bladder volume. We examined the relationship between bladder volume and urinary constituents in LUTS.
Patients and methods Eleven patients with sensory urgency (SU), 26 with detrusor instability (DI) and 12 with BOO were asked to void voluntarily. The residual volume was measured by catheterization and the total bladder volume (BV) determined. Urinary sodium, potassium, their ratio and osmolality were analysed. Correlation coefficients between BV and these variables were calculated, with $P<0.05$ regarded as significant.
Results There was a significant inverse relationship between BV and urinary sodium, potassium and osmolality in SU and DI but not in BOO. There was a significant positive relationship between BV and urinary sodium to potassium ratio in DI only:

LUTS	*Sodium*	*Potassium*	*Na : K*	*Osmolality*
SU	−0.64*	−0.89*	0.25	−0.70*
DI	−0.45*	−0.75*	0.44*	−0.73*
BOO	−0.31	−0.48	0.34	−0.54

*$P<0.05$, others not significant.

Conclusion There is an inverse relationship between urinary constituents and BV in patients with DI and SU. An interaction between urinary sodium, potassium and the urothelium in DI may be an important factor in controlling BV. Our results support investigations into the relationship between urinary constituents and the sensation of urge.
Funding: BUF/Bayer/Pharmacia Scholarship

P013

Bladder wall thickness and flow rate predict the presence and absence of obstruction in men with LUTS

M.E. Laniado, J. Ockrim, B. Rocco*, A. Marronaro*, A. Tubaro* and S. St Clair Carter *Charing Cross Hospital, London and *L'Aquila University Hospital*

Introduction Men with LUTS who are not obstructed experience less symptomatic relief after lower urinary tract surgery than men with obstruction. Bladder wall thickness has been shown to correlate with obstruction on urodynamics. The objective was to determine in a multiple linear and logistic regression whether the combination of bladder wall thickness and peak flow rate could identify patients who are either obstructed or unobstructed.
Patients and methods Men with untreated LUTS suggestive of BPH were investigated by IPSS, free flow rates, ultrasonographic measurements of bladder wall thickness, residual urine and prostate volume. Multiple linear regression and logistic regression with split-group validation was used to calculate obstruction using pressure/flow urodynamic studies as a criterion standard.
Results The 187 men (mean age 66 years) had moderate symptoms (IPSS 16/35) and were dissatisfied with their LUTS (QoL 4/6). In the derivation group, bladder wall thickness and peak flow were significant predictors of BOO (r^2 0.37, $P<0.001$) on multiple linear regression and there was little degradation in performance when assessed in the validation group. Similarly, on logistic regression the predicted probabilities of obstruction were high, indicating good discrimination (ROC curve area 0.85).
Conclusion Bladder wall thickness and flow rate contribute to identifying men with and without obstruction. Further studies should focus on identifying whether bladder wall thickness in

conjunction with flow rates can be used to predict changes in symptom scores or BPH-related complications after surgery.

P014

The proportion of patients with BPH and symptom improvement of $\geqslant 3$ points on the IPSS: doxazosin vs alfuzosin

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Introduction This double-blind multicentre trial assessed the efficacy and tolerability of doxazosin and alfuzosin in patients with moderate-to-severe BPH. A change of 3 points on the IPSS is the minimum change perceived by patients [*J Urol* 1995; **154**: 1783–4] and thus the proportion of patients with an improvement of $\geqslant 3$ points was compared.
Patients and methods In all, 210 men with BPH were randomized to doxazosin (1–8 mg/day) or alfuzosin (5–10 mg/day) for 14 weeks, and the IPSS and maximum flow rate (Q_{max}) were assessed. Safety was assessed primarily by adverse events. Endpoint efficacy data were analysed using an analysis of covariance model with the baseline as the covariate. The analysis to detect the proportion of patients who detected a change of 3 IPSS points used a chi-square test for the difference in proportions.
Result The mean final dose for doxazosin and alfuzosin was 6.1 and 8.8 mg/day, respectively. Both drugs significantly ($P<0.001$) relieved total, irritative and obstructive symptoms. Doxazosin produced significantly ($P<0.05$) greater improvements in total IPSS and irritative symptoms than alfuzosin; 87% (80/92) vs 76% (66/87) of patients taking doxazosin and alfuzosin, respectively, perceived an improvement in urinary symptoms based on achieving an IPSS of $\geqslant 3$. The difference between the groups approached significance in favour of doxazosin ($P=0.056$). Both treatments were well tolerated.
Conclusions Doxazosin was significantly more effective than alfuzosin in improving total IPSS and relieving irritative symptoms in patients with moderate-to-severe BPH. The proportion of patients with an improvement in IPSS of $\geqslant 3$ points was greater in patients receiving doxazosin.
Funding: Pfizer Inc.

P015

Effect of short-term treatment with finasteride on prostatic microvascularity in BPH

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Introduction Finasteride is a well established treatment for BOO secondary to BPH. Its maximum effect is attained by 6 months of treatment, mainly by atrophy and apoptosis of the glandular epithelium. It also controls associated haematuria, an effect noticed early in the course of treatment before any reduction in size. A recent report suggested that 2–4 months of treatment with finasteride before TURP reduced perioperative bleeding [*Urology* 2000; **55**: 684–689]. Thus the objective of this study was a quantitative assessment of the effect of short-term finasteride therapy on the microvascularity of BPH.
Patients and methods Twenty-four patients with acute urinary retention (AUR) secondary to BPH, who failed a trial without catheter, were randomized to a control group and a group treated with finasteride for a mean of 3 months. All patients underwent TURP after 3 months. Prostate chips were stained with CD31 to identify the blood vessels. Using computer-assisted image analysis, the total area occupied by the blood vessels and that of the glandular epithelium were determined. The overall microvascular density (MVD), stromal MVD and stroma/epithelium (S/E) ratio were calculated.
Results The overall MVD and stromal MVD in the finasteride-treated group were lower than that of the control group. The difference was not statistically significant. In the finasteride-treated group, there was a significant correlation between stromal MVD and S/E ratio.
Conclusion This pilot study suggests that short-term treatment with finasteride may reduce the microvascularity of BPH. A powered study is needed to evaluate this finding.

P016

Holmium bladder neck incision (HoBNI) vs holmium laser enucleation of the prostate (HoLEP) as day-stay procedures for small prostates (<40 g): a randomized trial

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Introduction BNI is a common treatment option for BOO in men with smaller prostates. BNI using the holmium laser was compared with HoLEP in a prospective randomized urodynamically based trial.
Patients and methods Forty patients with prostates of <40 g were randomized equally to either HoBNI or HoLEP (as day-stay procedures). All patients were urodynamically obstructed (Schäffer grade $\geqslant 2$). Perioperative and postoperative values were assessed including laser parameters, operating time, catheter requirements and symptom scores, peak flow rates and quality of life scores. Urodynamics and ultrasonographic measures were repeated at 6 months, with follow-up at 1, 3, 6 and 12 months after surgery.
Results The two groups were well matched for all variables at baseline. HoBNI was significantly faster than HoLEP ($P<0.001$); the mean (range) tissue weight in the HoLEP group was 12.1 (4–22) g and none of the specimens contained carcinoma. Two patients (10%) required re-catheterization in the HoBNI group with none in the HoLEP group. There was no significant difference in recovery time, hospital time (12.3 h vs 13.7 h) or catheter time (22.8 h vs 23.2 h) between the groups. Four patients (20%) in the HoBNI group required re-operation (HoLEP) for ongoing symptoms and obstruction. In the remaining patients there were no significant differences at each time in the IPSS, QoL score or peak flow rate. $PdetQ_{max}$ values at 6 months were significantly better in the HoLEP group ($P<0.05$) and the TRUS volume was significantly smaller ($P<0.001$).
Conclusions HoBNI and HoLEP are both safe on a day-stay basis in patients with smaller prostates. Fewer patients require re-catheterization or re-operation after HoLEP and the relief of obstruction was better at 6 months.
Funding: Pub Charity Inc.

P017

The use of the Comorbidity Symptom Scale to assess outcome after TURP in the elderly man

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Introduction TURP for LUTS caused by BPO is one of the most common urological procedures in the UK. Symptoms associated with BPO compromise the quality of life and general health status of affected individuals. However, the effect of surgery on overall quality

of life is often difficult to quantify. Many older men undergoing TURP have significant coexisting medical conditions, also affecting their quality of life. The Comorbidity Symptom Scale (CMSS) is an interviewer-administered questionnaire which quantifies the patients' perception of symptom severity. It has been well validated in a cohort of patients undergoing cataract surgery. The CMSS is a combined disease inventory and assessment of symptom severity [*JAGS* 2000; **48**: 1674–8]. The object of this study was to use the CMSS to determine the effect of comorbidity on the patients' perception of outcome after TURP.
Patients and methods Forty-four patients undergoing TURP for BPO were interviewed 24 h before and 3 months after surgery. Questionnaires completed included the CMSS, IPSS, sexual function, general health questionnaire (GHQ), hospital anxiety and depression (HAD) score, mini-mental state examination (MMSE) and Nottingham Extended Activities of Daily Living (ADL).
Results There were no differences between the scores for the ADL, GHQ, sexual function or MMSE before and after TURP. All urinary symptoms showed a significant improvement ($P<0.001$). The mean scores for all comorbidity items showed a significant improvement after TURP (19.1 vs 13.8, $P<0.001$). Moreover, when excluding urological scores, the comorbidity scores still showed a highly significant improvement (15.4 vs 12.3, $P=0.001$).
Conclusion The significant improvement in comorbidity scores detected after TURP is only partially a result of the relief of urological symptoms. TURP would seem to have an effect on the perception of symptoms from other comorbidities. A larger study is needed to evaluate this in more detail.
Funding: Prostate Research Campaign (UK)

P018

Should aspirin be stopped before TURP? Is there an answer?

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Introduction The evidence to suggest that patients who are on aspirin at the time of TURP have a higher risk of postoperative haemorrhage is conflicting. A randomized, prospective controlled trial (RPCT) was designed that could achieve statistical significance in resolving this issue. The feasibility of conducting this trial in the Australian state of Tasmania was also determined.
Methods A retrospective pilot study estimated the number of patients who undergo TURP annually in Tasmania, and the proportion of these who are on aspirin at the time of surgery. Using 'comparison of proportions', a statistical model determined how many patients would be required in a RPCT to support the hypothesis that concurrent aspirin therapy does not increase the risk of haemorrhage after TURP. The endpoints to be measured were the incidences of clot retention and blood transfusion, that historically occur at the 3% level. A doubling of these rates to the 6% level was arbitrarily assumed to be of clinical importance.
Results The proposed RPCT would require recruitment of ≈ 800 subjects into each arm to achieve statistical significance. If a lower level of clinical importance was assumed (e.g. 5%), even more patients would be required. About 80 patients on aspirin undergo TURP each year in the public sector in Tasmania. It would therefore take 20 years to recruit sufficient patients to conduct a statistically significant study.
Conclusions It is not feasible to conduct a meaningful study on TURP, haemorrhage and aspirin in Tasmania alone. A multicentre trial is required.

P019

TURP: do we know how much tissue to resect?

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Introduction TURP is the treatment of choice for symptomatic BPE. Alternatives to TURP may remove less tissue yet have equivalent outcomes. In contrast Chen *et al.* [*BJU Int* 2000; **85**: 79–82] reported a close correlation between the extent of tissue removal and clinical outcome. We present data on prostate volume and clinical outcome from a prospective study comparing TURP and transurethral vaporization of the prostate (TUVP).
Patients and methods In all, 235 men were randomized to TURP or TUVP. Patients were assessed before and 6 months after surgery with the IPSS, flow rates, pressure-flow urodynamics and TRUS. Data from TRUS were available for 203 patients. Nine patients had an increase in prostate size of >100% after surgery and were excluded from further analysis; 97 patients had complete pressure-flow urodynamic data.
Results The mean decrease in prostate volume was 24.8 mL in TURP and 21.5 mL in TUVP, representing a mean volume reduction of 40.5% and 36.2%, respectively. The average resected weight for TURP was 19.5 g. There was a poor correlation between prostate volume reduction and change in IPSS, flow rate or Abrams-Griffith number ($r=0.16$, 0.15, and -0.14, respectively).
Conclusion There is a poor correlation between prostate volume reduction and the subjective and objective outcome of bladder outlet surgery.
Funding: NHS R&D HTA Programme

Tuesday 25 June 14.30–15.30
Poster Session 3. Renal Cancer and Transplantation
Chairmen: M. Aitchison and P. Keane

P020

Cyclo-oxygenase 2 is over-expressed in RCC compared with normal kidney

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Introduction Cyclo-oxygenase-2 (COX-2) is important in the development and progression of several tumours; its role in RCC is unknown. Our objective was to determine COX-2 expression in RCC.
Patients and methods Surgical specimens (tumour and normal tissue) were obtained from seven patients with RCC. Cultured human RCC cells were analysed from three well-characterized cell lines. RT-PCR and immunoblotting were used to assess COX-2 expression. An intraoperative renal arterial and venous blood sample was obtained in one patient.
Results COX-2 mRNA levels were greater in five of the seven tumours than in normal tissue. There was more COX-2 protein in all tumours examined than in normal tissue. COX-2 mRNA was present in two of three RCC cell lines basally, and was induced by the tumour-promoting ester PMA at 6 and 12 h in all cell lines. Peripheral blood mononuclear cells (PBMC) from a renal venous sample (one patient) expressed greater levels of COX-2 mRNA than an arterial sample from the same patient.
Conclusions The finding that COX-2 message and protein is up-regulated in RCC is novel. Passage of PBMC through a tumour appears to induce COX-2 *in vivo*. The expression of COX-2 by RCC may explain the relative resistance of this tumour to conventional chemotherapy and immunotherapy, given the importance of this enzyme in increasing angiogenesis and invasiveness and inhibiting immune surveillance and apoptosis. Based on these studies it is important to determine whether COX-2 inhibition is useful alone or as an adjunct in the treatment of RCC.

P021

MN/CA9 gene expression as a potential biomarker in RCC

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Introduction MN/CA9 is thought to have a role in regulating cell proliferation and oncogenesis. The existence of a tumour-associated antigen would present a possible target for the molecular diagnosis and management of RCC. We evaluated MN/CA9 expression as a biomarker for RCC.
Materials and methods A MN/CA9 RT-PCR assay was applied to 26 RCC samples, preoperative blood and urine samples from 15 of these cases and 35 nonmalignant grossly normal renal tissue, including 21 from the kidneys with RCC. Gene expression was compared with tumour stage, grade and cell type.
Results Of the 26 RCC, 21 showed MN/CA9 expression, compared with three of 35 nonmalignant renal tissue samples ($P < 0.05$). Cells with MN/CA9 expression were detected in nine of 15 blood and four of 15 urine samples. All patients with urinary MN/CA9 expression showed positivity in blood and tumour tissue, whereas all patients with MN/CA9 in circulating cells had gene expression in the tumour. There was no difference in gene expression in tumour tissue, blood and urine in relation to stage, grade and histological cell type of RCC. However, all three patients with metastatic RCC had cells with MN/CA9 expression in their circulation.
Conclusions MN/CA9 expression in RCC is an adjunct to the cytological and histological diagnosis of RCC. Gene expression in blood may be used as a marker of metastasis or recurrence during follow-up. The low frequency of positive cancer cells in urine precludes using this approach for RCC screening.

P022

Laparoscopic radical nephrectomy for renal tumours

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Introduction After previously restricting laparoscopic nephrectomy to benign indications, all patients referred to one surgeon for radical nephrectomy were considered for a laparoscopic procedure.
Patients and methods Thirty-four consecutive patients with renal tumours requiring radical nephrectomy in an 8-month period from March 2001 were considered.
Results Ten patients were considered unsuitable for laparoscopic surgery (eight caval thrombus, one bulky tumour of 17 cm, and one lymphadenopathy). In two further cases the procedure was converted to open surgery after laparoscopic assessment (adhesions preventing introduction of further ports and mesenteric involvement by a 14-cm sarcomatoid tumour). In 22 cases, laparoscopic radical nephrectomy was undertaken using a modification of the transperitoneal approach for laparoscopic donor nephrectomy. The vascular pedicle was isolated and divided before mobilizing the kidney. The kidneys were retrieved intact within a plastic sack through either a 6–8 cm Pfannenstiel incision or port-site extension in the iliac fossa. One patient who developed hypercapnoea from a subcutaneous emphysema required open conversion via a subcostal incision. This and a wound separation requiring resuturing were the only complications. Blood loss was < 200 mL in all cases. The median (range) operative duration was 125 (70–270) min and the tumour diameter 5 (2.5–7) cm. A trainee was involved with all cases and was the primary surgeon for the entire procedure in eight.
Conclusions This series from a tertiary referral centre suggests that laparoscopic radical nephrectomy may be applicable to a large proportion of renal tumours. In units undertaking many of these procedures, trainees can readily acquire the necessary skills for this operation.

P023

Hand-assisted vs retroperitoneal laparoscopic nephrectomy: what's the catch?

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Introduction Proponents of hand-assisted laparoscopy (HAL) claim that the ability to retract and perform blunt dissection coupled with tactile sensation, 3-D spatial orientation and proprioception, offer the aspiring laparoscopic urologist the option to combine the ease of open surgery with the obvious benefits of laparoscopy; this results in a 'flatter' learning curve. The price that apparently must be paid for the use of HAL is surmised to be an increase in perioperative morbidity resulting in an increase in the length of inpatient stay. Our study assesses our experience with these approaches.
Materials and methods We prospectively recorded the perioperative details of patients undergoing laparoscopic ablative procedures by

one surgeon in district general hospitals. The operative time, blood loss and inpatient stay were noted. At the time of submission, data were available for 31 patients (mean age 58 years, range 15–80, and comparable between the groups); 13 underwent retroperitoneal nephrectomy (10 simple, three radical) and 18 HAL nephrectomy (two simple, nine radical, and seven nephroureterectomies). The selection criteria were somewhat arbitrary; larger tumours (T2) were assigned to the HAL group but three of the HAL radical nephrectomies were for T1 tumours. All retroperitoneal radical nephrectomies were for T1 tumours and all simple nephrectomies were for poorly functioning kidneys.
Results Comparison of HAL vs retroperitoneal nephrectomy.
Conclusions HAL did not result in a statistically significantly increased blood loss or a longer stay in hospital. This small study

		Mean		
Type of procedure	*No.*	*Operative time, min*	*Blood loss, mL*	*Hospital stay, days*
TP HAL RaN	9	130	160	4
TP HAL RaNU	7	240	240	4
HAL simple N	2	130	50	3
RP simple N	10	150	100	3
RP RaN	3	200	200	4

TP, transperitoneal; RP, retroperitoneal; N, nephrectomy; NU, nephroureterectomy; Ra, radical.

suggests that the differences between these techniques may be smaller than initially presumed. A prospective randomized trial comparing the two routes for tumours of similar size will provide definitive evidence.

P024

Loco-regional recurrence after nephrectomy for RCC – is further surgery worthwhile?

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Introduction The treatment of loco-regional recurrences of RCC after nephrectomy remains controversial. We examined the results of surgical treatment of loco-regional recurrences of RCC in patients with no distant metastases.
Patients and methods Between 1995 and 2001 (follow-up range 11–70 months) 11 patients (two female, mean age 69 years) with loco-regional recurrences of RCC after radical nephrectomy were referred from other hospitals. The sites of recurrence were ipsilateral adrenal, hilar nodes and renal bed in four each and within the skin incision in two. Secondary surgery comprised excision of the scar and wide en bloc excision of the adrenal (if present), renal bed tissue and all lymph nodes surrounding the ipsilateral great vessels.
Results Complete macroscopic clearance was achieved in all cases except one where nodes invaded the aorta. Seven of the eight with isolated adrenal and/or lymph node metastases are alive with no evidence of recurrence. Three of the patients with renal-bed recurrence developed distant metastases and died despite adjuvant immunotherapy. One of the two men with skin-incision recurrence died from metastatic disease despite immunotherapy.
Conclusions Excision of local recurrences of RCC is worthwhile; those with adrenal and local nodal recurrence fare best. It could be argued that adrenalectomy and complete nodal dissection at the first operation would have been more appropriate. Patients with recurrences within the renal bed and skin incision fare badly; this may reflect the aggression of the tumour or could be a result of tumour seeding from disruption of the primary.

P025

Can C-reactive protein help predict the response to interferon?

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Introduction An MRC trial showed that α-interferon improved survival in patients with advanced RCC, but response rates were low with considerable treatment toxicity [*Lancet* 1999; **353:** 14–7]. C-reactive protein (CRP), a measure of the systemic inflammatory response (SIR), is a prognostic indicator of survival in RCC [*Urology* 2001; **58:** 161–4]. We examined the relationship between CRP and response to interferon therapy.
Patients and methods CRP was measured before standard interferon therapy in 53 patients with progressive RCC. The response (defined for this purpose as complete response + partial response + stable disease) was assessed at 3 months.
Results Patients were grouped according to their CRP concentration; an abnormal CRP of >10 mg/L was considered as evidence of a SIR. Data are presented as the median (range) and groups compared using a chi-square-test.

Variable	*CRP ⩽ 10 mg/L*	*CRP >10 mg/L*	P
Number	15	37	
Age, years	63 (44–69)	60 (43–74)	0.478
Sex (M/F)	9/6	29/8	0.176
CRP (mg/L)	⩽10	76 (12–242)	–
ECOG PS 0/1/2	4/8/0	6/24/4	0.296
Response rate (3 months)	9/15	12/37	0.066

Conclusion As CRP appears to be an independent predictor of response, it could be used to identify patients most likely to benefit from interferon. SIR may be the cause of the poorer response to interferon in patients with a high CRP. Manipulation of the SIR response might be one way of improving the response rates to interferon.

P026

Interferon in the real world

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Introduction An MRC trial showed better survival with interferon treatment than with hormone therapy in RCC [*Lancet* 1999; **353:** 14–7]. We reviewed the outcome of patients treated with interferon in our specialised renal cancer clinic.
Patients and methods The tolerance and efficacy of interferon at a standard dose in patients treated between 1995 and 2001 for advanced RCC outwith a clinical trial were reviewed. Seventy patients were identified (mean age 60.2 years, range 38–74; male to female ratio 2.5 : 1; mean ECOG performance score before treatment 1, range 0–2).
Results The mean (range) duration of treatment was 5.3 (0.5–24) months. Sixteen patients received <3 months of treatment because of toxicity. Fifty-four patients were evaluable using the RECIST criteria. The overall response rate (ORR), measured as patients with evidence of a complete or partial response at 3 months was three of

54 (5.5%). If all 70 patients started on treatment are considered, the ORR decreased to 4.2%.

Response n *(%)*	*Treatment duration, months* 3	6
Number	54	35
Complete	1 (2)	1 (3)
Partial	2 (4)	2 (6)
Stable	18 (33)	16 (46)
Progression	33 (61)	16 (46)

Conclusion The ORR in our population was lower than in the MRC trial, (5.5% vs 13.6%) with stable disease in only a third of patients. The treatment was highly toxic with a quarter of patients unable to tolerate a 12-week course. Further studies are required to identify patients who will benefit from interferon therapy.

P027

Laparoscopic live donor nephrectomy: initial experience

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Introduction Laparoscopic donor nephrectomy (LDN) aims to make the act of kidney donation a more tolerable experience. We report our first year's experience with this technique.
Patients and methods All potential kidney donors were counselled about LDN. Only patients suitable for left kidney donation and found to have a single renal artery on MR angiography were considered.
Results Six patients underwent LDN (mean age 45.6 years). The donor and recipient were unrelated in three cases and related in three. A standard transperitoneal approach was used. One case was converted early because of failure to progress. In the remaining five, hand assistance was used to facilitate vessel ligation and extraction; three were completed laparoscopically with two conversions (one equipment failure, one failed to progress). The mean operative duration was 264 min, with an estimated mean blood loss of 200 mL. The mean warm and total ischaemia times were 19.5 and 73.8 min, respectively. Epidural analgesia was administered for 48 h, and the mean length of stay was 4.8 days. One patient developed a deep vein thrombosis after surgery. There was immediate graft function in all six cases, with no ureteric complications. One episode of acute rejection was recorded. Creatinine levels remained normal in the remaining five patients with a mean follow up of 7.9 months.
Conclusions LDN is technically feasible but is a challenging procedure that can be performed with minimal morbidity. The hand-assisted manoeuvre helps to control the vascular pedicle and reduce warm ischaemia time, but is not without difficulties because of the limited access and vision.

P028

Multimodal management of patients with urolithiasis after renal transplantation

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Objective To present the management and outcome of patients who developed urinary calculi after renal transplantation.
Patients and methods Between 1977 and 1999, 1476 patients underwent renal transplantation in one centre and 16 (13 adults and three children) developed urinary tract calculi.
Result The incidence of urolithiasis in renal transplant patients was 13 of 1325 (0.98%) in adults and three of 151 (1.98%) in children; their mode of presentation and the causes will be presented. Eleven patients were treated by ESWL, seven of whom required multiple sessions. Three patients required cystoscopy and stent insertion, and two required a nephrostomy tube to relieve obstruction. Two patients underwent flexible ureterorenoscopy and stone extraction, two had percutaneous nephrolithotomy (PCNL) and one patient each had open nephrolithotomy and open removal of bladder stones. PCNL failed to remove calculi in one patient who had the stone removed successfully by an open nephrolithotomy. The stone-free rate was 100% when different treatment methods were combined.
Conclusion There is a high incidence of metabolic causes and renal transplant patients with urolithiasis should undergo comprehensive metabolic screening. Flexible ureterorenoscopy and stone disintegration by laser currently adds another effective method of treating calculi in the transplanted ureter or kidney. The management of patients with urolithiasis requires a multidisciplinary approach by renal physicians, transplant surgeons, urologists and nurse specialists, who can provide treatment by a multimodal approach.

P029

Staged brachiobasilic fistula for secondary angio-access: preliminary results in 10 patients

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Introduction The brachiobasilic arteriovenous fistula (BBAVF) has been shown to be an effective means of secondary vascular access for haemodialysis. However, dissection and transposition of the deep and thin-walled basilic vein to the subcutaneous plane is a traumatic procedure, associated with a significant early failure rate from thrombosis. In 1997, El Mallah reported superior patency rates using a two-stage technique in which the anastomosis was formed in the deep plane and superficialized in a separate later procedure after venous arterialization. There have been no subsequent reports using this technique. We report our initial experience of the staged BBAVF in 10 patients.
Patients and methods Ten two-stage BBAVFs were formed in 10 patients (six women and four men, age range 54–75 years) with end-stage renal failure whose primary fistulae had failed and had no available superficial venous access. Both parts of the procedure were carried out under local anaesthesia. After initial formation of the anastomosis, patients were readmitted after an interval of 8 weeks for superficialization of the fistula (i.e. once venous arterialization had occurred). Fistulae were deemed ready for use 2 weeks later.
Results Of the 10 fistulae, nine remained patent after both the first and second stage, but one thrombosed before the second stage because of a period of hypotension. Of the nine remaining fistulae, three thrombosed at a mean of 11 months after the second stage, of which one had developed stenosis with steal syndrome and another haemorrhaged during use. One patient developed postoperative cellulitis that responded to antibiotic treatment. Six fistulae remain in use at present, with a mean (range) follow-up of 19 (14–32) months.
Conclusions This is only the second reported series using the two-stage technique to form a BBAVF. Our initial results suggest that the early patency rates are comparable with the one-stage procedure but a longer follow-up and more patients are needed before definitive conclusions can be drawn.

Tuesday 25 June 14.30–15.30
Poster Session 4. Basic Science: Oncology
Chairmen: N. Clarke and M. Knowles

P030

Expression of fibroblast growth factor receptors 3 and 4 in human prostate cancer

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Introduction The fibroblast growth factors (FGFs) and receptors (FGFRs) are important in the pathogenesis of prostate cancer. Many FGFs (FGF1, FGF2, FGF7 and FGF8) are over-expressed in prostate cancer. FGFs activate high-affinity FGFRs, of which there are currently five. FGFR1 and 2 are over-expressed in prostate cancer; FGFR3 and 4 are activated by several of the ligands over-expressed in prostate cancer (FGF1, FGF2, and FGF8), and their role in prostate cancer is not understood. We aim to examine expression levels of these receptors in malignant and benign prostate.
Materials and methods Immunohistochemistry was carried out on 58 malignant and 26 BPH histology sections. Each section was probed with antibodies raised against the c-terminus of each human FGFR protein. Each section was then scored depending on the staining intensity.
Results FGFR3 expression levels showed no significant variation in epithelial staining of BPH and malignant tissue sections. There was also no change in the pattern of cytoplasmic : nuclear expression levels, as has been reported in breast malignancies. Epithelial FGFR4 expression was entirely cytoplasmic with higher expression at the cell membrane. FGFR4 staining showed higher expression in high-grade prostate cancer than in benign prostate, using Fisher's exact test ($P<0.001$), and in moderate grade than in benign ($P<0.001$), and in high-grade than moderate grade ($P=0.004$).
Conclusions FGFR4 expression is up-regulated in prostate cancer and this correlates with increasing grade of cancer. This receptor may be important in prostate cancer development and progression, through its increased availability to up-regulated FGF ligands, thus potentiating prostate tumorigenesis.
Funding: British Urological Foundation

P031

Up-regulation of the b isoform of fibroblast growth factor 8 in prostate carcinogenesis

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Introduction Fibroblast growth factor 8 (FGF8) is known to be up-regulated in prostate cancer. However, correlations of expression with clinical variables has produced conflicting results. As the b isoform of FGF8 is the most tumorigenic, we assessed whether this isoform was more closely related to disease severity.
Materials and methods FGF8b expression in clinical prostate samples was analysed using an optimised immunoreactivity protocol. FGF8 gene amplification was concurrently studied by fluorescent *in situ* hybridisation (FISH). We then studied the effect of FGF8b on prostate cancer cell survival.
Results FGF8b was not expressed in 10 benign prostates; overall, 66% of cancers (59 radical prostatectomies, 30 TURP) expressed FGF8b. However, only 57% of organ-confined (stage T1–2) and 48% of low-grade disease (Gleason score 4–6) expressed FGF8b. In contrast, 95% of locally advanced disease (stage T3–4) and 75% of intermediate and high-grade disease (Gleason score 7 and 8–10) expressed FGF8b. Expression was also significantly associated with both stage ($P=0.02$) and grade ($P<0.001$). FISH studies showed no change in FGF8 gene copy number, with a mean (SD) number for benign nuclei of 2.33 (0.57) and for malignant nuclei 2.0 (0.81) ($P=0.51$). Using etoposide-induced apoptosis in LNCaP cells as a model, FGF8b enhanced survival and increased clonogenic efficiency, partly by blocking the activation of caspases.
Conclusion We report FGF8b over-expression in late-stage and high-grade prostate cancer. Furthermore, this occurs at the transcriptional level, as the gene locus is not amplified. FGF8b was also shown for the first time to have cell survival properties. These results suggest evidence of an important role for FGF8b in mediating prostate cancer progression.
Funding: Cancer Research Campaign

P032

Diethlymaleate primes for etoposide-induced apoptosis in the Dunning R3327-G rat prostate cell line

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Introduction Glutathione depletion by diethylmaleate (DEM) is associated with the onset of apoptosis. We have previously shown that manipulating glutathione by subtoxic dosage of DEM (25–50 μmol/L) is effective in priming for apoptosis in human prostate cancer cell lines. DEM primes for FAS antibody-, radiation- and chemical-induced apoptosis. The aim of this study was to determine whether similar concentrations of DEM could be used to prime for apoptosis in the Dunning model of prostate cancer.
Methods Dunning r3327-g rat prostate cells (1×10^5 per well) were cultured in the presence and absence of DEM (25 μmol/L) for 72 h. Cells were subsequently induced to undergo apoptosis by etoposide (62.5 μmol/L). Apoptosis and membrane integrity was assessed at 72 h by propidium-iodide incorporation as determined by flow cytometry. Cell proliferation was determined by crystal violet staining, as assessed by spectrophotometry.
Results The mean (SD) values were:

Treatment group	*% Apoptosis*	*Membrane integrity, %*	*Proliferation % of control*
n	3	3	
Control	11.9 (2.1)	89.3 (11.2)	100
DEM 25 μmol/L	10.1 (4.7)	90.0 (8.0)	62.5
Etoposide 62.5 μmol/L	44.6 (4.1)*	93.0 (7.7)	65.0
DEM 25 μmol/L + etoposide 62.5 μmol/L	56.5 (4.6)*†	90.3 (7.4)	38.5*

Student's *t*-test; *$P<0.001$ vs control, †$P<0.005$ vs etoposide.

Conclusion DEM did not induce apoptosis in the r3327-g cell line. Etoposide significantly increased the rates of apoptosis relative to control values. Pre-treatment with DEM significantly increased this effect and attenuated the antiproliferative effect of etoposide. The ability of DEM to prime the Dunning r3327-g cell line to apoptosis *in vitro* is likely to have important implications in establishing an *in vivo* model of adjuvant prostate cancer treatment.
Funding: Mater Hospital Grant

P033

A novel tri-specific antisense oligonucleotide to the inhibitors of apoptosis proteins enhances apoptosis in PC3 prostate cancer cells

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Introduction The inhibitors of apoptosis (IAPs) block caspase-mediated apoptosis. Prostate cancer cells are inherently resistant to apoptosis and previous studies in our laboratory showed that the IAPs are over-expressed in prostate cancer. We used a tri-specific antisense oligonucleotide (AO) to c-IAP1, c-IAP2 and xIAP to determine if down-regulation of these IAPs would increase apoptosis in PC3 cells.
Materials and methods Time and dose–response experiments showed that 6 h of incubation with 200 nmol/L of oligonucleotide and lipofectin resulted in optimum transfection conditions. These conditions were used to determine the effects on PC3 cells of IAP AO, scrambled AO and lipofectin alone. The endpoints were the percentage apoptosis (propidium iodide DNA staining using flow cytometry), cell number (crystal violet uptake assay) and IAP protein expression (SDS-PAGE western blotting). The results were assessed using Student's *t*-test.
Results The mean (SD) results were:

Treatment	*% Apoptosis*	*Cell no. (% control)*
Control	3.8 (1.3)	100 (16.2)
Lipofectin	4.7 (1.8)	77.9 (19.8)
IAP AO	7.3 (2.2)*	65.5 (26)†
Scrambled AO	4.4 (2.0)	73.0 (13.3)

*$P<0.05$ vs all groups, †$P<0.05$ vs control only, three independent experiments.

The IAP AO significantly induced apoptosis ($P=0.002$) and reduced cell numbers ($P=0.01$) compared with untreated controls. Western blotting showed a down-regulation in the expression of c-IAP1, c-IAP2 and XIAP in IAP AO-treated cells when compared with control cells.
Conclusions The tri-specific AO enhanced apoptosis in PC3 cells by down-regulating IAP expression. Strategies that target IAP expression, thereby enhancing apoptosis, could lead to the development of new treatments for prostate cancer.

P034

Chemosensitization of human prostate cancer using antisense oligonucleotides targeting the type 1 IGF receptor

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Introduction Androgen-independent prostate cancer is characterised clinically by chemoresistance. The type 1 IGF1 receptor (IGF1R) is important for tumour growth and apoptosis protection. Recent *in vitro* studies indicate that the IGF1R is up-regulated in prostate cancer cells during the development of androgen-independence. This study examined whether antisense oligonucleotides (AOs) to the IGF1R can reduce survival and enhance chemosensitivity in human DU145 androgen-independent prostate cancer.
Materials and methods DU145 cells were treated with IGF1R AOs or scrambled control OAs. Monolayer growth was assessed by MTS assay and anchorage-independent growth was assessed by measuring clonogenic survival in soft agar. AO-treated cells were exposed to cisplatin, mitoxantrone, paclitaxel or vehicle control. DU145 prostate cancer cell clones expressing IGF1R antisense RNA were developed to assess *in vivo* growth in nude mice.
Results IGF1R AOs caused dose-dependent inhibition of IGF1R expression to levels of 30–40% of those in control-treated cells. This was accompanied by a marked reduction in DU145 growth as measured by the MTS assay, and clonogenic survival was reduced by up to 80%. Growth of IGF1R antisense RNA-expressing DU145 cell clones was almost completely abolished *in vivo*. Furthermore, IGF1R AOs enhanced chemosensitivity to cisplatin, mitoxantrone and paclitaxel, with a 1.5–2-fold reduction in IC_{50}.
Discussion These results indicate that IGF1R down-regulation enhances the chemosensitivity of androgen-independent prostate cancer. In a clinical setting, targeted suppression of the IGF1R using AO technology may enhance the effects of conventional chemotherapy and therefore offers promise as novel therapy for patients with androgen-independent disease.
Funding: The PPP Foundation

P035

Characterisation of PSA promoter-enhancer constructs for prostate-specific gene therapy

J.G. Young, P.F. Searle*, L.S. Young*, A.P. Doherty*, D.M.A. Wallace* and N.D. James *CRC Institute, University of Birmingham and *University Hospital, Birmingham, UK*

Introduction The genes for the prodrug converting enzyme *Escherichia coli* nitroreductase and the reporter gene-enhanced green fluorescent protein (EGFP) have been cloned into adenoviral gene therapy vectors. The transgenes are controlled by a double PSA enhancer/single PSA promoter transcriptional regulatory region (TRR). The activity of this promoter was investigated in prostate cancer cell lines and primary prostate tissue. The stability of this PSA TRR was examined by southern blotting.
Materials and methods The human cell lines LNCaP, PC-3 and DU145, and the mouse prostate cancer cell lines transgenic adenocarcinoma mouse prostate (TRAMP) c1 and c2 were infected with adenovirus containing the reporter transgene EGFP and expression assayed by FACS analysis. Thin sections of primary prostate tissue from radical prostatectomy specimens were infected with adenovirus and EGFP expression analysed.
Results EGFP expression was detected in all human but not the TRAMP cell lines. Gene expression levels in the cell lines PC-3 and DU145 were lower than in LNCaP. Primary prostate tissue infections confirmed EGFP expression exclusively from epithelium. Southern blotting of viral DNA digests showed instability of this PSA TRR, with evidence of recombination to form single and triple enhancer variants during viral replication.
Conclusions The epithelial specificity of the PSA promoter-enhancer construct was confirmed in primary prostate tissue. Genetic instability with evidence of homologous recombination was found in viral DNA, making this vector unsuitable for clinical trials. Novel methods to increase the strength of PSA TRR-driven gene therapy will have to be found as replication of promoter or enhancer elements leads to genetic instability in vectors.
Funding: MRC/Royal College of Surgeons

P036

Combined suicide gene therapy and immunotherapy in the TRAMP model of prostate cancer

J.G. Young, N.K. Green, P.F. Searle, A.P. Doherty†, D.M.A. Wallace† and N.D. James *CRC Institute, University of Birmingham and †University Hospital Birmingham, UK*

Introduction A novel gene therapy system has been developed using *Escherichia coli* nitroreductase (NR) to convert the prodrug CB1954 into a potent alkylating agent. To elicit additional systemic antitumour effects single and combination adenoviral vectors expressing NR and mouse granulocyte-monocyte colony stimulating factor (MGMCSF) have also been generated. These were characterised in the transgenic adenocarcinoma mouse prostate (TRAMP) model of prostate cancer both *in vitro* and *in vivo*.
Materials and methods Vectors expressing the marker genes green fluorescent protein and β-galactosidase were used to assay infectivity and transgene expression levels *in vitro* and *in vivo*. Subcutaneous flank tumours were established in syngeneic c57/bl6 mice for *in vivo* studies.
Results TRAMP cells showed high adenoviral infectivity. *In vitro* enhancement of toxicity to CB1954 was similar in cells infected with the dual virus or a virus expressing NR alone. Studies of established subcutaneous TRAMP c2 tumours injected with ad5-β-galactosidase showed 1000-fold increases in transgene expression compared with mock infections. Injection of the dual expressing vector ad5-MGMCSF-NR produced a survival benefit in animals with TRAMP c2 tumours, but no additional benefit in survival was produced by injection of cb1954. *Ex vivo* gene therapy of TRAMP c2 cells with AD5-MGMCSF ablated tumour development compared with control adenovirus.
Conclusions Efficient infection and expression of transgenes has been shown in the TRAMP model. Subcutaneous tumours grown in syngeneic mice respond to intratumoral ad5-MGMCSF/NR but addition of prodrug conferred no additional survival advantage. *Ex vivo* treatment of TRAMP c2 cells with AD5-MGMCSF ablates tumorigenesis, suggesting that MGMCSF is the therapeutically active transgene.
Funding: MRC/Royal College of Surgeons

P037

Suicide gene therapy using a cytosine deaminase/5-flucytosine system in rat prostate cancer models

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Introduction New treatments are needed for patients with hormone refractory prostate cancer. We investigated the effectiveness of the cytosine deaminase/5-flucytosine (CD/5-FC) suicide gene therapy system in rat prostate cancer models *in vitro*.
Materials and methods PA3 and MLL cells were stably transfected with CD using a double-copy recombinant retrovirus under the control of the ERBb2 promoter. Transfection was confirmed using immunohistochemistry. Cell cytotoxicity with 5-FC was assessed using the MTS assay, and apoptosis using the commercially available Apoptag kit. The bystander effect was assessed by plating cells at different concentrations of wild-type and transfected cells. Cell viability was assessed using the MTS assay.
Results CD expression was confirmed by immunohistochemistry. Six days of treatment with 10 μg/mL 5-FC resulted in 60% cell viability in the transfected PA3 (PCD) cells, compared with 95% of the wild-type (PA3-WT). Three days of treatment with 100 μg/mL resulted in 40% cell viability in the transfected MLL (MCD) cells, compared with 95% in the MLL wild-type (MLL-WT). The bystander effect was apparent in both systems; the viability was 60% with only 30% transfected cells in the PA3 model. In the MLL model only 30% of the cells needed to be transfected for 40% cell viability. Apoptosis was detected in 30% of PCD cells and none of the PA3-WT cells after 6 days of treatment with 5-FC, and in 40% of the MCD cells vs none of the MLL-WT cells after 3 days of treatment.
Conclusions Cell death by apoptosis can be detected in transfected cells *in vitro*. There was a significant bystander effect *in vitro* and we are currently using these systems *in vivo*.

P038

MAP kinase kinase-5 over-expression in prostate cancer induces proliferation, migration and invasion

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Introduction MAP kinase kinase-5 (MEK5) is an important cell signalling protein which has a pivotal role in cellular mitogenesis [*Nature* 1998; **395:** 713–6]. It specifically phosphorylates ERK5 [*J Biol Chem* 1995; **270:** 12665–9], which activates the MEF2 transcription factors and c-jun [*EMBO J* 1997; **16:** 7054–66]. Previous work by our group has shown that MEK5 is over-expressed in human prostate cancer and that high expression is associated with the presence of metastases and poor survival. We conducted *in vitro* experiments to examine the mode of action of MEK5 in metastasis.
Materials and methods LNCaP cells were transiently transfected with the constitutively active form of MEK5 (LNCAP-d) or the vector alone (LNCAP-v). The properties of these cells were compared using a WST-1 proliferation assay, a migration assay and a matrigel-invasion assay. The proliferative, migration or invasion index was calculated to be the proportional increase in induction of these properties of LNCaP-d cells compared with LNCaP-v cells, and assessed using *t*-tests.
Results The WST-1 assay showed that the proliferative index of the LNCaP-d cells was 3.7 times greater than that of LNCaP-v cells ($P<0.001$). The LNCaP-d cells also migrated across a membrane and invaded through extracellular matrix more readily than the LNCaP-v cells; the migration index was 1.8 times and the invasion index 2.1 times that of LNCaP-v (both $P<0.001$).
Conclusions MEK5 over-expression in prostate cancer cells produces increased cellular proliferation, migration and invasion. These data provide further evidence to suggest a role for MEK5 in tumour invasion and metastasis.
Funding: British Urological Foundation, Helen Tomkinson and Albert McMaster Foundation

P039

Induction of neuroendocrine differentiation contributes to androgen-independent prostate cancer cell migration

C.P. Evans, M.J. Novotny, J.C. Yang and H.J. Kung *School of Medicine, University of California Davis, CA, USA*

Introduction Removing the androgen stimulus for prostate cancer growth and differentiation initially induces apoptosis, but prostate cancer cells eventually continue to grow in an androgen-independent (AI) state. During this transition, cancer cells may acquire neuroendocrine characteristics. Mitogenic hormones such as neurotensin stimulate the AI growth of cancer cells. Our hypothesis is that neuroendocrine differentiation contributes to the AI migration of cancer cells.
Materials and methods Androgen-sensitive prostate cancer cells (LNCaP) were grown in the presence or absence of androgen, or under conditions of both androgen deprivation and stimulation by interleukin-6, neurotensin, or bombesin. Neuron-specific enolase expression (a marker of neuroendocrine differentiation), neurotensin secretion and cell morphology were examined. In addition, the ability of neurotensin and bombesin to stimulate AI cell migration was assessed using a Boyden chamber assay.

Results Androgen deprivation with and without interleukin-6 stimulation resulted in both greater neuron-specific enolase expression and neurotensin secretion than in cells grown in the presence of androgen. Whereas untreated LNCaP cells have a fusiform morphology with tapering into unbranched processes, LNCaP cells stimulated with interleukin-6 in the absence of androgen developed compact rounded cell bodies and extended numerous long, fine, branched processes characteristic of neuronal cells. These changes were reversible on adding androgen to the growth media. In addition, both neurotensin and bombesin stimulated LNCaP migration three- to four-fold compared with the negative control.
Conclusions These data suggest that prostate cancer cells undergo differentiation to a neuroendocrine phenotype and contribute to the AI migration of cancer cells.

P040

Development of an inducible system to investigate the role of bone morphogenetic protein-6 in metastatic prostate cancer

S. Darby, N. Brown*, D.E. Neal, F.C. Hamdy* and C.N. Robson *University of Newcastle and *University of Sheffield, UK*

Introduction Bone morphogenetic proteins (BMPs) are members of the TGFβ superfamily that are important in cellular differentiation, proliferation and bone remodelling. BMPs regulate the expression of nuclear target genes by signalling through the intracellular SMAD pathway. We previously showed that BMP-6 is over-expressed in prostate cancer with established secondary skeletal metastases, which predominantly form osteoblastic lesions [*Br J Cancer* 1998; **78:** 1219–23; *Cancer Res* 1997; **57:** 4427–32]. The precise role of BMP-6 in the development and progression of prostatic metastases remains to be elucidated.
Materials and methods A BMP-6 tetracycline-inducible gene expression system was generated in the PC3-M prostate cancer cell line. BMP-6 protein over-expression was induced by tetracycline in a dose-dependent manner. *In vitro* assays were used to assess the effect of BMP-6 over-expression on cellular proliferation, migration, invasion and apoptosis. RT-PCR was used to measure the level of matrix metalloproteinase (MMP) expression in cells over-expressing BMP-6.
Results Western analysis showed that the tetracycline-inducible BMP-6 protein levels could be several times higher than the level of endogenous levels. Maximum expression occurred at 36–48 h of treatment with 1 μg/mL tetracycline. Comparable levels of secreted BMP6 were found in the culture medium. There was an increase in cellular migration and invasion after inducing BMP6 protein. MMP1 and MMP9 mRNA levels were increased in response to the induction of BMP-6 protein.
Conclusions BMP-6 is likely to be important in prostate cancer, particularly in the formation of skeletal metastases. The development of a BMP-6 inducible system opens a new avenue in studying the role of BMP-6 in metastatic prostate cancer.
Funding: Association for International Cancer Research (AICR)

Tuesday 25 June 16.00–17.00
Poster Session 5. BPH 2
Chairmen: T. McNicholas and M. Speakman

P041

Is TURP becoming an obsolete operation?

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Introduction TURP, often for acute urinary retention (AUR), was one of the commonest urological operations performed during the latter decades of the 20th century. However, our clinical impression is that this may no longer be the case. This study examines the changes in the incidence of AUR and the number of TURPs carried out in our unit over a 4-year period.
Patients and methods In all, 409 men were admitted with AUR in 1996, compared with 346 in 2000, a reduction of 15%. There were 375 TURPs in 1996, in contrast to 204 in 2000, a reduction of 45%. At the end of 1996, 160 patients were on the waiting list for an elective TURP, compared with 67 in December, a reduction of 58%. During the same period there has been a large increase in the use of drugs for the medical therapy of BPH. Prescriptions in the Cardiff area for finasteride increased from 3337 in 1996 to 4463 in 2000, an increase of 33%. Moreover, prescription numbers for the two most commonly used α-blockers (tamsulosin and alfuzosin) increased from 2984 in 1996 to 12 392 in 2000, an increase of 315%.
Conclusion The incidence of AUR is decreasing and fewer patients are undergoing or waiting for TURP. Many more men are now treated with medical therapy for symptoms of BPH than were so treated 4 years ago. Should these changes continue they are likely to have a major effect on urological practice and training.

P042

Myocardial infarction during TURP: incidence and implications

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Introduction Although TURP is generally considered the 'gold standard' treatment, myocardial damage has always been accepted as a potential consequence of TURP. Until recently there has not been a sufficiently sensitive or specific marker to accurately identify the incidence of this complication. Serum cardiac troponin I has the required characteristics and was measured in a series of 199 consecutive evaluable cases.
Patients and methods Serum for cardiac troponin I was collected before and 16–24 h after surgery. Patients with increased troponin I after surgery but normal levels before were considered to have sustained cardiac damage. The Detsky score (an index of cardiac risk), blood loss, irrigant absorption and other risk factors were assessed.
Results The mean age of the patients undergoing TURP was 73 years, the median blood loss during surgery 216 mL and the mean absorption of irrigant 140 mL. In 15 patients (8%), the cardiac troponin I level after surgery rose above the 95th centile for healthy individuals (0.4 μg/L), indicating cardiac damage. In five patients (2.6%) the troponin I levels were >2.0 μg/L. The only significantly different intraoperative variable was blood loss.
Conclusion These results, if reproduced, carry significant implications. Blood loss is not normally measured during TURP, although techniques are available. Other technologies, e.g. the bipolar electrode, appear to reduce blood loss and may be preferable. Should we be warning all patients that there appears to be a >5% chance of sustaining cardiac damage after TURP?

P043

A multicentre prospective, randomized, double-blind placebo-controlled trial of aspirin during TURP

R. Donat, M.S.A. Neill, R.J.S. Webber, G. Rix, A. Raza* and The East of Scotland Urological Research Group† *Western General Hospital, Edinburgh, *Ninewells Hospital, Dundee, and †Western General Hospital and Ninewells Hospital, Scotland, UK*

Introduction Many patients scheduled for TURP take aspirin (≈ 11%); aspirin might have a beneficial cardiovascular protective effect if continued before and after surgery. Whether concurrent medication with aspirin during TURP causes a significant increase in perioperative bleeding complications remains controversial. We conducted a prospective randomized trial to assess the risk of bleeding associated with aspirin.
Patients and methods A prospective, randomized, double-blind, placebo-controlled trial of 98 patients undergoing TURP was conducted. The main outcome measures were: intraoperative blood loss, haemoglobin levels on day 0, day 1 and day 3 after TURP, the blood transfusion rate, number of postoperative bladder washouts and delay in catheter removal because of bleeding. We also recorded a preoperative clotting profile, the tissue weight resected, surgeon, previous catheterization, use of finasteride, presence of cancer and any cardiovascular complications. The results were assessed statistically using multiple linear regression analysis, the chi-square test and Spearman rank correlation.
Results The mean (SEM) intraoperative blood loss adjusted for prostate weight was 10.1 (1) mL/g for the aspirin group and 9.1 (1) mL/g for the placebo group ($P = 0.07$, not significant). Twenty-nine patients on aspirin required at least one bladder washout, compared with 15 patients on placebo ($P = 0.014$). Eighteen patients on aspirin had delayed catheter removal, compared with four on placebo ($P < 0.01$). Four on aspirin required a blood transfusion for prolonged postoperative bleeding and two underwent reoperation for bleeding. There were no cardiovascular complications.
Conclusion Aspirin has no major effect on intraoperative blood loss, but significantly increases postoperative bleeding complications.

P044

Inter-operator TURP bleeding – is it a good measure of surgical skill?

J. Wilson, T. Lench, A. Keegan and M.J. Speakman *Taunton & Somerset NHS Trust, UK*

Introduction TURP is a benchmark for the training of specialist registrars, and is an important area of audit and clinical governance for consultants. Bleeding after TURP and transfusion rates could be useful measures for assessing the quality of TURPs.
Methods Patient data were audited for three consecutive years (October 1997 to September 2000) and were complete for 925 of a possible 1011 patients. Haemoglobin level, resection weights,

number of transfusions, operative surgeon and histology were assessed before and after TURP. The decrease in haemoglobin was expressed as a percentage of the resection weight for TURP conducted by five consultants, six registrars and one associate specialist.
Results The mean decrease in haemoglobin level for the individual consultants remained surprisingly constant over the 3 years. The range varied by 383%, whilst resection weight varied by only 100%. There were significant differences between the registrars' values from year to year, with a strong correlation with resection weight, but a tendency for greater blood loss in the middle years of training. The transfusion rate for all operators varied between 0 and 21%. Histology did not correlate with blood loss but the overall cancer detection rate for the 3 years was 23%.
Conclusion This simple ongoing audit has allowed 3 consecutive years of specialist registrars and consultants to be evaluated, the practice changed where necessary, and has allowed standards to be set for comparative audit. It indicates that there is a TURP blood loss 'fingerprint' for each surgeon, which varies with ability and may be useful for comparing operators.

P045

The accuracy of DRE in the determination of prostate size

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Introduction It is common practice to estimate the volume of the prostate gland during a DRE. Recent reports suggest that prostates of <30 mL would be better treated with transurethral incision of the prostate (TUIP) rather than TURP. We propose that it would be more accurate to estimate the size of the prostate as either small (<30 mL), medium (30–50 mL), large (51–100 mL) or very large (>100 mL). We prospectively compared the accuracy of both methods against that obtained by standard TRUS.
Patients and methods In all, 142 patients were prospectively enrolled and underwent DRE and TRUS by the same investigator. Prostate volume was estimated and grouped by DRE, and then by TRUS.
Results The interclass correlation coefficient was 0.68, indicating a good correlation for the DRE estimate of volume. This compares with a kappa score of only 0.55, indicating only a moderate correlation for the use of size groupings. The sensitivity and specificity for deciding whether a gland is <30 mL by DRE was 56% and 90%, respectively, when the exact volume was assessed, compared with 62% and 89% when size groupings are used.
Conclusions Overall there was a higher correlation for DRE weight estimation in grams rather than for groups. There is no statistical difference in the two methods when assessing glands to determine volume above or below 30 mL.

P046

The assessment of bladder contractility in men with LUTS by noninvasive measurement of bladder pressure

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Introduction Preoperative CMG gives information about the likelihood of a successful surgical outcome in men with LUTS, presumed secondary to BOO, but is invasive and uncomfortable. We have developed a method of noninvasively measuring bladder pressure, and this study aims to assess its usefulness in investigating bladder contractility.
Patients and methods A paediatric blood-pressure cuff is placed around the penis. When voiding has commenced, the cuff is automatically inflated until flow is interrupted. Preliminary results suggest that the cuff pressure (P_{cuff}) at flow interruption reflects intravesical isovolumetric pressure ($P_{ves,isv}$). From September 2001 until October 2002, 150–200 men with LUTS will have their P_{cuff} measured, with and without invasive CMG, to compare it with the current 'gold standard'.
Results To the end of November 2001, 42 patients (mean age 62 years, range 29–88) were recruited. A satisfactory measurement required a minimum voided volume of 200 mL. Analysis confirmed that the $P_{ves,isv}$ could be estimated from P_{cuff}; the Bland Altman (BA) method showed a mean difference ($P_{cuff}-P_{ves,isv}$) of 15 (24) cmH_2O. Over-estimation of $P_{ves,isv}$ was mainly caused by a cuff position below the symphysis pubis (mean height difference 9 cm). Test/re-test reproducibility was comparable with CMG, with a (BA) P_{cuff} measurement on separate voids of 4 (18) cmH_2O. Assessment by questionnaire showed that 74% of subjects preferred the cuff measurement to CMG (21% had no preference).
Conclusions These results support our pilot work which showed that P_{cuff} gives a good estimate of $P_{ves,isv}$. We consider that the test provides information about bladder contractility, which may be useful for the clinical assessment of men with LUTS.
Funding: Action Research, Prostate Research Council, Freeman Hospital Trustees

P047

The 'golden finger' in prostate volume analysis: should we trust digital estimation?

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Introduction We conducted a prospective analysis assessing estimates of prostate volume by TRUS, abdominal ultrasonography (AU) and DRE.
Patients and methods Fifty consecutive patients were assessed as outpatients. Five urologists with a minimum of 10 years' experience in examining prostates (by DRE) were randomly allocated patients to estimate their prostate size by DRE and/or TRUS. Patients were excluded if clinical T3+ prostate cancer was found. Two radiographers independently conducted AU to estimate prostate size. Both sets of observers were unaware of the other results. An independent reviewer analysed the data using the median (95% CI) values and compared the groups using Student's paired *t*-test.
Results The volume estimates were: DRE, 35 (5.26); AU 39 (7.24); and TRUS, 34.5 (5.72) mL. There was a significant difference between DRE and AU ($P=0.03$), and TRUS and AU ($P=0.0015$), but not between DRE and TRUS.
Conclusions This prospective, blinded study comparing methods of estimating prostate volume suggests that AU overestimates prostate volume and DRE appears to be a good estimate of volume, when compared with the gold standard (TRUS).

P048

No correlation between body mass index, total body fat content and lower urinary tract variables in symptomatic men

N.K. Lynn, G.N. Collins, S.C.W. Brown, P.J.C. Brooman and P.H. O'Reilly *Department of Urology, Stepping Hill Hospital, Stockport, UK*

Introduction The Massachusetts Male Aging Study suggested that body mass index (BMI) does not predict the development of BPH in asymptomatic men. However, others report an association between obesity and surgically treated BPH. We assessed the association between total prostate volume (TV), transitional zone volume (TZV), PSA, maximum urinary flow rate (Q_{max}), postvoid residual urine volume (PVR), the IPSS, BMI and total body fat content in symptomatic men.

Patients and methods A series of 195 consecutive men with LUTS were assessed. The TV and TZV were measured using TRUS (7.5 MHz), and PSA, height, weight, Q_{max}, PVR, IPSS and total skin-fold thickness also measured. The BMI and total body fat content were calculated using standardized nomograms. Spearman's rho was calculated for correlations.
Results The median (range) age, TV, TZV, PSA, Qmax, PVR, IPSS, BMI and total body fat content were 66.0 (43.0–87.0) years, 40.7 (29.3–134.0) mL, 18.6 (2.5–80.0) mL, 2.4 (0.8–30.0) mL, 12.0 (5.0–38.0) mL/s, 61.8 (0.0–1000) mL, 12 (5–31), 26.2 (12.0–84.75) and 23.2 (6.7–47.58) kg. There were no correlations between TV, TZV, PSA, Q_{max}, PVR, IPSS and BMI as the rho values were −0.023, −0.037, −0.132, 0.109, −0.097 and 0.031. All were statistically insignificant ($P>0.05$). There were also no correlations between TV, TZV, Q_{max}, PVR, IPSS and total fat content, as rho values were −0.048, −0.058, 0.132, −0.114 and 0.048. However, there was a weak correlation between PSA and total body fat content (rho = 0.2, $P<0.05$).
Conclusion There were no correlations between lower urinary tract variables, BMI and total body fat content. However, the correlation between PSA and total body fat content suggests a biological effect of obesity in prostate disease.

P049

Intermittent self-catheterization. A treatment option for acute urinary retention

N. Haldipur, D.P. Shipstone and J. Leveckis *Doncaster Royal Infirmary, Doncaster, Yorks, UK*

Introduction CISC is well established in the management of chronic urinary retention and neuropathic bladder dysfunction, whereas a trial without catheter (TWOC) and TURP are the standard treatments for acute urinary retention (AUR). TURP in patients presenting with AUR is associated with a higher mortality and morbidity than with elective surgery for LUTS. The objective of our study was to evaluate the outcome of patients with AUR managed by CISC.
Patients and methods Potential cases were detected using clinical coding. AUR was defined as the inability to void in the presence of lower abdominal or penile pain, with a residual volume on catheterization of 400–1000 mL.
Results Thirty patients were identified; all had been catheterized on admission. After a period of continuous drainage they underwent a TWOC and those who failed were offered CISC. The median (range) follow-up was 30 (15–90) weeks; 15 (50%) patients were using CISC, eight (26%) were voiding, four (13.%) had undergone TURP and two (6%) were unable to use CISC satisfactorily and had an indwelling catheter. One patient had died from vascular disease. No serious complications were noted.
Conclusions CISC provides a conservative management option for AUR, with a lower complication rate than TURP. It is useful for patients with significant comorbidity or who prefer to avoid surgery. In some patients a period of CISC allows a return to normal voiding.

P050

Towards a self-management intervention programme for men with LUTS: the role of caffeinated drinks

C.T. Brown, E. O'Flynn, J. van der Meulen, S. Newman*, A.R. Mundy† and M. Emberton *The Royal College of Surgeons of England, *UCL Department of Psychiatry & Behavioural Sciences, and †Institute of Urology and Nephrology, London, UK*

Introduction Self-management implies a shift of responsibility from the healthcare professional to the individual for the daily management of their condition. In chronic diseases, including asthma, arthritis and diabetes, self-management has been show to reduce symptoms, resource use and health-seeking behaviour. Some men with LUTS report symptom deterioration with caffeinated drinks, but the extent to which avoidance improves symptoms is not known.
Materials and methods As part of a phase 1 study (to identify components of the intervention) caffeine habits in men with uncomplicated LUTS (those which cause no serious health threat) were explored using qualitative semistructured interviews. Interviews were audiotaped, transcribed and analysed using grounded-theory methods.
Results Thirty men (mean age 71 years, range 54–80, and with all cultural, social and occupational classes represented) were interviewed (15 in a teaching hospital and 15 in a district general hospital). The mean (range) symptom duration was 1.7 (0.5–3) years, and the mean IPSS 16.1 (13–22). The mean number of cups of caffeinated drinks consumed per day was 6 (2–10). Only four (13%) of the men were aware that caffeinated drinks affected urinary symptoms. None of the patients had received advice about their caffeine habits, but were all willing to try de-caffeinated drinks or drink water instead.
Conclusion Men with LUTS consume large amounts of caffeinated drinks and are generally unaware of the effects. Avoiding caffeinated drinks has potential for lifestyle modification (self-management) to improve symptoms. Assessment in clinical practice is part of an ongoing research study.
Funding: The Royal College of Surgeons Research Fellowships

Tuesday 25 June 16.00–17.00
Poster Session 6. Basic Science: Oncology
Chairmen: P. Harnden and K. Mellon

P051

The application of surface-enhanced laser desorption and ionization to identify novel urinary tumour markers for RCC

M.A. Rogers, N.P. Munro, A. Paul*, J. Noble†, P. Selby and R.E. Banks *ICRF Cancer Medicine Research Unit, and *Department of Urology, St James Hospital, Leeds, and †School of Computing, Leeds University, Leeds, UK*

Introduction There is currently no clinically proven marker for RCC and, in advanced disease, the available therapies are limited. Surface-enhanced laser desorption and ionisation (SELDI) has been used to identify urinary biomarkers for RCC that may also provide novel therapeutic targets. SELDI involves time-of-flight protein mass spectrometry after initial chromatographic selection on a commercially available chip. Thereby, rapid profiling of complex biological samples is possible with resolution of low-mass (2–20 kDa) proteins in picomolar concentrations.
Patients and methods Urine was collected from 60 patients with subsequently histologically confirmed RCC, from 49 age-matched healthy subjects and from 29 patients with other benign urological pathologies. Samples were characterized using the 'SELDI Biosystem^{TM}' (Ciphergen) with a weak cation-affinity chip (WCX).
Results There were many differences in protein profiles in the 3.8–15.2 kDa range between disease and control samples. The most consistent was a 4.15-kDa protein in 32 RCC samples, which was present in only 14 healthy controls ($P = 0.012$, Fisher's exact test). This and other protein peaks discriminating RCC from control urine are currently being characterized. Neural network software is being used to characterize the generality of differences between RCC and control urinary proteins.
Conclusions SELDI has identified several differences in urinary protein profiles in RCC and control patients. The use of SELDI and other proteomic approaches to RCC promise to identify novel biomarkers and therapeutic targets in this disease.

P052

Urine dendritic cells in bladder cancer

J.D. Beatty, S. Islam, N. English, A. Jones, S.C. Knight and C.W. Ogden* *Antigen Presentation Research Group, NPIMR, Harrow, UK and *Department of Urology, Northwick Park Hospital, Harrow, UK*

Introduction Immunotherapy has been used to treat high-risk superficial bladder cancer for almost 30 years. More recently, new therapies using genetically modified BCG and dendritic cells (DC) have been used to skew the immune response to facilitate antigen-specific tumour cell killing. Primary immune responses against tumour antigen depend on the DC subset and maturation status. Noninvasive methods for assessing response and prognosis before, during and after immunotherapy for bladder cancer are needed. We identify and phenotype urine DC (uDC) from bladder cancer for the first time.
Materials and methods Urine from patients with bladder TCC was collected before surgery. Using four-colour flow cytometry a novel technique was developed to identify and phenotype uDC. Immunohistochemistry and electron microscopy were used to confirm the presence of uDC and their phenotype. uDC from bladder TCC were assessed functionally in an allogeneic mixed-leukocyte reaction (MLR).
Result uDC from bladder TCC expresses an immature myeloid phenotype with low or no CD83. The costimulatory markers CD86 and CD40, important in T cell interaction, are expressed. The maturing DC marker DC SIGN and plasmacytoid DC marker CD123 were identified in most samples. Functionally, uDC from bladder TCC did not stimulate an allogeneic MLR, supporting phenotypic evidence of an immature phenotype.
Conclusions uDC are present in bladder cancer; this discovery could lead to a new area of DC research. For the first time it may be possible to monitor bladder tumour DC response during immunotherapy using noninvasive techniques.
Funding: Ralph Shackman Trust

P053

Radioimmunotherapy of superficial bladder cancer – a combined approach

D.P. Scholfield, M.A. Hopper, A. Murray*, C.I. Scholfield†, A.C. Perkins* and M.C. Bishop *Nottingham City Hospital, *Queens Medical Centre, and †Lumitech Corporation, Nottingham, UK*

Introduction Intravesical radioimmunotherapy has potential as a treatment for superficial bladder cancer. Combined therapy with a radiosensitizing agent, e.g. mitomycin C may improve therapeutic efficacy.
Materials and methods *In vivo* studies were conducted immediately before TURBT; radiolabelled antibody was instilled 2–4 h before surgery, with the conjugate left *in situ* for 1 h. Gamma scintigraphy was performed before and after washout. Specimens were obtained at operation and assayed for radioactivity. Cell cytotoxicity was evaluated in MUC1-expressing bladder cancer cell lines. Cells were pulsed with radiolabelled antibody for 2 h and incubations continued for up to 120 h. Apoptosis was assessed by propidium iodide (PI) cell-cycle analysis, annexin V-FITC and Apoglow (ATP bioluminescence) techniques. Mitomycin C induced growth arrest in the radiosensitive (G2/M) phase of the cell cycle, shown using PI cell-cycle analysis. Cells were pulsed with mitomycin C for 1 h. After 24 h radiolabelled antibody was administered as above and incubations continued for up to 120 h. Apoptosis was measured as described above.
Results *In vivo* studies were conducted with no complications. The mean (range) tumour to normal ratio was 16 : 1 (1.2–79 : 1; $n = 14$). There was a 52% reduction in viable biomass after administering a dose approximating to an intravesical administration of 1 GBq. Combining mitomycin C with radiolabelled antibody induced more apoptosis than if each agent was given individually.
Conclusion Tumour targeting with ^{188}rhenium-labelled c595 was successful. Apoptotic cell death was induced by giving this conjugate alone or combined with mitomycin C *in vitro*.
Funding: Cancer Research Campaign

P054

The radiosensitizing effects of ZD1839 ('Iressa'), a selective epidermal growth factor receptor tyrosine kinase inhibitor, on related bladder tumour cell lines

V.K. Sangar, S. Madineni, S.A. Roberts, G.P. Margison, J.H. Hendry and N.W. Clarke* *Paterson Institute for Cancer Research and *The Christie Hospital NHS Trust, Manchester, UK*

Introduction Improving the response of bladder cancer to radiotherapy should lead to a better outcome and enhanced quality of life. This study aimed to establish the radiosensitizing properties of the selective, orally bioavailable EGFR tyrosine kinase inhibitor ZD1839 ('Iressa') on two bladder tumour cell lines with different degrees of radiosensitivity.
Materials and methods EGFR expression was quantified and a colony-forming assay used to establish the surviving fraction after 2 Gy (SF2) for the radioresistant cell line MGH-U1 and its radiosensitive mutant clone S40b. To monitor growth inhibition, cells were plated and treated with ZD1839 (0–10 μmol/L) before (24 and 4 h) and after (4 and 24 h) radiation (single dose, 0–6 Gy).
Results The mean (SD) EGFR expression was 113 (37) and 181 (24) fluorescent units ($P = 0.26$) and the SF2 values were 0.90 and 0.64 ($P < 0.001$) for MGH-U1 and S40b, respectively. There was synergy between ZD1839 and radiation in both cell lines, although the optimum schedules differed. For MGH-U1, synergy only occurred with 0.1 μmol/L ZD1839 administered 4 h after irradiation, and this was not statistically significant. In S40b, there was significant synergy with 0.1 μmol/L ZD1839 administered 4 h ($P = 0.01$) and 24 h ($P = 0.01$) before irradiation, and with 1 μmol/L ZD1839 administered 4 h ($P = 0.01$) before irradiation.
Conclusions ZD1839 radiosensitizes bladder cancer cell lines *in vitro*. This is the first report suggesting that ZD1839 has different radiosensitizing effects on related cell populations and that this property can depend on the schedule.
'Iressa' is a trademark of the AstraZeneca group of companies.

P055

The effect of EGFR-tyrosine kinase inhibition using ZD1839 ('Iressa') combined with photodynamic therapy in bladder cancer

C.H. Briggs, C.D. Betts*, K.J. O'Flynn*, J.V. Moore and N.W. Clarke* *Paterson Institute for Cancer Research, Christie Hospital, and *Department of Urology, Hope Hospital, Manchester, UK*

Introduction EGFR is important in TCC and is a target for therapy. The EGFR inhibitor ZD1839 (Iressa) has synergy with radiotherapy in TCC *in vitro* and reports in other cancers have shown that EGFR is involved in recovery after photodynamic therapy (PDT). This study combines Iressa with 5-aminolaevulinic (ALA)-mediated PDT to assess their combined effects on TCC *in vitro*.
Materials and methods Survival of the TCC line MGH-U1 and its radiosensitive clone S40b was determined after treatment with ALA/PDT and ALA/PDT/Iressa combinations. Cells were exposed to 5 mmol/L ALA with or without prior Iressa (10 mmol/L for 24 h during exponential growth). Cells were then exposed to light at 630 nm and 20 mW power. Experiments were carried out in quintuplicate. Flow cytometry was used to determine differences in cellular protoporphyrin IX (PpIX) fluorescence (the active PDT agent) after exposure to ALA and combined ALA/Iressa, to see if this accounted for differences in cell survival.
Results Clonogenic survival assays showed that both cell lines were sensitive to PDT alone, though MGH-U1 was significantly more so than S40b ($P < 0.001$). This was explained by a four-fold greater level of PpIX fluorescence in the MGH-U1 line. Adding Iressa did not affect PpIX fluorescence. Previous exposure to Iressa produced a six-fold increase in cell death with significant differences between the S40b and MGUH-1 cells ($P < 0.001$).
Conclusions Iressa (ZD1839) increases the sensitivity of TCC to ALA/PDT but there is a differential effect in radiosensitive and radioresistant cell lines. This suggests that there may be a role for EGFR inhibition in superficial bladder cancer treatment with PDT.

P056

P-cadherin expression identifies a more invasive phenotype in bladder TCC

R.T. Bryan, R.G. Hardy, Y. Yeo, G. Begum, D.M.A. Wallace* and J.A. Jankowski *The University of Birmingham and *The Queen Elizabeth Hospital, Birmingham, UK*

Introduction Cadherins and related catenins are the major mediators of cell adhesion in epithelial tissues. P-cadherin is a classical cadherin that remains unstudied in bladder TCC. It is normally expressed in the basal layer of stratified epithelia, including the bladder, and has been implicated in the early stages of epithelial remodelling in the colon; it confers a poor prognosis to infiltrating ductal breast carcinoma. We have studied P-cadherin expression in bladder TCC.
Materials and methods Immunohistochemistry (IHC) and immunofluorescence (IF) were used to stain 139 paraffin-embedded sections of bladder TCC for P- and E-cadherin and β-catenin. SDS-PAGE and western blotting of prospectively collected snap-frozen tissue samples were used to semiquantify protein expression. Appropriate controls were used for all experiments. Chi-squared and Wilcoxon log-rank tests were used to analyse the data.
Results An initial series of 94 TCCs of all stages showed that increased P-cadherin expression was significantly associated with increased tumour grade and muscle-invasive disease ($P = 0.001$). Analysis of a second group of 45 invasive tumours (pT1–4) showed that TCCs with increased P-cadherin expression and normal E-cadherin expression had a trend towards a higher grade and stage than those not expressing any cadherins. IHC and IF showed no nuclear localisation of β-catenin.
Conclusions Increased P-cadherin expression is associated with an invasive phenotype in bladder TCC. Even in the presence of normal E-cadherin levels, TCCs expressing increased P-cadherin have a more invasive phenotype than those not expressing any cadherins. P-cadherin thus appears to have a dominant role in the progression of bladder TCC.
Funding: RT Bryan is funded by a MRC Research Training Fellowship.

P057

Differential expression of hMLH1 and hMSH2 correlates with prognosis and smoking status, but not microsatellite instability in bladder cancer

J.W.F. Catto, G. Xinarianos*, J.L. Burton, M. Meuth* and F.C. Hamdy *Royal Hallamshire Hospital and *University of Sheffield, Sheffield, UK*

Introduction Defects in the DNA mismatch repair (MMR) proteins result in microsatellite instability (MSI), and subsequent malignancy in hereditary nonpolyposis colon cancer. The role of MMR proteins and MSI are not resolved in TCC of the bladder. We investigated the expression of two MMR proteins and the frequency of MSI in a well-characterized sample of TCCs.
Patients and methods The study included 111 patients with TCC of the bladder (superficial in 74, muscle-invasive in 37), with complete clinicopathological data (median follow-up 5 years, range 5–16). Immunohistochemistry was used to detect the expression levels of hMLH1 and hMSH2. Microsatellite analysis, for loci comprising the Bethesda Consensus Panel, was performed on 84 tumours.

Results There was reduced expression of either MMR proteins in 26 of 111 tumours (23%); expression was reduced more commonly in tumours of advanced stage ($P<0.03$) and grade ($P<0.04$). By 5 years, reduced expression was associated with fewer recurrences of superficial tumours ($P=0.015$) and fewer relapses in all tumours ($P=0.03$). Reduced expression was associated with cigarette smoking ($P=0.03$). MSI was seen at multiple loci in one tumour (1%) and was not associated with MMR expression.
Conclusions Differential expression of hMLH1 and hMSH2 appears to be a frequent event in the pathogenesis of TCC, and is associated with an improved outcome but not instability at the microsatellite loci tested. Cigarette smoking is associated with reduced expression levels of hMLH1, suggesting that chemical carcinogens found in tobacco may play a role in the dysregulation of MMR.
Funding: British Urological Foundation/Merck Sharpe and Dohme

P058

Dendritic cell subsets in bladder cancer and the effect of BCG

J.D. Beatty, J.A. Bycroft*, R.D. Smith*, H. Stoker*, S.C. Knight and C.W. Ogden* *APRG and *Department of Urology, Northwick Park Hospital, Harrow, UK*

Introduction BCG has been used as an effective intravesical chemotherapy for superficial bladder cancer for almost 30 years, but our understanding of the mechanism of its action remains poor. Primary immune responses against tumour antigen depend on dendritic cell (DC) subset and maturation status. Could their modulation by BCG be the pivotal factor in tumour immunity in different superficial bladder cancers?
Materials and methods To investigate this possibility peripheral blood DC in patients with carcinoma *in situ* (Tis) and T1G3 bladder cancers treated with BCG were examined. DC were identified by flow cytometry and the costimulatory markers CD40 and CD86, and maturation marker CD83, identified as potential indicators of BCG-induced DC activation. DC subsets were classified using the myeloid DC marker CD11c.
Results T1G3 bladder cancers had significantly more CD11c-negative DC than controls ($P<0.05$) before BCG, and Tis had significantly less ($P<0.01$). BCG normalized CD11c-negative DC cell numbers with a significant decrease ($P<0.01$) in T1G3 bladder cancers and an increase in Tis, indicating that these may be biologically distinct forms of bladder cancer. Furthermore, on treatment, absolute numbers of CD86-positive DC were increased in 75% of patients. CD40 was expressed on DC after BCG for the first time in 42% and CD83 in 25% of patients.
Discussion The therapeutic effect of BCG may be mediated by normalizing the numbers of DC in the CD11c-negative DC subset and up-regulating the costimulatory molecules CD86 and CD40. The CD11c-negative subset could have an important role in future DC immunotherapy.
Funding: Ralph Shackman Trust

P059

Radiosensitization of bladder cancer by gemcitabine and its relationship to nicotinamide n-methyl-transferase expression

V.K. Sangar, H. Kassem, R. Cowan*, G.P. Margison, J.H. Hendry and N.W. Clarke* *Paterson Institute for Cancer Research and *The Christie Hospital NHS Trust, Manchester, UK*

Introduction Nicotinamide n-methyl-transferase (NNMT) is an enzyme which may modulate radiosensitivity by altering DNA repair pathways. The aims of this study were to establish the radiosensitizing properties of gemcitabine in bladder tumour cell lines with different radiosensitivities and NNMT expression.
Materials and methods The radioresistant bladder tumour cell line MGH-U1 and its radiosensitive mutant clone, S40b, were studied. A colony-forming assay was used to establish the surviving fraction after 2 Gy (SF2) for both cell lines as a measure of radiosensitivity. A growth inhibition assay was used to screen for optimal dose and schedule. Cells were plated and treated with gemcitabine (0–10 μmol/L) at various times (24, 12 and 4 h) before irradiation (0–6 Gy). Radiosensitization was re-confirmed at the optimal schedules using the colony-forming assay. Survival data were fitted to the linear quadratic model from which dose modifying factors (DMF at 50% survival) were calculated. Differential NNMT expression was revealed by cDNA microarray analysis and confirmed using Sybr green I-based real-time QRT-PCR.
Results The SF2 values were 0.94 and 0.62 for MGH-U1 and S40b, respectively ($P<0.001$). QRT-PCR showed down-regulation of NNMT in S40b compared with MGH-U1. The MTT assay showed synergy between radiation and gemcitabine in S40b cells (0.01 μmol/L given 48 and 12 h before irradiation and 0.35 μmol/L 12 h before irradiation) and MGH-U1 cells (0.01 and 0.25 μmol/L 12 h before irradiation). Clonogenic assays showed that at 0.01 μmol/L (80–90% survival) radiosensitization occurs only in the S40b (low NNMT) cell line (DMF = 1.4; $P<0.01$). At 0.3 μmol/L (IC_{50}) both cell lines are radiosensitized; DMF = 2.4 ($P<0.001$) and 1.2 ($P<0.01$) for MGH-U1 and S40b, respectively.
Conclusion Gemcitabine is an effective radiosensitizer in bladder cancer but it has differential sensitizing properties. This differential may be relative to the expression of NNMT.

Wednesday 26 June 10.30–11.30
Poster Session 7. Paediatric Urology
Chairmen: H. Snyder and D. Thomas

P060

The Snodgrass procedure for distal hypospadias repair

M. Gundeti, D. Desai and P. Cuckow* *Great Ormond Street Hospital for Children and *Institute of Urology, London, UK*

Introduction As a part of an ongoing clinical audit programme, we have critically reviewed the results of the Snodgrass procedure as applied to distal primary and revision hypospadias.
Patients and methods Between July 1998 and December 2001, 85 patients underwent surgery in four different hospitals. A Snodgrass repair was used for distal hypospadias without chordee and a moderate to good urethral groove. Patients with a shallow groove were selected for two-stage repair according to Bracka. Occasionally a urethral plate plasty or a urethral plate inlay graft ('Snodgraft') was used before closure. After surgery, all patients had an 8 F dripping urethral stent and a foam dressing, which was removed after a week. They also received prophylactic antibiotics and oxybutynin. Ten patients had a Snodgrass procedure for simple revision of a previously failed repair. The results were assessed prospectively as a part of our audit programme.
Results Sixty patients with primary repair and 12 with a 'Snodgraft' were available for evaluation (mean age at surgery, 17 months). The follow-up was 3–18 months, when patients were usually discharged. Two fistulae were recorded (2.8%) and one patient required dilatation of meatal stenosis (1.4%). Two patients reported transient terminal haematuria 6 months after surgery, suggesting meatal narrowing; both are now asymptomatic. In five patients the meatus was low on the glans (including two after 'Snodgraft'). Doctors and parents deemed their outcome satisfactory. Results for revisions were good, with one fistula (10%), corrected by a two-stage repair.
Conclusions The Snodgrass repair is an effective single-stage procedure for distal hypospadias and simple revisions. There are tactics to extend the range of this operation. The meatus has a slit-like appearance but inspection often shows that part of the slit is a healed scar. Functionally and cosmetically, parents and doctors are pleased with this procedure.

P061

The role of laparoscopy in the patient with previous negative inguinal exploration for impalpable testis

A. Barqawi, B. Blythe, G. Jordan, R. Ehrlich and M. Koyle *The Children's Hospital, Denver, Colorado, USA*

Objective To evaluate the effect of laparoscopy in the management of patients with previous negative inguinal exploration for impalpable undescended testes.
Patients and methods Patients who underwent laparoscopy, after previous incomplete or 'questionable' negative inguinal explorations for impalpable undescended testis, were reviewed retrospectively.
Results Twenty-seven patients (aged 1–22 years), with 30 impalpable testes, underwent laparoscopy after previous negative open exploration. In nine (33%) blind-ending spermatic vessels, a vas and a closed ring were found, confirming the previous surgical diagnosis of an absent testis. However, in the remaining 18 (67%) patients, viable intra-abdominal/inguinal gonads were found in 10 and in the remaining eight, intra-abdominal remnants were identified. In one patient a seminoma of an intra-abdominal testis was present.
Conclusion When a patient is referred with an inconclusive previous inguinal exploration for an impalpable gonad, laparoscopy has an important role in confirming or refuting the diagnosis of an absent testis. Moreover, therapeutic laparoscopy provides definitive options to standard open techniques when a viable testis or remnant is encountered.

P062

Experience with endoscopic correction of primary VUR in children

G.V.S. Murthi, A.A. Azmy, A. Fyfe and M. Hobeldin *Royal Hospital for Sick Children, Glasgow, UK*

Introduction The endoscopic technique has gained wide acceptance as an effective surgical treatment for VUR in children. The objective of this study was to assess the efficacy of endoscopic correction (STING) of primary VUR in children and assess results over long-term follow-up.
Patients and methods Over an 11-year period (1987–97) 268 children with primary VUR were treated by this technique. A total of 412 refluxing ureters were injected endoscopically (142 with Teflon and 270 with Macroplastique) and followed for a mean (range) of 30 (6–84) months.
Results VUR was corrected successfully in 87% of patients, allowing the withdrawal of antibiotic prophylaxis. Sixteen ureters were reimplanted (12 for failed STING and four for obstruction by implant material). Five kidneys were removed because of severe damage by persistent reflux that could not be corrected. The results using Macroplastique and Teflon were similar. The incidence of recurrent UTIs decreased from 82% at presentation to only 3.6% after endoscopic treatment.
Conclusions The endoscopic treatment of primary VUR is safe, simple and effective; it decreases the incidence of recurrent UTIs and corrects reflux in a high proportion of cases.

P063

A novel treatment for urge incontinence in children

S.J. O'Toole, J.M. Currie, S. McCartney, S. Aitkenhead and A. Azmy *Royal Hospital for Sick Children, Glasgow, UK*

Introduction Most children presenting with daytime incontinence have varying degrees of detrusor instability; several of these children have symptoms of marked urgency. We report two children who had failed conventional management and had extreme urgency symptoms. Both of them responded dramatically to specific n-methyl d-aspartate (NMDA) blockers administered by caudal injection.
Patients The first patients was an 11-year-old boy with a 7-year history of diurnal enuresis and normal renal tract imaging. Frequency-volume charts showed a functional capacity of <100 mL and a requirement to void every 30 min to remain dry; this was unresponsive to a variety of anticholinergics. He was unable to play sport and his schooling was severely affected. The second patient was a 12-year-old girl who presented with diurnal enuresis after a UTI when aged 11 years. Renal tract imaging was normal and urodynamics revealed marked detrusor instability. Her functional capacity was <100 mL and her profound urge symptoms were unresponsive to a variety of anticholinergics.
Results Patient 1; after caudal injection of ketamine his functional volume increased to 200 mL and he was able to return to school, voiding every 2–3 h. Patient 2; after a caudal injection of methadone she became dry with 3-hourly voiding and a functional bladder capacity of >300 mL. Both of these children required a

second caudal injection but both have enjoyed sustained relief of their symptoms so far.
Conclusion Up-regulation of NMDA neurotransmitters at the spinal cord level are implicated in many chronic pain syndromes. Interruption of these pathways even briefly can bring long-term relief to the patient with chronic pain. Both of these children were treated with this approach and had a remarkable response. This reaction to treatment raises an interesting possibility. Is the urge syndrome an abnormal visceral pain response to previous irritation of the trigone?

P064

Lessons learned from children with catheterizable stomas

A. Barqawi, J. Lowe, P. Furness and M. Koyle *The Children's Hospital, Denver, Colorado, USA*

Introduction We sought to evaluate the effect of various factors that might ultimately influence the stoma complication rate associated with construction of a continent catheterizable urinary and Malone-ACE stomas.
Patients and methods Retrospectively, we reviewed our experience in patients who underwent urinary and/or Malone stoma reconstruction between 1990 and 2001. Age at diagnosis, mobility, patient weight, coincidental surgery (augmentation ± bladder neck reconstruction), single vs dual stomas and stomal site, were evaluated for early (<3 months) and late (>3 months) complications.
Results There were 107 (67 male and 40 female) patients (mean age 12.7 years, range 2–36) who had 150 stomas constructed during the period of analysis; 50 were urinary only, 14 Malone only and 43 (86 stomas) had both simultaneously constructed. The primary diagnosis was spina bifida in 54 (50%) patients and the mean follow-up 4.2 years. Early stomal complications included MACE breakdown (one), Mitrofanoff leak (one) wound complications (six) and one complete breakdown of urinary and Malone stomas in a patient who underwent dual stoma reconstruction. The most common late stomal complication was stenosis (22). Thirty-two (34%) patients with a urinary and 15 (26%) with a Malone stoma had stomal revisions. The diagnosis, mobility, weight status, stomal location, dual stoma and age at surgery had no effect on the stomal complication rate.
Conclusion Stomal complications are extremely common, whether urinary or Malone stomas are constructed individually or combined. No single factor can be implicated as being responsible for the outcome of stomal complications in either type.

P065

Revascularised pyeloureterocystoplasty in conjunction with ureterocelocystoplasty. The 'tea pot ureterocystoplasty': a new technique

A.M. Kajbafzadeh *Department of Urology, Children's Hospital Medical Centre, Tehran University of Medical Sciences, Tehran, Iran*

Objectives To present the results of revascularized ureteropyelocystoplasty and ureterocelocystoplasty in patients with end-stage bladder disease, and to compare the urodynamic studies before and after cystoplasty.
Patients and methods From May 1995 to May 2000, 45 patients with ureterocele were managed by our service; of these, seven with an ectopic obstructive ureterocele remained incontinent 6–12 months after ablation of the ureterocele. Urodynamic studies with a suprapubic line revealed a hyperactive bladder with a dyssynergic voiding pattern, not responding to conservative management. The hypothesis was that intrauterine outlet obstruction from an ectopic obstructive ureterocele can cause permanent bladder dysfunction after ureterocele ablation, a pathology similar to that in boys with a history of PUV bladder dysfunction, which can remain after valve ablation. Of these seven children with an ectopic ureterocele, eight units of duplex systems (one with bilateral duplex systems and two ectopic ureteroceles opening into the posterior urethra) required upper pole partial nephrectomy in conjunction with augmentation pyelo-ureterocystoplaty (five) and ureterocystoplasty (two). Augmentation cystoplasty was performed with the intact (not detubularized) intramural ureter. Because of poor long-term results in some patients with ureterocystoplasty, a revascularized pyelo-ureterocystoplasty was used. The upper pole was dissected free, preserving the vascular pedicle of the upper pole. The dysplastic hydronephrotic upper pole was removed. The dilated pelvis and ureter were preserved in continuity. The upper pole vein and artery were anastomosed to the inferior iliac artery (end-to-end anastomosis) and the common iliac vein (end-to-side anastomosis). The anterior part of the ureterocele remnant was excised and the posterior part left intact. The whole ureter was detubularized except the intramural ureteric part, which remained tubularized for the 'jet' phenomenon. A Mitrofanoff channel was constructed in five children. All patients had undergone a urodynamic study at 6 months and in five patients at 2 years after surgery.
Results All patients are dry during the day and night. The postvoid residual was <10% of the bladder capacity in four and three children still need clean intermittent catheterization. The compliance was high in all patients and remained stable for 24–36 months. The upper tract dilatation was decreased in all children. Incontinence was improved in all and VUR (three patients, five ureters) subsided during follow-up. The mean (range) follow-up was 30 (6–51) months.
Conclusions Ureterocystoplasty is an excellent choice for augmentation cystoplasty. Revascularization of the pelvis and ureter may prevent recurrence of a hypocompliant bladder in the long-term. Extensive dissection of an ectopic ureterocele may cause trigone and bladder neck denervation hypersensitivity, and may result in permanent bladder dysfunction, especially in young infants.

P066

Urological manifestations of myelodysplasia: a comparison of two groups with and without urological care

A.M. Kajbafzadeh, M. Baharnori and F. Nejat *Children's Hospital Medical Center, Tehran University of Medical Sciences, Tehran, Iran*

Objectives To evaluate and compare the outcome of 54 children with spinal dysraphism, to determine whether the early institution of treatment improves bladder and renal functional outcome.
Patients and methods Two groups of 27 children each were included in the study. Group 1 presented in early life with an intact spinal dysraphism; these 27 children were referred to our neurosurgical department for early spinal cord surgery. Group 2 was referred for the first time to our paediatric urology clinic for urinary and fecal incontinence, or because of end-stage renal diseases with or without VUR. All children in group 1 were evaluated by a paediatric urology team before any neurosurgical intervention. These children had a general and neurological physical examination, urine analysis, urine culture, urinary tract ultrasonography, vertebral X-ray and MRI, VCUG and a physiological-fill urodynamic study before spinal cord surgery. All of these children were followed up at the myelomeningocele (MMC) clinic by our standard MMC multidisciplinary team. These patients were divided into high- and low-risk groups, and were managed according to our MMC protocol. Group 2 were >2 years old (2–13 years) with no urological care after their spinal cord surgery; they were also evaluated as the first group at our MMC clinic by the same team.
Results Low-grade VUR was detected in five patients in group 1, but 10 (37%) n Group 2 had mostly high-grade reflux and major parenchymal scars. Urological and surgical interventions were indicated less often in group 1 (one needed endoscopic reflux correction) than in group 2, where 17 of 27 underwent major

reconstructions (augmentation cystoplasty and concomitant Malone antegrade continence enema, Mitrofanoff principle with or without ureteric reimplantation). The incidences of UTI, urodynamic abnormalities and renal scarring, and urinary continence were significantly different in the two groups. Tethered cords were more common in group 2 (59%).
Conclusions Early urological investigations and careful follow-up are mandatory for preventing renal damage and probably recurrent UTI in children with spinal dysraphism. Any changes in bowel habit or voiding function may be the earliest finding of a tethered spinal cord. Early untethering may prevent more complex neuropathy of the bladder and bowel. Changes in urodynamic findings may require early urological investigations or intervention, with clean intermittent catheterization, with or without a change in medication. When these methods are insufficient, careful neurological investigations are mandatory.

P067

Long-term results of continent urinary diversion in adolescent spina bifida patients

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Aims and objectives The right choice for managing urinary incontinence in spina bifida children is vital, as any improvement in bladder function is unlikely at puberty. Furthermore, because of the deterioration in respiratory reserve, kypho-scoliosis, and restricted anterior abdominal space for access and mobility, 10% of patients are inoperable. This study investigates the reliability in adult life of the Mitrofanoff continent diversion for spina bifida.
Patients and methods Between 1985 and 1998, 30 continent urinary diversions with bladder augmentation were constructed in 12 male and 18 female spina bifida patients (mean age at surgery 22 years, range 16–40). The catheterizable conduits used were appendix in 19, ureter in six and Monti in five patients, and the mean (range) follow-up was 8.8 (3–18) years.
Results Only two (6.5%) patients had a conversion of a continent cystostomy to an ileal conduit. The complications included GFR impairment in six (20%), bladder perforation in three (10%), bladder stones in 15 (50%) and stomal stenosis requiring revision in 15 (50%) patients. Two (6.5%) patients died, one from renal failure and the other from septicaemia. Complications were rare after 5 years and 85% of the patients maintained continence and continued to use CISC.
Conclusions In a selected group of spina bifida patients the Mitrofanoff continent diversion can be used, with lasting efficiency, but it is associated with a high early morbidity and mortality. This may be partly attributed to the earlier inability by the patients to look after the complex reconstruction, as shown by the rarity of complications beyond 5 years.

P068

Continent urinary diversion: 15 years experience

G.V.S. Murthi and A.A. Azmy *Royal Hospital for Sick Children, Glasgow*

Introduction The provision of continent diversion is a major challenge in the management of urinary incontinence. The objective of this study was to audit the results and long-term outcome in children who had continent urinary diversion.
Patients and methods Between 1984 and 1999 continent diversions were created in 40 patients (mean age at surgery 140 months, range 38–223). The mean (range) follow-up was 74.4 (12–134) months. The underlying pathological condition was spina bifida in 18, exstrophy/epispadias complex in nine, malignancy in four, and other anomalies in nine patients. The bladder was augmented with intestine in 14 patients (35%), the neo-bladder reservoirs reconstructed in 10 (ileocolic in nine, sigmoid colon in one). A Mitrofanoff appendicovesicostomy was used to provide a catheterizable channel in 39 patients and a Monti ileal channel in one. The Mitrofanoff channel was implanted into native bladder only (nine), undiversion of ileal conduit with Mitrofanoff channel (seven) and into augmented bladder or continent pouch (24). Twelve patients underwent operations on the bladder neck, i.e. injection in five, tightening in six and closure in four.
Results Complete continence with CISC was achieved in 26 patients (65%). In the remaining patients there was minor urinary leakage in four, stoma unused in two, urethral leakage in four, undiversion in three and one died. Problems encountered during the follow-up were: stomal stenosis (eight), intermittent failure to use CISC (five), urethral leakage (eight), calculi (five), pouch-ureteric obstruction (five), small bowel obstruction (one), and renal failure (two). The management of these will be discussed.
Conclusions Early results of the use of bowel to achieve urinary continence were encouraging, but a long-term assessment is necessary to detect late complications and institute treatment appropriately.

Wednesday 26 June 10.30–11.30
Poster Session 8. Management/Governance
Chairmen: K. Parsons and S. Payne

P069

Are GPs referring efficiently for prostate cancer? A primary care audit

B. Eddy, C. Kastner, P. Miller and A. Rané *East Surrey Hospital*

Introduction With no standardized protocol and a mass of confusing literature there is apparently a wide variation in the use of the PSA test by GPs in their primary-care practice. This has an influence on their referrals and therefore a marked variability in the management of patients with suspected prostate cancer. We have tried to quantify the understanding and use of PSA by GPs in four key areas, i.e. screening, referral levels, associated investigations and education, and then assessed the variability in referral patterns.
Methods A questionnaire was compiled and sent to 200 GPs registered in the East Surrey region.
Results From the 200 GPs questioned we received 118 responses (59%). Although there is not yet a consensus, 24 (20%) said that they already screen for prostate cancer. There was a marked variability in the level of PSA at which the GPs would refer the patient for a urological opinion. The highest level was 25 ng/mL and 33 (28%) would only refer if the PSA level was >10 ng/mL. Only 57 GPs (48%) would perform a DRE, 42 (36%) would refer without checking an MSU and 28 (23%) without checking renal function. Forty-one (35%) of GPs who responded felt they needed more education on the subject.
Conclusion There is much variability in the referral patterns among GPs for PSA measurements. We feel that patients with prostate cancer will have treatment delayed because of a lack of appropriate information for the primary-care practitioner. Inappropriate referrals could be reduced if all GPs performed basic investigations before referring, and all GPs and urologists alike would welcome a standard protocol on this matter.

P070

Outpatient clinic delays: a 13-year comparison

S. Albehussi, H.R.H. Patel, C.N. Luxman, T.S. Bailey, M.S. Nathan and R.A. Miller *The Whittington Hospital NHS Trust, London, UK*

Introduction The efficiency of the NHS is currently the subject of intense scrutiny. The media regularly highlight the length of waiting times for outpatient consultations, while the government continue to pressurise the NHS to ensure that patients are seen within a particular period. Is the structure and resources of the outpatient clinic adequate to cope with these demands? The efficient working of the clinic depends upon a multiskilled team of support staff, as well as dependable means of transferring information between healthcare professionals. We assessed the time efficiency of a general urology outpatient clinic and compared this with data collected 13 years earlier.
Patients and methods In a prospective study we analysed where time was spent for each follow-up patient attending the outpatient clinic in a general urology department. A broad case-mix of follow-up patients of varying age and both sexes (167) were recruited. The outcome measure was time spent per patient on each component of a single outpatient episode.
Results Over 40% of the time is lost in administration and inefficiency. When compared with data from 13 years earlier, the time lost was statistically similar ($P = 0.14$; t-test) and occurred for similar reasons.
Conclusion Factors not related to the clinician are associated with inefficiencies. As the demand on the NHS reaches new levels, the outpatient clinic needs greater and wider support.

P071

An audit of the implementation of a national guideline for assessing microscopic haematuria

S.M. Yong, J. Van de Riet and S.A. McNeill *Department of Urology, Western General Hospital, Edinburgh, UK*

Introduction The Scottish Intercollegiate Guidelines Network (SIGN) published an evidence-based guideline for the investigation of asymptomatic microscopic haematuria in adults in 1997. Before referral to a specialist it is recommended that a proper history, physical examination, urine culture and measurement of renal function be undertaken by the GP. We conducted an audit to assess how well these recommendations are being implemented by referring GPs.
Methods All referrals of patients with microscopic haematuria over a 4-month period were prospectively audited. By examining the information provided in the referral letters we assessed how well the SIGN guidelines had been followed.
Results One hundred referral letters for patients with microscopic haematuria were received from GPs within the study period. Forty-two patients had urinary symptoms, whilst 58 were asymptomatic. In 95 a history was provided in the letter, whilst only 11 letters contained information on the findings of physical examination. In 75 patients the results of a urine culture were documented. The renal function had been assessed by measuring serum urea and electrolytes in 26 patients, and radiological assessment arranged in 28.
Conclusion This audit illustrates that despite the availability of national guidelines on investigation of microscopic haematuria, many GPs are failing to implement them fully. As the primary purpose of a guideline is to assure a minimum standard of care, further efforts are required to ensure more consistent application of such guidelines.

P072

How should the role of urology nurses be extended?

B.S. Lewis, J.L. Lewis and M. Cynk *Kent and Sussex Hospital, Tunbridge Wells, Kent, UK*

Introduction The NHS Plan recognises that nurses have the potential to develop their role to include aspects of care traditionally undertaken by doctors. The UKCC has opted to enable nurses to perform tasks which they feel competent and confident to do. As a result nurses are undertaking flexible cystoscopy, prostate assessment (including DRE) and TRUS and biopsy in some hospitals. However, clinical governance demands that these procedures should only be carried out by individuals with documented training and proficiency. A BAUS working party set out guidelines and recommendations for nurse-run flexible cystoscopy (BAUS, 2000). There have been no accepted guidelines for nurses undertaking prostate assessment or TRUS and biopsy of the prostate. Teaching has been individualized at a few hospitals and there are no nationally recognized training courses or transferable qualifications. A formal teaching programme is clearly required.

Method We present three structured competency-based training programmes for nurses performing flexible cystoscopy, prostate assessment, or TRUS and biopsy of the prostate. Each programme has a theoretical and a practical component, and a teaching tool linking theory and practice. After successful completion, the nurse will have documented proficiency in the technical aspects of these procedures and in the interpretation of the findings, so that the patient can be directed to the most appropriate management pathway.
Conclusion This model aims to develop nurses further than envisioned by BAUS and will lead to educational recognition as a module for an MSc or as a stand-alone qualification. These courses should enable a safe, orderly development of advanced urology nursing.

P073

Prostate biopsy results by telephone – do patients like it?

D. Kelleher, N.J. Fenn, S. Matthews, M.G. Lucas, K.C. Vaughton and P. Bose *Urology Department, Morriston Hospital, Swansea, UK*

Introduction A rapid-access prostate cancer-detection clinic has been set up to ease the demand on the outpatient department for patients with suspected prostate cancer. As part of this commitment, it has been necessary to telephone the patient with their biopsy results. This study aims to assess patient satisfaction with telephoned results.
Method Patients at risk of prostate cancer, i.e. raised PSA or suspicious DRE are seen in the clinic. The patient is examined and counselled about the procedure and implications of possible results. Octant biopsies are taken and the patients are informed that results will be conveyed by telephone. Written consent is obtained. The biopsy results are telephoned to the patient by the consultant at the prearranged time.
Results In all, 147 patients underwent TRUS and prostatic biopsy. Of the 147 questionnaires sent out, 127 were returned. Fifty-one questionnaires were returned from patients diagnosed with adenocarcinoma; 83% were happy to have received their results over the phone, 11% would prefer outpatient review and 6% would be satisfied with a letter. Of the patients with benign disease, 88% were happy that their results were conveyed by telephone, 4% wanted outpatient review, with 8% satisfied with a letter.
Discussion From our experience of the first year's results, it would seem both practical from the hospital's perspective and satisfactory to the patient to convey prostatic biopsy results by telephone. It gives the patients ample time to ask questions of the consultant. Telephoned results may indicate the way forward in patient care.
Funding: Astra Zeneca

P074

Effective use of time for multidisciplinary team meetings – a protocol for discussion of patients

J.L. Lewis and B.S. Lewis *Kent and Sussex Hospital, Tunbridge Wells, Kent, UK*

Introduction The National Cancer Plan and the NICE Guidelines for Improving Outcomes in Urological Cancer both emphasize a multidisciplinary approach to the management of patients with cancer. For useful discussion, adequate time needs to be available for Multidisciplinary Team (MDT) meetings. Few urologists, oncologists, pathologists and radiologists have dedicated time within weekly job plans and many meetings take place out-of-hours or during lunch breaks.
Method A system of stratifying patients for discussion has been adopted by an MDT working in a district general hospital. Cases are classified for discussion as follows; Level 1; full discussion; Level 2; radiology only; Level 3; histology only, including after surgery; Level 4, patients for noting only. These include patients with uncomplicated conditions, unequivocal histology and staging who can be treated according to protocol. This will include G1-2, pTa and pT1a TCC of the bladder. This stratification of patients is linked to clear, written policies for several recurring clinical situations. These have been agreed by the MDT and include policies for follow-up of patients with bladder cancer, follow-up and re-biopsy of patients with benign prostate histology and a raised PSA, and policies for staging patients with prostate, bladder and kidney cancer.
Conclusion This model for case discussion at MDT meetings has resulted in longer discussion of difficult cases without sacrificing discussion of the more routine cases.

P075

Consent or request to treatment? The patient's view

N. Burns-Cox, L.Z. Solomon and S.A.V. Holmes *Solent Department of Urology, Portsmouth, UK*

Introduction Informed consent is currently an integral part of the patient/doctor relationship and is required by law. However, the patient/doctor relationship has changed dramatically in recent years. Patients now must be seen to make their own decisions on their treatment. This is clearly set out in recent documents by the GMC and DOH. Doctors continuing to seek consent contradicts these guidelines, as it implies the doctor makes the decision on treatment and requests the patient to accept it. To clarify the situation and empower patients, we propose that informed consent is replaced by 'patient-informed request' for treatment. This study aimed to determine whether patients would like to see the consent process changed to clarify their role in deciding their treatment.
Patients and method Prospectively consecutive patients attending urology outpatients were requested to complete a short questionnaire.
Results Two hundred patients completed the questionnaire; 84% wished to continue to consent rather than request a treatment, but 46% felt they would feel more in control if they requested a treatment. Overall, only 16% would prefer to decide on their own treatment, but 30% of patients aged <40 years wished to decide their treatment.
Conclusion The vast majority of patients wish to continue to consent to treatment. This is in direct contradiction to guidance from the GMC and the DOH and therefore places doctors in a vulnerable position. 'Patient-informed request', although potentially unpopular with patients, would clarify the patients' active role in deciding their treatment.

P076

Auditing a urological training scheme – beyond the operative logbook

A. Thompson and D.A. Jones* *Stepping Hill Hospital, Stockport and *Blackburn Royal Infirmary, Lancs, UK*

Introduction Surgical training has developed, with a more structured programme replacing the old apprenticeship. Despite these changes, attempts to audit training have been limited to comparisons of trainees' logbooks. We describe our experience with an all-encompassing audit of our regional training scheme.
Method All current trainees completed a questionnaire relating to their appointment, the education programme and other deanery issues. Each current trainee and recently appointed consultants who were trainees during the audit period also completed separate questionnaires for each training post held since 1997. All aspects of training, including appraisal in post, academic opportunity and management of patients, were examined in detail. Operative surgery was marked according to opportunity, supervision, teaching and appropriateness of cases. The data for each post were grouped together and presented graphically to compare posts against each other.

Results Of 70 questionnaires, 65 (93%) were returned. Graphs will be presented which highlight strengths and weaknesses of different posts. The highest scoring posts gave trainees flexible job plans, appropriate responsibility, feedback on performance and operative cases.
Conclusion We have identified areas of good practice and specific weaknesses within individual training posts and the overall training programme. This has been fed back to trainers to encourage the general adoption of best practice throughout the training programme. Such an audit is a difficult but, invaluable undertaking. Trainees feel the process is more transparent than college assessment forms. Re-audit is planned in 4 years to assess our progress. We commend this process to other training schemes.

P077

Does the record of in-training assessment accurately assess the progress and requirements of surgical trainees in urology?

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Introduction The record of in-training assessment (RITA) is a report of annual reviews of a specialist registrar's (SPRs) progress through the grade. This assessment is usually based on an annual interview, which should be reliable and valid, taking into account objective evidence of the trainee's progress over the preceding year. We present the first critical appraisal of the RITA process as perceived by current urological trainees.
Methods A postal survey of urology SPRs in the UK was conducted. Detailed questions were asked about educational support and supervision, the provision of objective training goals, mentoring, appraisals and the annual RITA assessment.
Results One hundred completed questionnaires were analysed. Only 34% of trainees had educational objectives outlined and written down at the beginning of their current post; 40%, 44% and 35% of trainees had targeted goals for knowledge, operative competencies and vocational skills, respectively. Despite this, only 3% of trainees received a RITA grade D or E, indicating unsatisfactory progress. Of trainees, 47% felt that there was inadequate guidance about expected achievements on an annual basis within their training programme.
Conclusions This study highlights the deficiencies and considerable variability in educational supervision, appraisal and assessment for urology SPRs across the UK. The lack of clearly defined and transparent training objectives means there is no gold standard to assess a trainee's progress at a regional level or for comparative assessment nationally. At present the RITA process lacks consistency. All trainees should have clear, realistic and measurable training goals assessed objectively on a yearly basis.

P078

Presumptive coding. A preliminary study of the ability to aggregate input diagnoses and determine their relevance to urological resourcing and clinical governance

S.R. Payne, R.D. Napier-Hemy, T. Ganesan and W.H. Turner* *Manchester Royal Infirmary, Manchester and *Addenbrooke's Hospital, Cambridge, UK*

Introduction A system for coding the reason for urological referral, from primary care, has been developed using ICD10. This system enables comparison of outcome with presumed diagnosis, with many implications for urological service provision.
Methods Three studies were carried out: (i) A pilot study to aggregate information, provided in GPs' referral letters to a single consultant, into a few input diagnostic codes (925 patients); (ii) Validation of the aggregated codes using input diagnoses from a second centre (928 patients); (iii) A prospective study by three urologists, using the Torex SMS patient administration system in one unit over a 6-month period, to determine the system's generic utility (918 patients).
Results Aggregation of input diagnoses from GP referrals into 36 'presumptive codes' was possible and could be validated. Prospective coding, carried out for 96% of eligible patients, was possible with $<1\%$ of referral diagnosis not being codable. Further aggregation of the data for 2771 patients showed that 31% of patients were referred with urological malignancy, 29% were referred with LUTS or incontinence, 16% with andrological problems, 12% pain in the urogenital tract, 8% UTIs and 4% upper tract pathology.
Conclusions Presumptive coding is a feasible and valid method of recording input diagnoses for patients presented to a urological service. The information it provides has relevance for the structuring, resourcing and manpower requirements of that service. We anticipate that 'presumptive coding' will become an essential tool in clinical governance for the bench-marking of treatment outcomes dependent upon input diagnosis.

P079

Identifying under-performing surgeons

R. Singh, N. Smeeton and T.S. O'Brien *Guy's Hospital, London, UK*

Introduction The outcome of operations varies among surgeons; judging whether such differences reflect under-performance or statistical chance is essential. Only then can patients be protected from poor surgeons, and surgeons be protected from unfounded allegations. We have taken the example of cystectomy to see how this might work in practice.
Methods A Medline search allowed us to define an acceptable mortality rate after cystectomy of 4%, hereafter this is termed 'competence' and 'excellence' was defined as a mortality of 2%. Three theoretical scenarios were explored: (i) The sample size needed to confirm under-performance for surgeons with twice, three times, five times and 10 times the acceptable mortality rates (Row A); (ii) the likelihood of two or three consecutive deaths (Row B & C); (iii) The likelihood of clustering of deaths, i.e. two deaths in five consecutive cases or two deaths in 10 cases (Row D & E). Statistical modelling was based on binomial probabilities to give a significance of 0.05 and a power of 0.8.
Results The results of the statistical models were:

	Mortality rate, %					
Model	*2*	*4*	*8*	*12*	*20*	*40*
A. Sample size to prove mortality >4%:						
	–	–	211	65	21	7
B. Probability of two consecutive deaths:						
	<0.001	<0.002	0.006	0.014	0.04	0.16
C. Probability of three consecutive deaths:						
	$<10^{-5}$	$<10^{-4}$	$<10^{-3}$	0.002	0.008	0.064
D. Probability of two in five deaths:						
	0.004	0.014	0.05	0.098	0.21	0.35
E. Probability of two in 10 deaths:						
	0.015	0.05	0.15	0.23	0.30	0.12

Conclusions Large sample sizes are needed to reliably identify even quite serious under-performance. For surgeons performing 25 cystectomies per year, 9 years of data will be needed to identify individuals with double the accepted mortality rate. One in 20 competent and one in 70 excellent surgeons will experience clustered deaths (two in 10 cases). Consecutive deaths are extremely unlikely if a surgeon is competent.

Wednesday 26 June 14.30–15.30
Poster Session 9. Reconstruction and Trauma
Chairmen: C. Chapple and L. Gilliland

P080

The effect of pregnancy in women with complex urinary tract reconstruction for congenital urological abnormality

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Introduction Pregnancy in women with complex urinary tract reconstruction for congenital urological problems is a rare but increasingly common event. We have evaluated the effect of pregnancy upon renal function and the effect of congenital urinary tract abnormality and reconstruction upon pregnancy and delivery.
Patients and methods The case notes of 13 women (median age 30 years) who have had 17 live babies were reviewed. Data collected included patient demographics, congenital urological abnormality, urological reconstructive procedure(s) and any subsequent urological complications. Pregnancy details, including urological and obstetric complications, presentation and mode of delivery, were also obtained.
Results Eight patients had exstrophy-epispadias, three cerebral palsy and two spinal dysraphism. All exstrophy patients had had bladder neck reconstruction and bladder closure. Ten patients had an enterocystoplasty, three an ileal conduit, seven a Mitrofanoff/Monti channel, two an ACE, two colposuspensions and one an AUS. Pregnancy-related urological complications were UTI (10), bladder stones (five) and upper tract obstruction requiring nephrostomy and stent (one). There was no deterioration in GFR after pregnancy. Only five of the births were normal vaginal deliveries, 12 were by Caesarean section for obstetric indications (six each elective and emergency), including four breech births in the eight exstrophy patients.
Conclusions Pregnancy in women with complex urinary tract reconstruction for congenital urological abnormalities is safe for both mother and baby. There is no associated deterioration in renal function but there is an increased need for Caesarean section.

P081

Ureteric embolization – an alternative management strategy for urinary fistulae complicating advanced pelvic malignancy

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Introduction Urinary fistulae occasionally complicate advanced/recurrent pelvic malignancy or its treatment. Extensive surgical reconstructive procedures may be difficult or seem unjustified in the presence of advanced malignancy. Ureteric embolization with permanent nephrostomy is a minimally invasive alternative in these circumstances and we present our technique and experience.
Patients and methods Since 1998, percutaneous transrenal embolization of six ureters was carried out in four patients (two each, unilateral and bilateral) all of whom had lower tract fistula as a sequelae of advanced malignancy. All procedures were performed under local anaesthesia as a day-case procedure by consultant radiologists. After ultrasonographically guided percutaneous renal puncture, an Amplatz super-stiff wire is inserted down the ureter using a biliary manipulation catheter. A Gelfoam plug is introduced along an 8 F coaxial dilatation stylet and positioned above the level of the fistula; 2 mL of cyan-acryl glue is injected into the Gelfoam plug and the catheter withdrawn before the glue sets. A covering nephrostomy is inserted which is changed every 3–6 months.
Results The follow-up was 3–48 months (there was one death from cancer 3 months after embolization) and all the patients achieved complete dryness after the procedure, which was well tolerated. One patient required repeat bilateral embolization for recurrent incontinence but is dry at 48 months. There were no embolization-related complications.
Conclusions Percutaneous transrenal ureteric embolization is a safe, effective, well-tolerated and repeatable minimally invasive alternative in the management of urinary fistulae from advanced pelvic malignancy. It offers excellent symptom palliation with minimal morbidity.

P082

Prostatorectal fistulae after radical prostatectomy for prostate cancer

D.E. Andrich, K. O'Malley and A.R. Mundy *Institute of Urology, London, UK*

Introduction Prostatorectal fistula is a rare but serious complication of radical prostatectomy. Many different surgical approaches have been described to deal with it; this report describes our experience with one approach.
Patients and methods Fourteen patients have been treated with a minimum follow-up of $\geqslant 6$ months of normal voiding since surgery, to be sure they are cured. All were operated on transperineally 3–6 months after the radical prostatectomy and all had had a covering colostomy.
Results All fistulae were closed satisfactorily although prolonged wound drainage was common. Urinary closure was more difficult than rectal closure.
Conclusions A transperineal repair has given entirely satisfactory results in this group of patients. More elaborate trans-sphincteric repairs appear unnecessary. In this, as in all sphincter repairs, the use of interposition grafts and drains may be critical.

P083

The continent catheterizable conduit in adult urological practice

D.R. Basavaraj, S. Bhargava*, A. Burns* and S.C.W. Harrison* *St James' University Hospital, Leeds and *Pinderfields General Hospital, Wakefield, Yorks, UK*

Aim To review the results, from a single centre, of continent catheterizable conduit surgery.
Patients and methods Between May 1993 and August 2001, 40 patients underwent surgery to have a continent catheterizable conduit created. Case notes were reviewed and data collected on indication for surgery, specific surgical procedure (reservoir, conduit and stoma) and any ensuing complications. Of the 40 patients, 37 patients' notes were available for review (mean age 36 years, range 11–65).
Results The mean (range) follow-up was 43 (8–104) months. The commonest indication for surgery was a neuropathic bladder (68%). The conduit was created using the appendix, ileum (Monti/plicated) and ureter in 22, 14 and one patients, respectively. Simultaneous bladder augmentation was undertaken in 23 patients and a neobladder created in four. The bladder outlet was closed, supported

or an AUS used in 21 patients. All patients continue to use their conduit at the time of review. Re-operation was needed for three patients with early and four with late complications unrelated to the conduit. Of the 13 (35%) patients who developed conduit-related complications, 10 had difficulty in catheterization, two were incontinent and one had both. Conduit revision, stomal revision and dilatation resolved problems in four, three and four patients, respectively.
Conclusions Our study supports the continued use of this technique in the adult population. All patients continue to use their continent catheterizable conduit at 43 months of mean follow-up. Patients undergoing this procedure should be adequately counselled about complications, a realistic expectation of results, and the need for minor and occasional major revision procedures.

P084

Bladder preservation in adult classic exstrophy: early results of six patients

M.G. Andankar and H.R. Pathak *B.Y.L. Nair Charitable Hospital, Mumbai, India*

Objectives To report our experience with the treatment of classic exstrophy of the bladder in adults using ileocystoplasty, bladder neck reconstruction and abdominal wall closure with flaps. The treatment of choice has been cystectomy with urinary diversion in all reported cases.
Patients and methods We treated six males (16–22 years old) with classic bladder exstrophy and complete epispadias who had received no previous treatment. Multiple random biopsies revealed non-specific inflammatory changes with focal areas of keratinization. Three patients were treated in two stages. The first stage included ileocystoplasty, bladder neck reconstruction and abdominal wall closure with the use of flaps. The epispadias was repaired in the second stage. In three patients the reconstruction was completed in a single stage.
Results All patients were continent at the last follow-up, with three using self-catheterization and three voiding spontaneously. The renal variables and ultrasonography were normal at a follow-up of 6–52 months. Cystoscopy at 6 months showed normal-looking mucosa in four patients and mild inflammation in one. One patient has not yet been followed up. After surgery all had improved social interaction.
Conclusion Bladder preservation with primary reconstruction of bladder exstrophy in adults is safe and feasible in the absence of significant histological changes in the bladder mucosa. The abdomen can be closed with no difficulty using rotational flaps. These patients require a strict follow-up to detect malignant transformation at an early stage.

P085

Penetrating injuries of the male genitalia: the Groote Schuur experience

F.C. Tyler, J. Naude and A. Pontin *Department of Urology, Groote Schuur Hospital, Cape Town, South Africa*

Introduction This presentation reviews patients who suffered penetrating injuries (gunshot injury) to the male genitalia. This includes an analysis of the age of the patient, site of injury, management and outcome, with specific interest in potency and ability to void.
Patients and methods Forty patients were referred to out department with penetrating injuries of the male genitalia, from August 1997 to September 2001. They were managed in the acute setting and followed up as outpatients on discharge.
Results Of the 40 patients, only 22% had isolated injury to the male genitalia; 46% had only penile injury, 39% only scrotal injury and 15% penoscrotal injury. Only 20% of penile injuries had urethral involvement. Only half of the cases with scrotal injury had involvement of the testes/cord; 9% of patients had bilateral testicular involvement. Although some patients were lost to follow-up, there were no deaths, 12% had erectile dysfunction (successfully treated medically) and all patients had a good outcome with regard to voiding.
Conclusion Gun shot injury to the penis is a relatively benign condition!

P086

The type of urethroplasty for a pelvic fracture urethral distraction defect cannot be predicted preoperatively

D.E. Andrich, K. O'Malley and A.R. Mundy *Institute of Urology, London, UK*

Introduction The perineal progression approach to pelvic fracture urethral distraction defects (PFUDD) is a well established standard surgical approach. The implication is that the longer the defect on preoperative X-rays the more elaborate the surgical approach will need to be, and the shorter it is the simpler the surgery will be. This report describes our experience.
Patients and methods A hundred consecutive patients with PFUDD who underwent anastomotic urethroplasty were reviewed. Only 62 patients had combined ascending and descending studies to allow an estimate of the length of the defect. The operative notes of these 62 patients were compared for the length of their radiological defects.
Results Accounting for magnification, the defects were 1–7 cm long; in 54 the defect was <4 cm. In these 54 the radiological length had no bearing on the type of surgery needed to achieve a tension-free anastomosis; mobilisation and spatulated anastomosis alone (step 1); step 1 plus crural separation (step 2); step 2 plus inferior pubectomy (step 3); or step 3 plus urethral re-routing (step 4). All patients with defects of >4 cm required step 4 or an abdomino-perineal approach.
Conclusions A relatively short PFUDD on a preoperative X-ray does not mean a simple anastomotic urethroplasty. A surgeon embarking on an anastomotic urethroplasty for a PFUDD must be willing and able to do all the potentially necessary surgical steps, whatever the radiological appearance, and the patient must be counselled about the same potential consequences as for an overtly complex repair.

P087

Endoscopic urethroplasty with unseeded small intestinal submucosal (SurgiSIS) collagen matrix grafts – a pilot study

P.J. le Roux and J.H. Naude* *Tygerberg Hospital, South Africa and *Groote Schuur Hospital, Cape Town, South Africa*

Introduction Bulbar urethral strictures can be successfully treated by endoscopic urethroplasty using full-thickness skin grafts. SurgiSIS is an acellular biodegradable collagen matrix graft manufactured from porcine small intestinal submucosa. It has been used successfully in open urethroplasty. We performed a pilot study of endoscopic urethroplasty using unseeded SurgiSIS grafts instead of skin in nine patients with bulbar urethral strictures. The aims of the study were to assess the tissue integration and epithelialization of SurgiSIS used in endoscopic urethroplasty, and the efficacy of this treatment in maintaining long-term urethral patency.
Patients and methods Nine patients with bulbar urethral strictures defined by urethrography were enrolled. After an optical urethrotomy, the SurgiSIS grafts were tubularized over a purpose-specific graft-carrying balloon device and secured into the opened urethra as described for endoscopic urethroplasty. The grafts were tattooed with India ink to facilitate endoscopic recognition during follow-up. Patients were followed up with urethroscopy and urethrography at

regular intervals as per protocol, or when symptoms arose. Failure was defined as the need for any further intervention.
Results Urethral patency was maintained in two patients at 9 and 18 months, respectively. One patient was lost to follow-up. In six patients the stricture recurred within 6 months of surgery. Of these, three have undergone subsequent open urethroplasty, two are currently awaiting urethroplasty, and one maintains patency with regular dilatations. Biopsies were taken from the grafted areas in those patients who underwent open urethroplasty. Histological analysis showed good epithelialization, but marked fibrosis in the grafted areas.
Conclusion Endoscopic urethroplasty with unseeded SurgiSIS grafts was unsuccessful in this study.

P088

Flexible cysto-urethroscopy is the best way of following up patients with urethral stricture syndrome

C.R. Chapple, S.K. Goonesinghe, T. Nicholson and C. De Nunzio *The Royal Hallamshire Hospital, Sheffield*

Introduction Urethral strictures can be difficult to diagnose as the flow rate does not diminish until the urethral calibre is $\leqslant 3$ mm. Previously, the follow-up after urethral injury has relied upon contrast imaging. This review evaluates the role of flexible cysto-urethroscopy in this context.
Patients and methods A prospective review was conducted of 141 patients treated by one surgeon over a 9-year period.
Results In all, 122 patients had flexible cysto-urethroscopy during the follow-up (median 30 months); 41 patients (34%) had undergone previous urethroplasty. After urethroplasty, 26 of 122 patients (20%) required further intervention; 12 patients had a thin diaphragm at the anastomotic site, treated by either gentle dilatation or urethrotomy with no further recurrence, and 14 developed significant re-stenosis. In 96 patients (79%) no further intervention was necessary. Three (7%) after repeat urethroplasties and nine (11%) after primary urethroplasty had diaphragms. Re-stenosis was seen in eight patients (19.5%) with repeat and six (7%) after primary procedures. Within the anastomotic urethroplasty group, eight (10%) had diaphragms and five (6.4%) had re-stenosis. Within the substitution urethroplasty group, four had diaphragms (9.3%) and nine re-stenosis (20.9%).
Conclusions Urethroplasty is a very effective surgical procedure for managing difficult urethral strictures. Accurate follow-up of patients is important to identify at an early stage those who develop recurrence. Many patients with re-stenosis defined in this study would not have been detected for some time if follow-up had been based on flow rates alone.

P089

In vitro assessment of Permacol – a potential material for bladder replacement

M. Kimuli*†, B. Cross*†, I. Eardley† and J. Southgate‡
**University of York, York, †Pyrah Department of Urology, St James's University Hospital, Leeds, and ‡Department of Biology, University of York, UK*

Introduction The complications associated with enterocystoplasty are well documented and caused by the different functional properties of the gastrointestinal epithelium and urothelium. In this study, we investigated whether normal human urothelium (NHU) and smooth muscle cells (SMC) will re-populate Permacol *ex-vivo*. Permacol is made from porcine dermis from which the cellular components have been enzymatically and chemically removed, leaving a cross-linked collagen and elastin matrix.
Materials and methods NHU and SMC were isolated from human urinary tracts and expanded *in vitro* until sufficient quantities were obtained. Each cell type suspended in medium was then seeded separately onto the Permacol. SMC were grown in Dulbecco's modified Eagle's medium, while NHU were divided into three groups. One group was grown in keratinocyte serum-free medium (KSFM) alone, while the other two were supplemented with serum and calcium, respectively. A single Permacol disk was removed weekly from each group for immunohistological assessment. Electron microscopy was carried out on the matrices removed at day 28.
Results By 7 days, monolayers of urothelium were seen on the Permacol in cultures maintained in KSFM alone or KSFM supplemented with serum. There were areas of stratification in the cultures grown in the calcium-supplemented medium. No further histological changes were seen subsequently. SMC failed to grow on or into the Permacol. Electron microscopy confirmed the histological findings.
Conclusion The growth and stratification of urothelium on Permacol in this preliminary study is encouraging. Further studies are underway to facilitate propagation and penetration of SMC into Permacol.
Funding: Permacol supplied by Tissue Science Laboratories

Wednesday 26 June 14.30–15.30
Poster Session 10. Surgical Techniques
Chairmen: B. Guillonneau and D. Tolley

P090

Prophylactic antibiotics in flexible cystoscopy: lessons not learnt

J. Evans, S. Lewis, K. Murray, N. Shrotri and A. Rane* *Kent and Canterbury Hospital, Canterbury and *East Surrey Hospital, Redhill, Surrey, UK*

Aim Previous studies have shown the beneficial use of prophylactic antibiotics before flexible cystoscopy. Most hospitals in Kent, including ours, still do not use them routinely. This prospective audit was carried out to determine whether the infection rate after flexible cystoscopy was as high as that shown in previous studies.
Patients and methods Consecutive patients (166) who underwent flexible cystoscopy between October and December 2001 were recruited to this prospective study. All patients provided an MSU before undergoing flexible cystoscopy and another sample 48 h later. Cystoscopes were disinfected using the standard Trust policy, with full aseptic precautions.
Results Twenty-four patients failed to return their second MSU specimen and seven who were already on antibiotics were excluded from the study. Of the remaining 135 patients, 109 had a negative first and second MSU. Fifteen grew a positive culture on the second MSU, of which five grew *Enterococcus*, four *Escherichia coli*, one *Proteus* and one *Staphylococcus*, the remaining four showing mixed growth, with an 11% infection rate.
Conclusion Antibiotic prophylactic using gentamicin has decreased the rate of urinary infection from 21% to 6% in previous studies. Most units still do not use them routinely. An infection rate of 11% is still high and we are in the process of closing our audit loop, using prophylactic antibiotics in the next 150 consecutive patients undergoing flexible cystoscopy. The results will be presented at the meeting.

P091

Radial artery phalloplasty in penile reconstruction in female to male transsexuals

J.S. Kalsi, M. Arya, R. Rees, S. Minhas and D.J. Ralph *The Institute of Urology, London, UK*

Introduction Several techniques have been used for phallic reconstruction in transsexuals. We present our results with the use of radial artery phalloplasty (RAP) in reconstructing the penis.
Patients and methods Between 1998 and 2001, 15 patients (mean age 40 years, range 30–48) underwent phalloplasty using a radial artery forearm free flap; eight had a single-stage procedure, with primary urethral anastomosis, whilst seven underwent staged procedures. The arterial anastomosis was undertaken microsurgically using either the inferior epigastric artery or a saphenous interposition graft to the femoral artery. Venous continuity was established with saphenous grafts. Additionally, penile sensory innervation was provided by anastomosis of the ilio-inguinal nerve to the cutaneous nerves of the forearm.
Results Immediate postoperative complications included thrombosis of the arterial graft in one patient, which was successfully re-anastomosed, and superficial wound infections in eight patients, which were successfully treated with intravenous antibiotics. Longer-term complications using a one-stage procedure consisted of urethrocutaneous fistula in two patients and the development of strictures of the neourethra in five, requiring surgery (stricture excision with replacement using buccal mucosa or simple dilatation). There were no significant complications with the forearm donor site. All patients were satisfied with the cosmetic appearance of their neophallus.
Conclusion RAP offers an effective and cosmetically acceptable means of penile reconstruction in patients undergoing gender re-assignment surgery. However, patients should be advised of the significant risk of stricture/fistula formation of the neourethra, especially in a one-stage procedure.

P092

Does epidural anaesthesia affect intraoperative nerve stimulation during radical prostatectomy?

S.R.J. Bott, P. Amoroso*, M. Arya and R.S. Kirby† *Institute of Urology and Nephrology, *Department of Anaesthesia, St Bartholomew's Hospital, and †Department of Urology, St George's Hospital, London*

Introduction Erectile dysfunction is a complication after radical retropubic prostatectomy (RRP) in 14–72% of men. To reduce this, intraoperative stimulation of the cavernosal nerves, using the Cavermap™, has been developed to provide functional information to augment the anatomical technique. Central neural blockade (epidural), using a local anaesthetic solution, is routinely given at the time of induction of anaesthesia.
Patients and methods Fifty-nine consecutive patients undergoing RRP were randomized to receive an epidural anaesthetic containing 40 mL 0.2% ropivacaine either at induction or at the end of surgery. The surgeon and assistant were unaware of the selection process. The Cavermap™ was used to stimulate the cavernosal nerves with a current of up to 20 mA at the prostate base and apex bilaterally. Recordings were taken before dividing the urethra and immediately before the anastomosis; the timing of the recordings was noted. Tumescence or detumescence was detected by a mercury strain gauge on the penis and was recorded ($+3$ to -3).
Results Patients who received the epidural at induction had a significantly lower response to nerve stimulation on the second testing (mean reduction 2.79, $P<0.001$). Patients who received an epidural after nerve stimulation did not have a significantly lower response (mean reduction 0.88 $P<0.08$). There was no difference in the timing of the first and second recordings between the groups.
Conclusions The use of an epidural anaesthetic block at induction has a significant effect on the efficacy of intraoperative nerve stimulation during radical prostatectomy. The timing of administration or the contents of the epidural should be adjusted if accurate intraoperative nerve stimulation is to take place.
Funding: AstraZeneca/BUF scholarship

P093

A prospective comparison of robot-assisted anatomic prostatectomy and conventional radical retropubic prostatectomy: the Vattikuti Urology Institute experience

A. Tewari, B. Guillonneau*, G. Vallancien* and M. Menon *Vattikuti Urology Institute and JFCC, Detroit, MI, USA and *Institut Mutualiste Montsour, Paris, France*

Introduction Robotic assistance may enhance the precision of anatomical dissection and increase the feasibility of performing

laparoscopic radical prostatectomy for most surgeons. We prospectively compared operative variables in the first 30 patients (20 'learning' and 10 'standardized') undergoing robot-assisted anatomical prostatectomy (RAP) and contemporary patients undergoing conventional radical retropubic prostatectomy (RRP) at our institution.

Patients and methods The study design was a prospective unrandomized comparison of RAP with the Da Vinci surgical system and anatomical RRP using the technique of Walsh. We evaluated: (i) baseline patient and tumour characteristics (age, serum PSA, biopsy, Gleason, clinical stage, body weight and height; (ii) intraoperative variables (operative duration, blood loss, need for transfusion, number of units transfused; (iii) postoperative variables (pain score, duration of hospitalization, percentage of patients discharged in <1 day, catheter duration; (iv) histopathological variables; and (v) complications, in the two groups.

Results The preoperative variables were comparable for both groups. The mean set-up time for RRP was 0.25 h and for RAP was 0.95 h ($P<0.001$). The mean operative duration was 2.3 h (incision to closure) for RRP and 4.75 h for RAP ($P<0.001$). One patient required conversion from RAP to RRP because of lack of progress. The mean blood loss was 970 mL for RRP and 329 mL for RAP ($P<0.001$). The decrease in haemoglobin was greater in the RRP group (4.4 RRP vs 1.2 g RAP; $P<0.05$). More blood units were transfused in the RRP than in the RAP group (27 vs 6; $P<0.05$). The mean pain score on 1 day after surgery was 7 in the RRP and 4 in the RAP group ($P=0.05$). The mean hospital stay was 56 h after RRP and 36 h after RAP (not significant); 63% of the RAP and none of the RRP group were discharged within 23 h ($P<0.001$). The pathological stage, margin status and PSA values were no different in two groups. The set-up, operative time, blood loss and duration of catheterization were significantly less after the technique was standardized.

Conclusions RAP is a longer procedure than RRP but the blood loss is minimal; patients feel less pain and are discharged earlier from hospital. In our hands, the margin status and complication rates are comparable for both techniques.

P094

Urological laparoscopy: is the learning curve really less steep with hand-assisted laparoscopy?

A. Rane, B. Eddy, S. Sriprasad*, J. Poulsen*, V. Srinivasan† and P. Dasgupta‡ *East Surrey Hospital, Redhill, *Kings College Hospital, London, †Glan Clwyd Hospital, Rhyl, and ‡Guy's Hospital, London, UK*

Introduction Proponents of hand-assisted laparoscopy (HAL) claim that it is learned more quickly than 'pure' laparoscopy. The claim is that the ability to retract and perform blunt dissection, coupled with tactile sensation, 3-D spatial orientation and proprioception, offer the aspiring laparoscopic urologist the option to combine the ease of open surgery with the obvious benefits of laparoscopy. Our study attempts to determine this claim objectively.

Methods We prospectively recorded the perioperative details of patients undergoing laparoscopic ablative procedures by one surgeon in district general hospitals. The subjective difficulty was scored and operative time, blood loss and inpatient stay noted. At the time of submission, data were available for 37 patients; 10 had simple nephrectomies by the retroperitoneal route, three underwent retroperitoneal radical nephrectomy, six standard transperitoneal laparoscopic radical nephrectomies, nine had radical nephrectomies by the transperitoneal hand-assisted approach and seven hand-assisted nephroureterectomy for TCC of the renal pelvis; two patients underwent hand-assisted simple nephrectomy.

Results The subjective difficulty encountered was less with HAL than with conventional pure laparoscopy in most cases that could be compared directly. Blood loss was similar, as was inpatient stay.

	Mean				
Procedure (N)	*Operative time, min*	*Blood loss, mL*	*Hospital stay, days*	*Difficulty score (1–10)*	*Significant complications*
Transperitoneal laparoscopic radical nephrectomy					
(6)	190	220	4	–	7
Transperitoneal HAL radical nephrectomy					
(9)	130	160	4	–	5
Transperitoneal HAL radical nephroureterectomy					
(7)	240	240	4	–	7
HAL simple nephrectomy					
(2)	130	50	3	–	5
Retroperitoneal simple nephrectomy					
(10)	150	100	3	1	6
Retroperitoneal radical nephrectomy					
(3)	200	200	4	–	8

Conclusions For tumours, HAL gives a greater degree of confidence to the novice and does reduce operating time; it does not particularly influence the outcome with extirpative procedures carried out for benign pathology. This is a small series and more patients are needed to ratify this claim.

P095

Laparoscopic training for urologists

M. Ramalingam, K. Selvarajan and K. Senthil *KG Hospital and Postgraduate Institute, Coimbatore, India*

Introduction Since January 2001, 24 urologists have undergone training in laparoscopy. The trainers included a urologist, a paediatric and a laparoscopic surgeon. The hand–eye coordination was achieved more quickly among the urologists undergoing laparoscopic training.

Methods Laparoscopic urology training in our centre was specifically structured for the urologist by one of the authors, who is a laparoscopic urologist. All the trainees were able to achieve adequate skill in the endotrainer manoeuvres (bead transfer, cobra drill, orange peel, chicken dissection and endosuturing) within ⩽4 h. After they had fine-tuned their endotrainer skills they had animal laboratory training (live pigs, 30–40 kg) wherein they were all able to clip testicular veins, dissect the kidney and renal hilum. The same centre conducts a laparoscopic training programme for paediatric surgeons and to date 12 have undergone training. The study showed significant differences between the groups of trainees in time to achieve adequate skills in the endotrainer manoeuvres and animal laboratory training.

Conclusion The presence of a urologist in the laparoscopic training programme for urologists helps in tailoring the training specifically for urologists. Urologists were able to achieve adequate skill more quickly because of their previous experience in endourological surgery requiring hand–eye coordination. This study should encourage urologists to undergo training in laparoscopy, and more laparoscopic training specifically structured for urologists should be devised.

P096

How to learn laparoscopy – experience in one centre

N. Soomro, D. Thomas, D. Rix and D. Tolley* *Freeman Hospital, Newcastle upon Tyne and *Western General Hospital, Edinburgh, UK*

Introduction There is compelling evidence which suggests that laparoscopic procedures on the upper urinary tract result in a better outcome. Thus the interest in laparoscopic techniques is increasing and the challenge is to diffuse these new technologies throughout urology in a safe and controlled manner, with a minimal learning curve and associated morbidity.
Methods An initial audit of potential workload was carried out to identify service needs and to determine whether introducing this specialized service was appropriate in our hospital. After discussion with the medical director it was agreed that one surgeon in a department of 12 consultants would be trained in the technique, following the guidelines presented to and approved by BAUS council and the SAC. The plan comprised identifying suitable cases, involving an experienced laparoscopic urologist initially as a tutor and then as a mentor, supported by visits to recognised centres in the UK and abroad. A second consultant has now been trained in laparoscopy, having evaluated and established this training programme.
Results The results for 44 procedures (there was also one marsupialization of a renal cyst and one exploration of an intra-abdominal testis) were:

	Nephrectomy			
Variable	*Simple*	*Radical*	*NU*	*Pyeloplasty*
n	19	10	5	8
Operating time, min	177	175	195	192
Weight, g	238	561	261	–
Transfusion	1	0	2	0
Conversion	1	0	0	0
Complications	1	0	1	1
Hospital stay, days	3.6	3.7	7	4.2

NU, nephro-ureterectomy.

Conclusion An audit of outcome would suggest that by following the agreed guidelines, this technique can be safely introduced into urological practice. Furthermore, previous criticism that this technique involved a protracted learning curve and exposed patients to additional risks is not borne out by our experience. Our data also suggests that the complication rate associated with major upper tract renal surgery is lower if the procedure is performed laparoscopically and that a high conversion rate seen in other series can be avoided by a mentoring process with appropriate case selection.

P097

Initial UK experience with various hand-assisted laparoscopic devices

D.M. Burke, V. Srinivasan and A. Rane* *Glan Clwyd Hospital, Rhyl, North Wales and *Frimley Park Hospital, Surrey, UK*

Introduction Hand-assisted laparoscopic surgery (HALS) is being increasingly used in urology. It has obvious benefits over laparoscopic surgery in that the surgeon has tactile feedback, is able to perform blunt dissection and has greater control over bleeding. It is easier to perform than conventional laparoscopic surgery and therefore plays a major role in shortening the learning curve. However, to enable both surgery and teaching to be carried out satisfactorily the hand-assisted devices (HADs) which facilitate the intra-abdominal placement of the hand must attain certain standards.
Method There are currently four HADs available in the UK; the Intromit™, the Handport™, the Pneumosleeve™ and the Gelport™. They were assessed by a telephone questionnaire to all consultants known to be using HALS within the UK. Each HADs was assessed for insertion, durability, comfort and cost. Qualities were graded individually on a scale of 1 to 5.
Results The Gelport™ device consistently scored higher on all surgical aspects, with mean scores for each section of 5, 4.3 and 5, respectively. However, it scored lowest of all devices on cost, with a mean score of 1.5. The best device perceived financially was the Pneumosleeve™, with a mean score of 3.75.
Conclusion From our initial study, although not all of the consultants questioned had experience with all of the devices being trialled, it appears that the Gelport™ had the highest standards and is therefore recommended by the authors for HALS.

P098

The use of ureteric access sheaths and flexible ureteroscopy; a marriage in heaven?

L. Ajayi, J. Allan, H. Naerger, B. Montgomery and E. Palfrey *Frimley Park Hospital, Surrey, UK*

Introduction The combination of holmium laser and flexible ureteroscopy has changed clinical practice in upper tract endourology, but the poor durability of modern flexible ureteroscopes is well documented. Ureteric access sheaths have the potential benefits of preventing back-loading ureteroscopes, protecting the ureter during repeated instrument changes, providing a continuous working channel allowing multiple passes to clear stone or tumour, reducing theatre time and potentially reducing torque. We present the inaugural British results of the use of the Applied™ ureteric access sheath with flexible ureteroscopy.
Patients and methods Twenty-nine consecutive flexible ureteroscopies were undertaken for diagnosis or stone disease in the kidney. In all patients a retrograde study was used first to check the ureter and a 'Sensor' guidewire then passed to the kidney. The access sheath is then passed to the kidney under radiological control. The standard sheath used was 9 F (internal diameter) and 35 cm, with a SL-6 hydrophilic coating, although the 55 cm equivalent was used in some larger men. The wire and internal dilator were then removed leaving the access sheath *in situ* and a direct working channel to the kidney.
Results We have now performed 38 procedures with the ureteroscope; 97% of all access sheaths passed with no effort into the upper ureter, and of these ureters, 28% had previously been stented. The flexible ureteroscope was passed with ease to the kidney in all 28 patients and in no case did we have to back-load the ureteroscope. Twenty-two patients had a significant stone load that required treatment with the holmium laser and fragment removal with zero-tip Nitinol baskets. The stone size was 5–25 mm and 16 patients required multiple passes to clear debris from the kidney, with >5 passes in 10 patients. No difficulty was encountered in multiple passes although a patient developed pyelonephritis. No strictures have yet developed.
Conclusions The Applied™ ureteric access sheath provides safe and rapid access to the kidney, allowing a continuous working channel whilst protecting the ureter and flexible ureteroscope.

Wednesday 26 June 16.00–17.00
Poster Session 11. Prostate Cancer: Diagnosis
Chairmen: F. Hamdy and P. O'Reilly

P099

A one-stop prostate cancer detection clinic – is it feasible?

P. Bose, D. Kelleher, S. Matthews, N.J. Fenn, M.G. Lucas and K.C. Vaughton *Urology Department, Morriston Hospital, Swansea, UK*

Introduction Public awareness of prostate cancer has increased recently, resulting in a substantial increase in hospital referrals of men with an elevated PSA level. With limited resources it is becoming increasingly difficult for the urology department to meet the government cancer guidelines. To deal with this issue we have initiated a one-stop diagnostic clinic.
Method A consultant urologist and nurse practitioner run the clinic. Men with an elevated PSA or abnormal DRE are seen; they are counselled and all management options discussed. A prostatic biopsy is taken at the same time if indicated. The patients are informed of their biopsy results by telephone within 4 working days. An information booklet is sent to all the patients with cancer, staging investigations arranged and they are then reviewed in the next multidisciplinary clinic. Patients with a benign biopsy are discharged to their GP.
Results Between August 2000 and July 2001, 185 men were assessed; 159 (86%) had a prostatic biopsy and 26 (14%) opted for surveillance. Cancer was detected in 60 men (38%) and in 12 (7.5%) patients there was suspicion of cancer; 98% had their histology results informed within 4 working days. All 127 patients who returned a satisfaction questionnaire were happy with the service. The cost per patient was £80.
Conclusion We feel that this clinic is an efficient and cost-effective way of assessing patients at high risk of prostate cancer. It is acceptable both to the patients and to GPs.
Funding: Astra Zeneca

P100

Do we have an optimum rapid-access prostate-assessment clinic?

N. Kakani and J. McLoughlin *West Suffolk Hospital, Suffolk, UK*

Background This unit has played an active part in the Cancer Services Collaborative for over 2 years. During that period we have progressively altered the way in which patients with suspected prostate cancer are evaluated and flow through the system. These methods have been constantly audited and validated by patient feedback, leading to the present format.
Methods Patients referred with suspected prostate cancer are offered an appointment within 2 weeks for initial assessment (Thursday). An information sheet details the reason for their attendance and forewarns them that they may undergo TRUS and biopsy on their first visit. An FP10 prescription for prophylactic antibiotics and a pre-booked follow-up appointment is sent to them for 8 days after biopsy, at which the results are given. In the clinic the consultant meets them for the first time and discusses the options, and if appropriate proceeds with a TRUS and biopsy under local anaesthetic. Patients are asked if they would like to be telephoned with the results, should they be available before their follow-up appointment. The histology results are then reviewed in a multidisciplinary meeting the following Monday (4 days after biopsy) and where appropriate patients are telephoned with their results and an outline treatment plan. If the results are negative the patients are given a choice to keep the follow-up appointment.
Results Over the last 18 months 450 men have been assessed in this manner. The mean time from referral to intention-to-treat was 84 days before the Collaborative and is now 17 days with the new system. Patient satisfaction is high, as validated by patient-assessment forms.
Conclusion We have established, audited and modified a system which is safe and reliable in the rapid assessment of patients with suspected prostate cancer. This also treats the 'worried well' effectively and quickly.

P101

Current practice of PSA screening in general practice

K.J. Ho, B. Little and M.R.A. Young *Craigavon Area Hospital, Scotland, UK*

Introduction The NHS does not invite men for PSA testing and does not expect GPs to discuss PSA screening with asymptomatic patients. This survey reports current PSA testing trends in general practice.
Methods For hundred GPs were randomly selected to receive a questionnaire comprising six sections: PSA testing indications; investigations used to test for prostate cancer; counselling before PSA testing; age groups for PSA testing; response to abnormal PSA results; and PSA testing workload.
Results The response rate was 71%; of the GPs, 80% test men with urinary symptoms, 65% test men with a positive family history, 7% actively arrange PSA screening, 21% include a PSA test in patients with unrelated symptoms and 62% test on patient request. Of the GPs, 86% used DRE and PSA to test for prostate cancer, the remainder using PSA only; 42% performed additional tests; 91% of GPs advise patients when PSA is tested and 71% discuss implications of an abnormal result. Only 18% discuss prostate cancer treatment. The mean age for commencing PSA testing was 50 years, with no upper age limit. When a PSA test is abnormal, 88% counsel before referral, 55% repeat the test, and 25% refer directly without counselling. The mean PSA threshold for referral is 6.6 ng/mL. Only 11% of practices have a formal policy about abnormal PSA results; 54% of GPs believe PSA testing will generate a moderate increase in workload if widely publicised.
Conclusion Opportunistic PSA screening is freely practised, not confined to a specific age band, and likely to generate a significant increase in workload.

P102

A simple chart to monitor and predict PSA values

P.R. Malone *Royal Berks and Battle Hospitals NHS Trust, Reading, UK*

Introduction Serial PSA values allow the progress of prostate cancer to be monitored; it can be helpful to view the results in graphical form but this can be difficult because of the wide range in PSA values (e.g. from 0.04 to 10 000 ng/mL). Furthermore, the rise in PSA is exponential in patients with prostate cancer, making it troublesome to predict future values.
Methods These problems can be overcome if PSA is plotted on a logarithmic scale. An A3 sheet allows a scale of PSA from 0.01 to 10 000 ng/mL to be plotted against monthly divisions of time for 15 years. This folds conveniently in half to fit the patient's A4 notes.
Results We have used the chart in over 800 patients. Once a trend in PSA has been established, then future values and the age at which the patient will achieve a given value can be predicted by extrapolating a straight line drawn through the plotted values.

Conclusion This chart is rapid to produce and update; viewing the chart gives an almost instantaneous appraisal of the patient's progress. It can be used to predict future PSA levels or the age of the patient when a given level will be achieved. This is particularly useful in determining the best time to treat patients under surveillance.
Funding: Schering Health Care Ltd.

P103

Performance of complexed PSA is not affected by prostate volume

N.K. Lynn, G.N. Collins, S.C.W. Brown, P.J.C. Brooman and P.H. O'Reilly *Department of Urology, Stepping Hill Hospital, Stockport, Cheshire, UK*

Introduction Complexed PSA (cPSA) has been suggested to be better than total PSA (tPSA) in the diagnosis of prostate cancer. We studied the effect of prostate volume on the performance of cPSA and tPSA.
Patients and methods A series of 217 patients referred for prostate biopsy with a tPSA of <15 ng/mL were assessed. Blood samples were taken before any manipulation. The tPSA (Elecsys immunoassay) and cPSA (Bayer immunoassay) were measured and the ratio calculated. Total prostate volume was measured with 7.5 MHz TRUS and sextant biopsies taken in all cases. The performance of cPSA and tPSA were calculated for large (>60 mL) and small (<60 mL) prostates using ROC curve analysis.
Results The mean (range) age, tPSA, cPSA and prostate volume were 67.6 (44.0–84.0) years, 7.0 (0.1–14.7) ng/mL, 5.8 (0.1–14.0) ng/mL and 61.6 (15.4–224.0) mL, respectively. The areas under the ROC curve (AUC) for large and small prostates were:

Variable	*Overall*	*>60 mL*	*<60 mL*
n	217	99	118
Cancer detection, %	19	8	28.8
AUC for tPSA	0.66	0.63	0.79
AUC for cPSA	0.73	0.75	0.823

The AUC of cPSA for the total population was larger than that for tPSA and the AUC for tPSA was significantly lower ($P<0.05$) for larger than smaller prostates, but there was no significant difference in the AUC for cPSA.
Conclusion cPSA performs better than tPSA; the cancer detection and performance of tPSA were poor in patients with large prostates. However, prostate volume had no significant effect on the performance of cPSA.

P104

The utility of free/total PSA ratios in detecting high Gleason grade prostate cancer in a cohort of prospectively screened young men with a total PSA of 4–10 ng/mL

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Introduction The use of PSA as a tumour marker for prostate cancer has greatly improved the early detection of the disease. However, its lack of specificity often results in biopsies of benign prostates and the detection of low-grade and possibly insignificant cancers. In this study we aimed to ascertain whether the addition of free/total PSA ratios could improve the detection of high-grade cancers (Gleason sum 7–10) in a prospectively screened population of young men.
Subjects and methods Men 50–65 years old were contacted via their local general practice and invited by letter for prostate cancer screening. In each man the serum free and total PSA were measured and the free/total ratio calculated. All men in the cohort with a total PSA of 4–10 ng/mL who underwent TRUS-guided biopsy of the prostate formed the basis of this analysis. The histological findings were compared with the free/total PSA ratio.
Results Of the 625 men screened, 41 (6.6%) had a PSA of 4–10 ng/mL; a histological diagnosis of prostate cancer was made in 13 of the 42 (32%). The free/total PSA was associated with grade of disease ($P=0.01$, chi squared for trend). Using a free/total ratio <12% as a threshold for a biopsy diagnosis of Gleason sum 7–10 cancer, the positive and negative predictive values (with 95% CI) were 40 (12–74)% and 100 (89–100)%, with a sensitivity of 100 (40–100)% and a specificity of 83 (68–94)%.
Conclusion In this specific cohort of screened men, those men with a low free/total PSA ratio (<12%) were at a greatest risk of having high-grade prostate cancer (Gleason sum 7–10). Men with a higher free/total PSA ratio are much less likely to have prostate cancer, and those that do have a lower Gleason sum (2–6) on biopsy.

P105

A national survey of TRUS-guided prostatic biopsies: is it time for a national guideline?

S. Masood, H.R.H. Patel, J.H. Palmer, G.R. Mufti and M.K.M. Sheriff *Medway Maritime Hospital, Kent, UK*

Introduction Currently there are no guidelines on TRUS and biopsy of the prostate, particular for how many biopsies should be taken and the most appropriate antibiotic prophylactic regimen. We surveyed national practice to begin the process of developing such guidelines.
Method Sixty centres across 12 regions, encompassing England, Scotland, Wales, Northern Ireland and the Republic of Ireland, were polled using a telephone questionnaire. Descriptive data were collected on: (i) operator (clinician, nurse, radiographer); (ii) analgesia/anaesthetic used (general, regional, local, none); (iii) antibiotic prophylactic regimen; and (iv) the number of biopsies. All questions related to the standard protocol of the centre.
Results A mean of five centres per region were sampled across the UK and Ireland (60 in all). A summary of our the findings is shown in the table. Importantly, the number of biopsies was variable in over a quarter of the centres, whereas antibiotic prophylaxis was poorly standardised in terms of type, dosage timing and duration.

Question	*Response, %*
Operator	
Urologist	85
Nurse	0
Radiologist	15
No. biopsies	
6	78
8	10
10	13
12+	8
Antibiotics	
Ciprofloxacin	70
Gentamicin	30
Metronidazole	22
Augmentin	12
Trimethoprim	8
Ofloxacin	5
Anaesthesia/Analgesia	
General	0
Regional	0
Local	8
None	92

Conclusions We highlight the need for national, evidence-based guidelines on antibiotic prophylaxis and biopsy numbers, to allow

standardization of the technique, thus allowing equivalent cancer detection rates nationwide, with minimal morbidity.

P106

Diagnostic outcomes and treatment of patients >70 years old with an abnormal PSA referred for TRUS-guided prostatic biopsy

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Sunderland Royal Hospital, Sunderland, UK

Introduction Radical treatment for prostatic adenocarcinoma is offered to patients aged ⩽70 years, with a 10-year life-expectancy. However GPs continue to refer elderly patients with elevated PSA levels. This study was conducted to evaluate the diagnostic findings and treatment options in men aged ⩾70 years with LUTS and who were referred with an abnormal PSA level.
Patients and methods Between 1996 and 2000, 427 patients aged ⩾70 years with LUTS were referred for investigation of elevated PSA levels. Patient age, associated comorbidity, PSA, Gleason score, bone scan results and treatment pursued were reviewed retrospectively. All patients had an extended-core (at least eight cores) biopsy.
Results The diagnostic outcome and treatment were assessed for four groups categorized by PSA level and DRE (group 1, PSA 4–15 ng/mL, normal DRE; group 2, PSA 4–15 ng/mL, abnormal DRE; group 3, PSA >15 ng/mL, normal DRE; and group 4, PSA >15 ng/mL and abnormal DRE:

Clinical outcome	*Group* 1	2	3	4	*P*
n	113	116	69	122	
Cancer detected, *n* (%)	19 (17)	54 (47)	25 (32)	102 (84)	0.001
High-grade cancer (Gleason Grade >6), *n* (%)	8 (7)	45 (39)	37 (54)	82 (67)	0.001
Hormonal treatment, *n* (%)	9 (8)	27 (23)	16 (23)	88 (73)	0.001

Conclusions Elderly patients with a PSA of ⩽15 ng/mL and a normal DRE had a significantly lower cancer detection rate, with a high proportion of low-grade cancer, which did not require active treatment. Most of these patients would not benefit from aggressive evaluation of an elevated PSA level. Guidelines for using PSA in this patient group could decrease the inappropriate use of biopsy and decrease the burden on cancer services.

P107

A randomized trial of diclofenac suppositories before transrectal biopsy of the prostate

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Introduction TRUS-guided biopsy of the prostate has developed into the procedure of choice for diagnosing prostate cancer. TRUS and biopsy is generally used with no analgesia on an outpatient basis. Several recent studies have suggested different types of analgesia for this procedure. Diclofenac suppositories are easily administered and safe in most patients, but there have been no previous placebo-controlled studies of the use of diclofenac before TRUS and biopsy.
Patients and methods An ethics committee-approved prospective randomized double-blind placebo-controlled trial was conducted into the use of diclofenac suppositories for analgesia before TRUS and biopsy. The patients were randomly administered a suppository (100 mg diclofenac or placebo, identical) 1 h before biopsy, at the same time as antibiotic prophylaxis. Directly after the procedure the patients were asked to mark on a 10-cm linear visual analogue scale the degree of discomfort experienced during the procedure. Two weeks later the patients were reviewed in outpatients, the histology and further management discussed, and any complications noted. The difference between the groups was tested with an independent-sample *t*-test.
Results In all, 72 patients were included in the study; there was no significant difference in other variables, i.e. mean age, median PSA value, mean prostatic volume and median number of biopsies taken in each group, or in complications (table). The mean (SD) pain score for the diclofenac group was 2.9 (2.3), compared with 4.9 (2.7) in the placebo group; the difference was significant ($P<0.001$).

	Diclofenac	*Control*	*P*
n	37	35	
Mean age, years	67.9	65.1	0.13
Median PSA, ng/mL	17.8	16.0	0.82
Mean, prostate volume, mL	48	50.4	0.6
Median no. biopsies	8	8	0.12
Haematuria, %	32	40	0.5
Histology (cancer)	43	49	0.65
Mean pain score	2.8	4.9	<0.001

Conclusion The administration of diclofenac suppositories before TRUS and prostate biopsy reduces patient discomfort associated with the procedure, with no significant increase in morbidity.

P108

Entonox® inhalation and tolerance of TRUS-guided prostate biopsy: a double-blind randomized controlled study

J. Masood, N. Shah, T. Lane, H. Andrews, P. Simpson and J.M. Barua *Department of Urology, Harold Wood Hospital, Romford, Essex, UK*

Objective To conduct a randomized double-blind placebo-controlled trial to evaluate the effectiveness of Entonox® (50% nitrous oxide/oxygen) as analgesia during TRUS-guided prostate biopsy.
Patients and methods Patients referred for TRUS-guided prostate biopsy for the first time were recruited, subject to exclusion criteria, and randomized to breathe either Entonox or air via similar breath-activated devices. At the end of the procedure patients completed a visual analogue pain scale. Patients who declined the study also completed the visual analogue pain scale to assess the placebo effect of receiving gas through a mask.
Results The trial included 110 patients; statistical analysis (one-way ANOVA) showed a highly significant difference in pain perception among the three groups ($P<0.001$). There was significantly less pain with Entonox than air, and with Entonox than placebo, but no significant difference between the air and placebo groups. Seven of 51 patients receiving Entonox complained of feeling drowsy during the procedure, which resolved on completing the procedure; 49 patients in this group were happy to undergo the procedure again if needed. Two of 45 patients given air had the procedure abandoned because of the pain. Another 19 patients would have liked more analgesia and two would have preferred a general anaesthetic if the procedure was to be repeated.
Conclusion Entonox is a safe, fast-acting and effective form of analgesia for the pain of prostate biopsy; it should be the analgesia of choice for this procedure.

Wednesday 26 June 16.00–17.00
Poster Session 12. Andrology
Chairmen: C. Evans and T. Terry

P109

Erectile dysfunction is a marker for asymptomatic peripheral vascular disease

H. Solomon, J. Man, E. Martin, S. Padayachee and G. Jackson *Guy's & St Thomas' NHS Trust, London, UK*

Introduction Increasing evidence suggests that vascular erectile dysfunction (ED) is a risk factor for coronary artery disease. Few studies report the association between ED and peripheral vascular disease (PVD). Therefore, men with ED and established cardiovascular disease (CVD), but asymptomatic for PVD, underwent routine screening for PVD.
Patients and methods In 40 men, risk factors for CVD were assessed and concomitant drug therapy recorded. The diagnosis of ED was established using the International Index of Erectile Function. All men underwent routine ultrasonographic angiology of the carotid arteries, subclavian arteries and arteries of the lower limbs, despite being asymptomatic for PVD.
Results ED was confirmed in all 40 men; the stenosis on ultrasonographic angiology was either severe (>70%), moderate (20–70%), minor (<20%) or normal. Eight men (20%) had at least one severe stenosis, 14 (35%) had at least one moderate stenosis, five (12.5%) had at least one minor stenosis and 13 (32.5%) had normal scans. Of the 22 men (55%) with moderate/severe stenoses, 16 had at least two of four CVD risk factors; 15 of these men were on statin therapy, 10 were on ACE inhibitors and 12 were on β-blockers.
Conclusions Of 40 men with ED who were asymptomatic for PVD more than half were also at an increased risk for PVD. ED is an important marker of arterial disease, particularly when several risk factors are present. Therapeutic strategies to minimize subsequent risk need to be targeted more effectively.

P110

The relationship between erectile dysfunction and coronary artery disease in men undergoing elective day-case cardiac catheterization

J.W.C. Man, H. Solomon and G. Jackson *Guy's and St Thomas' Hospitals, London, UK*

Introduction Although the association between coronary artery disease (CAD) and erectile dysfunction (ED) is well known, the temporal relationship between these conditions and the use of ED as a predictor or marker of CAD have not been fully evaluated.
Patients and methods Of 145 men, 130 admitted for elective day-case coronary angiography completed a questionnaire about the timing, severity and risk factors of CAD and ED (including the sexual health inventory, SHI). Information was also obtained from angiogram reports and hospital notes.
Results The mean (SD) age of the men was 59 (1.9) years; their other characteristics were: 18 current smokers, 94 ex-smokers, 17 never smoked; myocardial infarct 60; known CAD 69, prior coronary angioplasty 16, CABG 10, dyslipidaemia 105, diabetes 25, hypertension 73, family history of CAD 75; confidence in achieving and maintaining an erection (question 5 of SHI) very low 37, low 15, moderate 27, high 28, very high 14, no answer six, suggesting that at least 79 men (61%) had some degree of ED, whereas 63 (48%) actually admitted to having ED. There were 59 with ED and CAD, four with ED and no CAD/minor plaque disease, 47 with CAD and no ED, and 17 with no ED and no CAD/minor plaque disease. More patients with ED had CAD (59) than those without ED (47). Those with ED had more severe CAD; ED preceded cardiac symptoms in 33 men and cardiac symptoms preceded ED in 25; five thought the ED and cardiac symptoms appeared at the 'same time'.
Conclusion In this cohort of men undergoing coronary angiography, ED affected a large proportion; some with SHI evidence of ED denied having ED; those with ED had more advanced CAD; only four men with ED did not have significant CAD. ED often preceded CAD. These findings support the hypotheses that ED may be an important marker of atherogenesis and may be a predictor of CAD. Furthermore, it seems that men with ED referred for coronary angiography are most unlikely to have normal coronaries.

P111

The value of routine cardiological assessment in patients with erectile dysfunction

H. Solomon, J. Man, G. Jackson and T. O'Brien *Guy's & St Thomas' NHS Trust, London, UK*

Introduction Erectile dysfunction (ED) and coronary heart disease commonly coexist. The Princeton consensus panel offers guidelines for the management of ED in patients at significant cardiac risk. We report the results of the implementation of these guidelines in a cohort of men with ED and show the necessity of such a strategy for managing ED.
Patients and methods In all, 178 men, referred to the urology service were assessed by both urologists and cardiologists at a 'one-stop' ED clinic. All patients had BP recorded and gave fasting blood samples for lipid, diabetes and hormone profiles. The Princeton consensus guidelines were applied to all men who could then be stratified into low, intermediate or high cardiovascular risk. The intermediate/high-risk group had ED treatment deferred and warranted further cardiovascular management until re-stratified into low risk. Men considered low risk were treated immediately for ED.
Result Fifty-two men (30%) were categorised into intermediate/high-risk groups; 32 (18%) men required intensive cardiological investigation including exercise testing, echocardiography and angiography. Sixty-five men (37%) had uncontrolled hyperlipidaemia; of these, 46 (71%) were previously undiagnosed. Forty-two men (24%) had uncontrolled diabetes; of these, six (14%) were previously undiagnosed. Thirty-five men (17%) had uncontrolled BP; of these, 11 (31%) were previously undiagnosed.
Conclusion The management of ED should include a thorough cardiac history with emphasis on cardiovascular risk factor control. The Princeton guidelines offer a platform for managing ED in patients at cardiac risk and treating ED must be deferred until patients are low risk.

P112

Homocysteine and copper inhibit prostacyclin release from rabbit cavernosal smooth muscle through the effects of superoxide

R.W.A. Jones, N. Shukla, G.D. Angelini, J.C. Gingell, R.A. Persad and J.Y. Jeremy *Bristol Royal Infirmary, Bristol, UK*

Introduction The effects of the superoxide radical (O_2^-) on the nitric oxide (NO)-cGMP axis are well documented. Homocysteine and

copper enhance O_2^- production in vascular tissues and have been shown to inhibit cavernosal NO-mediated relaxation via the effects of O_2^-. Oxidative stress also impairs prostacyclin (PGI2) production in vascular tissues. We aimed to investigate the effects of homocysteine and copper on PGI2 release in isolated rabbit cavernosum.
Materials and methods Isolated cavernosal tissue segments from 10 New Zealand white rabbits were incubated in homocysteine (100 μmol/L), copper (1 μmol/L) or a combination of the two, in the presence or absence of superoxide dismutase (SOD, 300 U/mL). Tissue PGI2 production was stimulated with calcium ionophore (10 μmol/L), and PGI2 measured by competitive enzyme immunoassay.
Results Cavernosal PGI2 was potently stimulated by calcium ionophore (mean 29.74 vs 15.35 mg/mL/mg tissue/h, $P<0.001$). Homocysteine and copper alone inhibited this PGI2 response (15.86 and 17.16 mg/mL/mg tissue/h, respectively, $P<0.05$ for both). The independent effects of homocysteine and copper appeared to be partly, although not significantly, prevented by SOD (19.8 and 20.79 mg/mL/mg tissue/h, respectively). Homocysteine and copper together also potently impaired PGI2 (10.91 mg/mL/mg tissue/h, $P<0.01$) and this inhibitory effect was significantly prevented in the presence of SOD (23.17 mg/mL/mg tissue/h, $P<0.05$).
Conclusions Homocysteine and copper, both independently and combined, impair cavernosal PGI2 release. SOD significantly prevents the impairment of PGI2 by homocysteine and copper in combination, suggesting that O_2^- mediates this inhibitory effect. We hypothesise that O_2^- may affect cyclo-oxygenase activity in the corpus cavernosum.
Funding: The Ralph Shackman Trust

P113

The effect of varying sperm retrieval techniques on the outcome of intracytoplasmic sperm injection in male factor infertility

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*Manchester Royal Infirmary, *Manchester Fertility Services, Manchester, UK*

Introduction The advent of sperm retrieval techniques and intracytoplasmic sperm injection (ICSI) have revolutionized clinical practice in male factor infertility. This single-centre study compared ICSI cycles using ejaculated sperm, percutaneous epididymal sperm aspiration (PESA) and testicular sperm extraction (TESE).
Patients and methods A total of 644 consecutive ICSI cycles were analysed retrospectively. Sperm was preferentially obtained from an ejaculated specimen (508), then PESA (89) and finally TESE (47). The fertilisation rate and cumulative pregnancy rate were calculated for each group.
Results There were no differences in maternal factors between the groups. The source of sperm did not significantly affect the fertilisation rate of the oocytes: 59.6% (ejaculated), 53.8% (PESA), 53.7% (TESE). During ICSI cycles means of nine eggs were injected with a mean yield of five fertilized oocytes. Of these, two were returned to the female partner with the rest frozen for subsequent replacement. The cumulative pregnancy rate per egg recovered and undergoing ICSI was 31% (ejaculated), 35% (PESA) and 26% (TESE). These differences were not statistically different. Sperm, which could be used for ICSI, were found in 52 of 71 azoospermic men (73%) who underwent TESE after negative PESA. Overall, half of men with unobstructive azoospermia could have sperm retrieved that was viable for ICSI.
Conclusions High fertilisation rates and embryo cleavage rates can be obtained with modern ICSI techniques using unejaculated sperm. There was no significant difference in the cumulative pregnancy rate per egg recovery between ejaculated sperm and those retrieved from the epididymis and testis directly.

P114

Is penile plication an adequate operation for Peyronie's disease?

S.K. Gupta, R. Roop and R.A. Ewing *Halton General Hospital, Runcorn, Cheshire, UK*

Introduction Penile plication is one of the commonest operations to correct penile deformity caused by Peyronie's disease. We assessed current sexual function and satisfaction with treatment outcome in patients who had undergone penile plication for Peyronie's disease in last 5 years.
Patients and methods Between 1996 and 2000, 43 patients with Peyronie's disease underwent penile plication; the case notes were available for 40 and these were reviewed to determine the outcome of treatment. Their present sexual function was assessed using the International Index of Erectile Function-5 (IIEF) questionnaire, together with questions to assess residual deformity and treatment satisfaction, sent to each patient; 25 returned the completed questionnaire.
Results The mean (range) age of the patients was 51 (41–64) years and the mean duration of symptoms 37 (12–64) months. After surgery 27 patients (67%) reported complete penile straightening, 10 (25%) minor and three (8%) major residual deformities. Of the 25 patients who returned the completed questionnaire, eight (32%) had no erectile dysfunction (ED, IIEF >21), 10 (40%) had partial ED (IIEF 10–20) and seven (28%) severe ED (IIEF <10). Fifteen patients reported penile shortening but it affected sexual performance in only two. Ten patients (40%) were unhappy with the treatment outcome; the major cause of treatment dissatisfaction was ED (90%).
Conclusion Although corporeal plication for Peyronie's disease gives good cosmetic results, the subjective evaluation showed that many patients had significant ED and were dissatisfied with the outcome. We recommend that patients should have a thorough evaluation for ED before penile straightening, as some of these patients may be more suitable for a penile prosthesis.

P115

Audit of the outcome of circumcising and non-circumcising Nesbit's procedures for Peyronie's disease

S. Phipps and L.E.F. Moffat *Aberdeen Royal Infirmary, Aberdeen, Scotland, UK*

Introduction Peyronie's disease is common and several variations of Nesbit's procedure for the condition have been described. This audit aims to compare the outcome of circumcising and non-circumcising Nesbit's procedures performed within one department.
Patients and methods The case records of 72 patients (mean age 53 years) who underwent Nesbit's procedure over a period of 9 years were reviewed retrospectively. The presenting features, comorbidity, type of Nesbit's procedure undertaken, postoperative complications, and outcome at clinic review were assessed. The results of circumcising and non-circumcising procedures were compared.
Results Seventeen (24%) of the procedures were non-circumcising, 16 performed by the same surgeon. The remaining 55 (76%) patients were circumcised as part of the Nesbit procedure, performed by six surgeons. Early complications included three superficial wound infections in the circumcised group, and one haematoma in the uncircumcised group. At the 3-month clinic review, 44 (80%) and 13 (76%) of the circumcised and uncircumcised groups, respectively, were having normal intercourse. There was one case of new impotence within each group, and two patients within the circumcised group were unhappy with penile shortening. Four (7%) and one (6%) of the circumcised and uncircumcised groups, respectively, experienced some degree of recurrent deformity.

Conclusion The non-circumcising Nesbit's procedure has comparable outcome and complications to the circumcising procedure. We suggest that a non-circumcising Nesbit's procedure should be offered to men who do not want circumcision.

P116

Tissue grafting for penile curvature: a review of 23 cases

R.W.A. Jones, B. Patel, R.A. Persad and J.C. Gingell *Bristol Royal Infirmary, Bristol, UK*

Introduction New materials are available for use as implants in a modified Lue procedure to correct penile curvature. We have used SurgiSIS™ (Cook Urological), a porcine small intestinal submucosal tissue, and Pelvicol™ (Bard), an acellular collagen matrix.
Patients and methods The notes were reviewed of 23 patients who had undergone the modified Lue procedure with insertion of Pelvicol (in 10) or SurgiSIS (in 13) implant over a 2-year period. A detailed questionnaire was sent to all patients to determine the occurrence of residual curvature, shortening, numbness, pain, palpable nodules, erectile dysfunction and overall satisfaction.
Results Twenty-three patients were included (mean follow-up 9.5 months); the diagnosis was Peyronie's disease in 18 (mean angle 60°) and congenital curvature in five (mean angle 32°). Curvature was dorsal in 13, lateral in eight and ventral in two. Five patients (22%) simultaneously underwent the modified Nesbit procedure. No allergic responses or graft infections occurred. To date, completed questionnaires have been received from 10 patients and more responses are anticipated. Significant residual deformity was reported by four patients and significant shortening in three; two reported significant glanular numbness. Seven are currently sexually active and all but four would recommend the operation to a friend. Three patients have required re-operation for persistent penile curvature.
Conclusions Our initial experience suggests that tissue (or acellular collagen matrix) grafts are well suited to use in a modified Lue procedure, with encouraging clinical results.

P117

Evaluation of extracorporeal shock wave treatment in Peyronie's syndrome

R. Manikandan, W. Islam, V. Srinivasan and C.M. Evans *Glan Clwyd Hospital, Rhyl, Wales, UK*

Aim To evaluate the results of extracorporeal shockwave treatment (ESWT) in patients with Peyronie's disease.
Patients and methods The study included 42 patients (mean age 55.4 years, range 32–72) with a mean (range) duration of disease of 16.5 (3–60) months. Before treatment the angle of the penis was assessed by injecting alprostadil (10–20 μg) and photographing the penis. Patients were also questioned about pain on erection, whether intercourse was possible and the quality of erections. All were initially treated with three sessions of ESWT (3000 shock waves). After three sessions patients who subjectively felt that there was an improvement or those who wanted further treatment went on to have further sessions. The mean (range) duration of follow up was 5.9 (2–18) months).
Results Patients who felt that there was an improvement in angle were asked to provide photographs to assess it objectively; six (14%) said that they had excellent results, 21 (50%) had a significant improvement, seven (17%) a slight improvement and eight (19%) no change. Of 25 patients who had pain on erection before ESWT, 21 (85%) reported complete or near complete relief afterward. Five of 24 reported an improvement in quality of erections after ESWT. Eight had mild pain and one had severe pain during or immediately after treatment; two of these nine also had bruising, managed conservatively.
Conclusions The results of ESWT appear promising, with minimal complications, but the long-term results need to be evaluated.

P118

Plaque excision and Pelvicol™ grafting in extensive Peyronie's disease

S.N. Lloyd *St James's University Hospital, Leeds, UK*

Introduction Penile deformity in Peyronie's disease can be treated by tunical excision and grafting with autologous tissue or a suitable biomaterial. Porcine dermal collagen (Pelvicol™, Bard UK) is an acellular non-immunogenic material which can be used to substitute the tunica albuginea.
Patients and methods Indications for graft surgery in stable Peyronie's disease were: patients with severe penile deformity preventing penetrative sexual intercourse where a standard Nesbit's procedure would produce unacceptable shortening; an hourglass deformity with distal flaccidity; a failed Nesbit's procedure. Seventeen procedures were undertaken in 16 patients. The fibrous plaque was exposed after elevating the overlying neurovascular bundles. Most of the plaque was excised and replaced by a Pelvicol™ graft 1 cm larger in each dimension than the excised tissue. Check insufflation confirmed penile straightening.
Results Thirteen patients were satisfied with the results at follow-up, but one with severe proximal disease had no improvement; two patients have yet to be reviewed. Sildenafil is required to augment erection in most of these patients; one required intracorporal PGE1 injection.
Conclusion Plaque excision and tunica grafting with Pelvicol produces penile straightening without shortening. Patients should be advised that although the resultant erection should be straighter, erectile quality might be adversely affected and require augmentation.

P119

The Lue procedure in Peyronie's disease

A. Adeniyi, J.S. Kalsi, M. Arya, N. Christopher, S. Minhas and D.J. Ralph *The Institute of Urology, London, UK*

Introduction Peyronie's disease can cause significant penile deformity, erectile dysfunction (ED) and penile shortening. Operative correction of the deformity by a Nesbit procedure may worsen the shortening. The aim of this study was to assess the role of the Lue procedure in the surgical correction of Peyronie's disease.
Patients and methods Over a 5-year period, 51 patients (mean age 51 years, range 27–68) with Peyronie's disease had their penile deformity corrected by plaque incision and saphenous vein grafting. The penile deformity and length were measured before and after surgery. The outpatient follow-up consisted of inducing an artificial erection and measuring penile length and angulation.
Results The mean (range) preoperative penile deformity was 57 (20–90)° and the mean follow-up 16 months. A successful (excellent or satisfactory) result was obtained in 47 patients (92%). The penis was straight in 42 patients, whilst nine had a residual deformity of >10°. Four patients (8%) developed ED and 18 (35%) had penile shortening (>1 cm in eight).
Conclusion The Lue procedure remains a highly effective treatment option for the surgical management of Peyronie's disease, with high rates of satisfaction. Despite this, patients should be warned that there is a risk of penile shortening and development of post-operative ED.

Thursday 27 June 10.30–11.30
Poster Session 13. Stones
Chairmen: D. Fawcett and S. Rizvi

P120

Holmium:YAG lasertripsy for ureteric calculi: a review of first 150 ureteroscopic procedures

M.G. Andankar, P.N. Maheshwari, M. Bansal and S. Hegde *R.G. Urological Research Institute, Mumbai, India*

Objective To report the retrospective analysis of initial 150 patients with ureteric calculi treated using Ho:YAG laser lithotripsy.
Patients and methods One hundred and fifty consecutive patients treated with Ho:YAG laser ureterolithotripsy were reviewed (104 males and 46 females, mean age 45 years, range 6–72). In 97 patients calculi were located in the lower third, in 41 in the middle third, and in 12 in the upper third of the ureter. An 8 F rigid ureteroscope was used and the Ho:YAG laser energy delivered using 365 μm laser fibre (Slimline, Coherent, UK). The laser was set at 5–8 J power and a frequency of 5–8 Hz. Flexible ureteroscopy was not used because there were no instruments.
Results Lasertripsy was effective in all stones, allowing disintegration into minute fragments. In most upper and middle ureteric calculi, the calculus was powdered and ureteric stenting used. In the lower ureter larger fragments (3–4 mm) were detected. The clearance rate of the stones was 91.3% at 3 weeks, increasing to 96% at 6 weeks. None of the patients had any ureteric damage during the vaporization. Inadvertent contact with the ureteric mucosa produced extremely small lesions that had no immediate or postoperative relevance.
Conclusions The Ho:YAG laser constitutes an effective instrument for fragmenting any kind of ureteric stone. This permits the use of thin ureteroscopes and, if used with caution, is safe for the ureteric mucosa.

P121

Ureteroscopy in the management of ureteric calculi: a 10-year experience

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Purpose We report our 10-year clinical experience of using rigid ureteroscopy to treat ureteric calculi, determining the morbidity associated with this minimally invasive technique.
Patients and methods In all, 2350 ureteroscopies were performed on 2003 patients between January 1990 to January 2000. Data were collected from the operative theatre registry and subsequent files of the patients. The information included gender, age, location of the stones, bilateral simultaneous stones, number of attempts needed and ensuing complications.
Results Most patients had lower ureteric stones (80%), with upper ureteric stones in 470 patients. Fifty-two patients had bilateral ureteric stones, with a left : right ratio of 3 : 1. Twenty patients needed a percutaneous nephrostomy tube before ureteroscopy to relieve complete obstruction, or if they had a single kidney or infection. Ureteroscopy was successful in 2280 patients, with three needing open surgery, and in two the stone was pushed into the kidney for subsequent percutaneous nephrolithotomy. Seventy patients had a JJ stent inserted with subsequent ESWL because ureteroscopy failed. The complication rate was 0.35%, with only five patients having a ureteric stricture, which needed dilatation only, and two sustaining ureteric perforation, needing exploration and re-implanting of the ureter.
Conclusions Ureteroscopy is a safe and effective method for treating ureteric stones; it has a high success rate and low morbidity, and is the preferred treatment.

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270 flexible ureteroscopies using only four ureteroscopes... and still going! Maximizing the lifespan of your kit

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Introduction Flexible ureteroscopy represents the latest development in treating renal tract calculi, although its use is yet to become widespread. The instrument is perceived as expensive and delicate, limiting the number of cases done with each ureteroscope.
Patients and methods In all, 270 patients underwent flexible ureteroscopy between November 1999 and December 2001, using the Olympus URF P3, an 8.4 F endoscope with 180° deflection at the tip. Electrohydraulic lithotripsy (EHL) was used for the first 120 cases, a holmium laser being available from February 2001. A single ureteroscope was used for the first 120 cases, with a further three being used since. Two of these endoscopes remain operational. The ureteroscopes are used in one theatre devoted to endourology, and they are maintained between cases by a dedicated small group of nurses. Patients are treated or closely supervised by a consultant. Intraoperatively, special care is taken of the ureteroscope, which is kept on a separate trolley from other equipment. Patients are screened before inserting any instrument along the working channel of the ureteroscope to ensure that the end of the ureteroscope is straight. When performing lithotripsy, the laser fibre or EHL probe is positioned clear of the end of the ureteroscope before firing. The ureteroscope is leak tested after every use.
Conclusion At a cost of £7000–£10 000 (11 000–16 000 Euros) it is essential that flexible ureterorenoscopes are maintained with care both during and between cases. Heavy-handedness in the context of a tight budget results in the scopes not fulfilling their potential.

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Evaluation of the expenditure incurred during flexible ureterorenoscopy

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Introduction The expense of purchasing a flexible ureterorenoscope and its repair is understood, but it was felt that the cost of disposable instrumentation has not been assessed.
Method The data, collected prospectively from the first use of a new ACMI DUR 8 flexible ureterorenoscope, includes indications for flexible ureterorenoscopy (FURS), usage of laser probes, disposable instrumentation, cost and timing of scope repair.
Results Of the 81 patients who have undergone FURS, 60 were for stone disease, 17 for known or suspected TCC, and four underwent endopyelotomy. Significant damage to the scope occurred after the 12th patient during the cleaning process, resulting in a crescentic defect in the field of vision, which gradually worsened. The ability of the scope to deflect was maintained throughout. Since being repaired, after 29 patients, there is currently 20% pixel damage

(further 52 patients). This scope is listed at £14 995 and repair/exchange costs £4200 but expenditure on ancillary equipment totalled £22 044, of which £18 579 was on disposables and £3465 on nine laser-probes. The mean (range) cost of disposables per stone patient was £255 (14.13–501.33) and the mean cost in patients with TCC was £159 (29.65–514.23).
Conclusion In this series the costs of the ancillary equipment have already exceeded the purchase and upkeep of the scope, and we expect this to continue in the long term. More durable scopes are reducing the instrumentation costs, but with the increased use of FURS, the major cost of disposables continues to escalate and should be considered in the budget planning.

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An audit of day-case vs inpatient ureteroscopy – what is possible?

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Introduction The technique of ureteroscopy is rapidly developing, with a move away from routine pre-intubation, ureteric dilatation and postoperative stenting. The procedure can be performed on a day-case basis but this has usually been associated with stenting before and after treatment. We present our initial experience of day-case ureteroscopy compared with inpatient treatment.
Patients and methods We retrospectively audited 80 day-case and inpatient ureteroscopies (in 80 patients in whom the case notes were complete and available) undertaken by two surgeons in two hospitals over 1 year. A standardized pro-forma was completed by an independent observer from a review of the hospital notes. All procedures were performed with the Wolf 7.5/8.5 F ureteroscope with no ureteric dilatation, under general anaesthetic using the Lithoclast™. Patients received simple analgesia to take home and were strongly advised to attend casualty with any postoperative problems.
Results Of the 80 ureteroscopies, 40 were day-case procedures and the results were:

Group	*Inpatient*	*Day-case*
Total number of ureteroscopies	40	40
Number of stones	31	34
Mean stone length, mm	8.89	5.92
Position of stone		
lower ureter	12	12
mid ureter	5	9
upper ureter	9	10
Stone-free rate, *n*/*N* (%)	28/31 (90)	26/34 (77)
JJ stent:		
before procedure	8	19
after procedure	4	3

No patient required re-admission and there were no documented visits to the casualty department after treatment.
Conclusions Day-case ureteroscopy appears to be safe, with limited major postoperative morbidity. Stenting before and after treatment is not invariably required and modest sized upper and mid-ureteric calculi can be considered for day-case treatment. From these results we have now changed practice toward more day-case ureteroscopy and all cases are now part of a detailed prospective audit.

P125

Treatment of lower ureteric stones: ureteroscopy vs the Dornier Compact Delta Lithotripter

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Introduction Lithotripsy using new-generation machines requires minimal analgesia and so can be easily given in an outpatient setting. We report our experience with the Dornier Compact Delta lithotripter in the primary management of lower ureteric stones and compare this with our results for ureteroscopic management of similar stones.
Patients and methods Patients treated for lower ureteric stones between April 1999 and August 2001 were identified from our database. Those with complete follow-up were included in this study; 112 received ESWL and 120 underwent ureteroscopy, with most (80) using the holmium laser. All ESWL patients were routinely followed up at 2 weeks with a plain abdominal film, while patients undergoing ureteroscopy had a plain film on the first day after treatment. The timing of further follow-up was based on the initial response to treatment.
Results Of 112 stones, 84 (75%) were fragmented by ESWL (93% of successful and 38% of unsuccessful cases). A total of 58 (52%) patients were rendered stone-free after one treatment. This increased to 73 (65%) after a second treatment and 75 (67%) after a third. The mean size of successfully treated stones was less than for those that failed treatment (7.6 vs 8.7 mm) although the difference was not significant. The mean size of the ureteroscopically treated stones was similar (8.35 mm) with successful treatment occurring on the first occasion in 107 (89%) patients. Of the 13 failures, eight resulted from an inability to access the stone, four from incomplete fragmentation and one from stone loss back into the kidney. A JJ stent was placed in 37 (31%) patients, necessitating a second procedure.
Conclusions When ESWL can be delivered promptly in an outpatient setting it remains a useful first-line treatment for managing lower ureteric stones. While not as effective as ureteroscopic treatment its use can prevent the need for more invasive treatment in a half to two-thirds of patients.

P126

Transcutaneous nerve stimulation is an effective method of analgesia for patients undergoing ESWL

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Introduction In this randomized prospective trial we aimed to discover whether transcutaneous electrical nerve stimulation (TENS) is an effective method of analgesia for patients undergoing ESWL for renal tract calculi.
Patients and methods Seventy-two patients were randomly allocated into one of three groups: in group 1, 32 had an active TENS machine, in group 2, 17 were attached to a sham TENS machine and in group 3, 18 had neither. All patients received 75 mg pethidine intramuscularly and 50 mg diclofenac orally before ESWL. A pain score was recorded on a visual analogue scale and the maximum power of the ESWL machine that the patient could tolerate noted. Five patients were excluded from the study.
Results A relative pain index was calculated as a quotient of the analogue pain score and power level of the ESWL machine to give a relationship between them. There was a significant difference between the groups and relative pain index; the TENS group had less pain at a higher power setting. There were no significant differences

with age, gender and location of the stone. The mean (range) scores for pain, power and pain index were:

	No TENS	*Sham TENS*	*TENS*
Pain score	0.21 (0–3)	2.46 (1–4)	1.88 (0.5–4)
Power score	6.94 (5–9)	6.47 (3–9)	7.22 (5–9)
Relative pain index	0.32 (0–0.5)	0.43 (0.13–0.83)	0.27 (0.07–0.67)

Conclusion TENS is an effective, noninvasive and side-effect-free form of analgesia which improves the efficacy of ESWL by allowing a higher power setting, resulting in better stone fragmentation.

P127

Cystine stones: prevention better than cure?

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Introduction Homozygous cystinuria predisposes an individual to the formation of multiple and recurrent urinary calculi, often requiring interventional treatment. Therapeutic regimens commonly use cystine-complexing agents that have to be titrated to be effective and avoid side-effects. We reviewed the management of a series of patients with homozygous cystinuria and urinary tract calculi.
Patients and methods The records of patients with homozygous cystinuria presenting to a regional stone unit over a 10-year period were examined retrospectively.
Results The study included 28 patients (13 male and 15 female). In all, 145 procedures were carried out, comprising 89 ESWL, 27 percutaneous nephrolithotomy, 24 ureteroscopy ± laser lithotripsy and five open procedures. Of the study group, 25 patients (89%) had received pharmacological management. Fourteen patients had used cystine-complexing agents, eight of whom had experienced significant side-effects necessitating withdrawal of the treatment.
Conclusions This patient group produces a significant demand on the endourology service of our unit. Previously there was no definitive protocol for the medical, or surgical, management of individuals with cystinuria. It is anticipated, with the establishment of a combined urology/nephrology clinic, that the number of stones formed and the frequency of surgical intervention will be reduced in this complicated group of patients.

P128

Hypocitraturia in metabolically active calcium nephrolithiasis

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Introduction Urinary citrate has been identified as a potent inhibitor of calcium stone formation. Hypocitraturia is presumed to contribute to calcium stone formation by enhancing urinary saturation (by reduced citrate complexion to calcium), and by promoting nucleation and crystal growth. Hypocitraturia may be severe, i.e. < 100 mg/day, or mild-to-moderate, i.e. 100–320 mg/day [*Urol Clin North Am* 2000; **2:** 443–53].
Patients and methods The present study included 52 metabolically active stone-forming patients (having two or more newly formed stones during the previous 2 years). Their stones were formed of pure calcium oxalate or a mixture of calcium oxalate and phosphate or uric acid, as shown by infrared spectrophotometry. With the patients on a random diet, a 24-h urine sample was analysed for volume, pH, citrate, calcium, uric acid, magnesium, oxalate and creatinine. A fasting venous blood sample was analysed for calcium, phosphorus, uric acid, sodium, potassium and creatinine.
Results The metabolic abnormalities included hypercalciuria in 38 patients (73%), hyperoxaluria in 18 (35%) and hyperuricosuria in 11 (21%). The greatest variation in all urinary biochemical variables was in the urinary citrate level, at 6–998 mg/day. Three patients only had normal urinary citrate levels (>640 mg/day). One patient had a urinary citrate level of 432 mg/day. The remaining 48 patients (92%) had definite hypocitraturia (6–229 mg/day) which was moderate (110–229 mg/day) in 22 and severe (6–94 mg/day) in 26. Isolated hypocitraturia was the only metabolic abnormality in six patients (11.5%).
Conclusion Hypocitraturia alone or associated with other metabolic abnormalities affects 92% of metabolically active Egyptian calcium stone-formers. This incidence is higher than that reported in North America (60–63%). This difference may be a result of the observed low consumption of citrus juices in Egypt. Estimates of urinary citrate should be included in the metabolic evaluation of stone-formers. The prophylactic effect of citrate supplements (dietary or pharmacological) is the subject of an ongoing study.

P129

Percutaneous removal of impacted upper ureteric stones

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Introduction The management of impacted upper ureteric stones remains problematical. Flexible ureteroscopy is increasingly being used, usually with lasers, but the equipment is delicate and expensive. In addition, there is a steep learning curve. We have been approaching these stones antegradely for some years. This technique has the major advantage of retrieving stones through a dilated proximal ureter, rather than dragging them through an oedematous and spasmodic distal ureter. This presentation examines the technique and discusses the design parameters of the ideal antegrade ureteroscope.
Patients and methods We reviewed our results for 25 patients (mean age 56 years, range 18–81) undergoing antegrade ureteroscopy between October 1997 and October 2000, identified from the radiology department computer system. A percutaneous tract was created to accommodate an Amplatz sheath and either a rigid nephroscope or the flexible ureteroscope used to remove the stone.
Results There were 39 stones with a median (range) length of 7 (5–15) mm. In eight patients the stone required fragmentation. Twenty-three patients were immediately stone-free (92%). Five patients required stenting (20%) either to protect the ureter or for residual stone fragments. There were no long-term complications associated with this technique.
Conclusion Antegrade ureteroscopy combines high immediate stone-free rates with low morbidity and ancillary procedure rates. These factors combine to make it a cost-effective option compared with ESWL or retrograde ureteroscopy. We feel that this under-used technique deserves a more prominent place in the stone surgeon's armamentarium, particularly if a nephrostomy has been required.

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Retroperitoneal laparoscopic pyelolithotomy for staghorn stones

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Introduction Patients with staghorn calculus disease are regularly being treated by percutaneous nephrolithotripsy as monotherapy or combined with ESWL. However, the procedure sometimes requires

multiple renal punctures and more than one sitting for total stone clearance. The purpose of this study is to report the feasibility and safety of an alternative minimally invasive procedure in such patients, using the retroperitoneal laparoscopic approach.

Patients and methods Retroperitoneal laparoscopic pyelolithotomy was performed in four patients with staghorn renal calculi of 22–45 mm largest diameter. The balloon technique of retroperitoneoscopy was used in all cases. The intrarenal pelvis was accessed by careful intrarenal dissection after retracting the posterior lip of the renal sinus with a Cobra dissector. The technique of extraction of the staghorn stone will be demonstrated.

Result The stones were successfully removed in all four patients. The mean operative time was 158 min and the blood loss was minimal. All accepted oral food the same evening and were ambulatory the next day. Mild oral analgesics were required only for 1–3 days. The mean for urinary leak was 3.2 days and for resumption of work 15.8 days.

Conclusions No definite conclusions can be drawn because there were too few patients, but the results show that in experienced hands the retroperitoneal laparoscopic approach is a safe minimally invasive alternative for patients with staghorn calculi, where an open procedure is otherwise justified.

Thursday 27 June 10.30–11.30
Poster Session 14. Bladder Dysfunction
Chairmen: T. Arnold and M. Lucas

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Mechanical stretch alters the phenotype of human bladder smooth muscle cells

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Purpose BOO is characterized by smooth muscle hypertrophy and an alteration in function. We hypothesise that mechanical stretch is associated with an increase in cell proliferation and cell size, and a decrease in apoptosis. The aims of this study were to investigate the effects of mechanical stretch on apoptosis, proliferation, cell hypertrophy and growth factor production in human bladder smooth muscle cells *in vitro*.
Materials and methods Normal human bladder detrusor muscle was obtained at radical cystectomy and primary cultures established. Cells were seeded on to flexible plates and mechanically stretched at a range of pressures for 3, 6, 12 and 24 h using the Flexercell^{TM} 2000. Apoptosis was assessed by propidium iodide incorporation and flow cytometry. Radiolabelled thymidine incorporation was used to assess proliferation. Western blotting was used to study α-smooth muscle (SM) actin expression, a marker of cellular hypertrophy, and culture supernatants were retained for TGFβ-1, IGF-1 and bFGF detection by ELISA.
Results Mechanical stretch induced a 50% decrease in spontaneous apoptosis and a 20% increase in proliferation: Bladder SM cells stretched at 80 cmH_2O (see Table below).

Western blot revealed a time dependent increase in α-SM actin expression. ELISA assays showed a 23% decrease in TGFβ, a 57% increase in IGF-1 and a 300% increase in bFGF levels in response to stretch, which may contribute to the proliferative and anti-apoptotic responses seen.
Conclusion Mechanical stretch increases cellular size, numbers and survival, providing a possible mechanism for the increase in tissue size and altered function seen clinically in bladder dysfunction.
Funding: BUF/Pfizer Scholarship 2001/2002

Mean (SD) variable	*Time, h*				
	0	*3*	*6*	*12*	*24*
Apoptosis, %	20.6 (4.5)	22.2 (6.5)	16.3 (6.5)*	16.2 (6.4)*	11.7 (3.1)*
Proliferation, c.p.m.	122 012 (8128)	138 632 (4364)*	146 991 (6408)*	134 160 (8833)*	121 773 (8246)
TGF-β, pg/μg protein	1333.8 (85)	–	1016.9 (30)*	–	1083.6 (113)
bFGF, pg/μg protein	14.04 (5.2)	43.37 (3.01)*	27.08 (3.5)	22.66 (4.0)	3.63 (1.7)
IGF-1, ng/μg protein	2.74 (0.3)	–	4.31 (0.5)*	–	3.1 (0.5)

Student's *t*-test, *$P<0.05$ vs 0 h.

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The non-proliferating bladder smooth muscle cell after hypoxia

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Introduction Recent animal studies have confirmed that BOO causes significant bladder-wall hypoxia during both the filling and voiding phases. We hypothesize that the response of the detrusor to a hypoxic environment contributes to bladder dysfunction in BOO. The aim of this study was to evaluate the effect of hypoxia on cell survival and growth.
Materials and methods Normal human detrusor muscle was obtained at radical cystectomy and primary cultures established. Cells were then cultured in the presence of 1% oxygen in a hypoxic chamber for different times. Apoptosis was assessed by propidium iodide DNA staining and flow cytometry. Proliferation was assessed by radiolabelled thymidine incorporation. Cell supernatant was retained for growth factor estimation by ELISA and nuclear extracts were isolated for HIF-1α expression by Western blotting.
Results The smooth muscle cells responded to the presence of hypoxia through significant up-regulation of HIF-1α and VEGF in a time-dependent manner. Hypoxia did not induce cell death, but significantly reduced the proliferative rate over time. However, these cells remained responsive through their release of VEGF, which may explain the increase in microvascular growth seen in the obstructed bladder.
Human bladder smooth muscle cells cultured in 1% hypoxia

	Mean (SD) variable		
Time, h	*Apoptosis, %*	*Proliferation, c.p.m.*	*VEGF, pg/μg protein*
0	7.49 (2.0)	70475 (1945)	120 (10)
12	8.54 (2.3)	56810 (878)*	216 (11)*
24	8.24 (2.6)	48956 (3963)*	260.3 (5.5)*
48	8.57 (2.7)	31292 (3491)*	431.3 (28)*

ANOVA, *$P<0.05$.

Conclusion This study shows for the first time that hypoxia induces bladder smooth muscle cells to enter a non-proliferative phase associated with angiogenesis, that may contribute to bladder dysfunction.
Funding: BUF/Pfizer Scholarship 2001/2002

P133

The value of uroflowmetry: how low can we go?

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Introduction The yardstick for the diagnosis of BOO is pressure-flow urodynamics (PFU) but the investigation is invasive and resource-intensive. Non-invasive uroflowmetry is valuable, but the minimum voided volume (VV) for reliable interpretation is controversial. A significant proportion of men with LUTS are unable to provide a VV of 150 mL, leading to wasted uroflow attempts in clinic and possible further invasive tests. The aim of this study was to determine the minimum VV to optimise the diagnostic yield of uroflowmetry.
Patients and methods In all, 159 men underwent uroflowmetry at the LUTS clinic before PFU. The maximum urinary flow rate (Q_{max}) was identified visually after excluding artefacts, in accordance with good urodynamic practice. The ICS nomogram defined BOO on PFU and this diagnosis was correlated with the Q_{max} on uroflowmetry, using different minimum VVs as a threshold. Ninety-five (60%), 46 (30%) and 12 (8%) of men failed to provide a VV of >200 mL, >150 mL and >90 mL, respectively, on two consecutive uroflow attempts.
Results The predictive value of flow volumes for BOO were:

Volume voided, mL	*No. (%) patients*	*Q_{max}, mL/s*		
		<10	*10–15*	*⩾15*
>200	64 (40)	–	–	–
Obstructed, %	–	6 (55)	10 (38)	6 (22)
Unobstructed, %	–	5 (45)	16 (62)	21 (78)
>150	113 (71)	–	–	–
Obstructed, %	–	30 (86)	23 (50)	10 (31)
Unobstructed, %	–	5 (14)	23 (50)	22 (69)
>90	147 (93)	–	–	–
Obstructed, %	–	49 (86)	27 (51)	12 (31)
Unobstructed, %	–	8 (14)	26 (49)	25 (69)

Reducing the minimum VV to 90 mL had no effect on reliability in relation to diagnosing BOO. Using this lower threshold improved the diagnostic yield by reducing wasted uroflow strips in clinic.

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Abdominal leak-point pressure – cough or Valsalva?

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Introduction The abdominal leak-point pressure (ALPP) effectively classifies stress urinary incontinence (SUI). We aimed to determine the most reliable method of generating abdominal pressure for detecting and classifying SUI.
Patients and methods Fifty patients (34 women and 16 men, mean age 57.9 years) underwent multichannel video-urodynamics. At 250 mL filling volume, each patient performed three consecutive coughs and Valsalva manoeuvres, which were compared for pressure generated, leak induction and pressure variation. Statistical analysis was by paired Student's *t*-test and ANOVA.
Results Of 296 provocative manoeuvres, cough generated higher pressures than Valsalva in 85%. Leakage was detected in 19 of 24 (79%) patients complaining of SUI, 16 (84%) by cough, 12 (63%) by Valsalva and nine (47%) by both. The sensitivity and specificity were 89% and 67% for cough ($P=0.02$), and 55% and 65% for Valsalva ($P=0.04$). Failure to perform both manoeuvres or to repeat manoeuvres would have missed SUI in seven (37%) and two (11%) patients, respectively. In 15 patients with type 3 SUI, cough underestimated the severity of outlet incompetence in 12. In four patients with type 2 SUI, Valsalva failed to produce leak in three. Pressure variation was similar for cough and Valsalva, although the latter had a greater tendency to decrease with repetition (6.7% vs 19%; $P=0.02$).
Conclusion Cough is superior to Valsalva in detecting SUI, whilst cough under-diagnoses type 3 SUI, Valsalva under-diagnoses type 2. Both manoeuvres should be used to detect and classify SUI and the use of repetitive manoeuvres further enhances the diagnosis.

P135

Efficacy of repeated periurethral collagen injection

V. Mahendra, T. Nambirajan, S. Woolsey, R. Nelson*, A.R. Stone* and I.K. Walsh *Belfast City Hospital, UK and *University of California, Davis, USA*

Introduction Periurethral collagen injection is effective for type 3 stress urinary incontinence (SUI). The need for multiple injections and the durability of response remain unknown. We studied: (i) the durability of response to collagen injection; (ii) the long-term effect of multiple injections on the response durability; and (iii) overall patient satisfaction.
Patients and methods Seventy-five women with type III SUI were treated with periurethral collagen injection under local anaesthetic. The follow-up comprised a yearly questionnaire documenting the degree of incontinence, pad usage and patient satisfaction. Patients also completed the Incontinence Impact Questionnaire and Urogenital Distress Inventory. The median (range) follow-up was 25.4 (3–64) months from the first injection and 22.4 (2–64) months from the last.
Results Forty-nine (71%) women required one injection to achieve continence, two injections were required in 21 (30%) women and five (7%) needed more than two injections; 69 (92%) patients completed at least one questionnaire. Sixty-on (88%) showed initial improvement and 46 (68%) showed continuous improvement; 48 (70%) were satisfied and would undergo the procedure again and 55 (80%) women would recommend the procedure to a friend. The durability of response was unaffected by the number of injections but the probability of maximum continence was higher with first than with multiple injections, at 24% vs 0% at 12 months.
Conclusions Periurethral collagen injection is effective in the short term for type III SUI. Although a maintained maximum response was present in 8% of patients, over two-thirds experienced some long-term benefit. Repeated injections do not significantly improve durability.

P136

Support requirements and programming method for an S3 neuromodulation service within the NHS

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Introduction The Medtronic S3 nerve neuromodulator has been shown to be of potential benefit to patients with detrusor overactivity and women with urinary retention. The requirements for establishing and supporting a programming service within the NHS are described.
Patients and methods Over the past 6 years 52 patients with severe LUTS underwent a temporary period of percutaneous S3 nerve stimulation, involving input from both urologists and the medical physics team. Positive results after the test stimulation led to 29 patients receiving definitive S3 neuromodulator implants. The implanted patients now represent 85.83 patient-years of follow-up, which has been supported by the medical physics department.
Results Temporary percutaneous nerve evaluation, definitive implantation and postoperative programming, as well as re-operation support, have become components of a neuromodulation service. Most postoperative patient contact is with the medical physics department. Post-implant programming and support per patient required a mean of 15 h in the first year, with 5 h per year thereafter. A refined programming method will be presented, including troubleshooting guidelines for nerve accommodation and collateral pain. Normal values for stimulation parameters are defined for amplitude, electrode selection, pulse frequency and impedance. Practical patient guidance will be discussed covering issues such as interference from radiofrequency sources, difficulties with the work environment and problems with travel overseas.
Conclusion Obtaining the best results for patients with S3 neuromodulator implants requires significant and experienced support from a committed medical physics team.

P137

Urological complications in 192 spinal cord injury patients with over 15 years of follow-up

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Patients and methods We retrospectively reviewed the records of 246 post-traumatic patients with spinal cord injury (SCI), who have been attending a tertiary referral centre for SCI patients, for urological follow-up for the past $\geqslant$15 years; 54 records were incomplete or the patients had transferred their care elsewhere, and the remaining 192 records were suitable for analysis. Information collected included demographic data, mechanism and level of injury, drainage modalities, surgical procedures and urological complications.
Results The mean (SD) follow-up was 23.6 (7.5) years and the mean age at injury 26.1 (10.9) years. The most common mechanism of injury was road traffic accident, in over half the patients. Most patients changed their method of bladder drainage at least once. The predominant method used for the duration of each patient's follow-up was recorded; 89 used Convene^{TM} drainage, 46 voided spontaneously, 39 used CISC, 12 used indwelling catheters and six had undergone urinary diversions. Eighty-three patients (43%) experienced a total of 111 complications. The incidence of complications by drainage method was as follows: Convene drainage 49%; spontaneous voiding 15%; CISC 51%; indwelling catheter nine of 12; urinary diversion, three of six.
Conclusion There is a high incidence of complications in patients with SCI and indwelling catheters. The complication rate in those using CISC is higher than that reported elsewhere [*J Urol* 2000; **163**: 768–72]. The incidence of renal failure was not significant.

P138

Lower urinary tract function in ambulatory neuropathic patients with incomplete spinal cord lesions

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Aims We evaluated lower urinary tract function in patients with incomplete spinal cord injury and who could walk.
Patients and methods Fifty-three (35 men and 18 women, mean age 46 years, range 18–87) consecutive walking spinally injured patients were seen over 4 months. They had cervical (18), thoracic (three) and lumber (16) spinal lesions. One had spinal haemorrhage and 15 had spinal surgery for back problems. All underwent video-urodynamics (VCMG) with appropriate bladder management, and were regularly followed up (mean 4.7 years) with either VCMG or uroflowmetry.
Results None of the patients had entirely normal bladder function; 33 (62%) voided spontaneously, confirmed on VCMG, but with varying degrees of bladder dysfunction. Seventeen patients (32%) required CISC and three had a suprapubic catheter. During the follow-up 10 patients who were initially voiding spontaneously were changed to CISC because of detrusor hyper-reflexia with associated dyssynergia. Four patients using CISC were later able to void to completion on urge, confirmed on VCMG. Fourteen of 18 cervical patients initially voided on urge, while 10 of 16 lumbar patients used CISC. Twelve patients with back surgery could void on urge but three had to use CISC because of later detrusor sphincter dyssynergia.
Conclusions This study appears to be the first to evaluate lower urinary tract function in walking spinally injured patients. Although most could void on urge, they had abnormal bladder function, which could change over time. Hence they need close urological follow-up with VCMG or uroflowmetry at least once a year.

P139

The effects of cannabis-based medicinal extract on bladder dysfunction in patients with advanced multiple sclerosis

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Introduction Our aim is to evaluate the safety, tolerability, dose range and efficacy of two preparations of sublingual cannabis-based medicinal extract (CBME) in an open-label pilot study in patients with advanced multiple sclerosis (MS) and refractory LUTS in whom indwelling catheterization is being considered.
Patients and methods LUTS are titrated against dose-related side-effects. In 11 patients (three men and eight women, aged 31–64 years), the treatment comprised tetrahydrocannabinol (THC) and cannabidiol (CBD) for weeks 1–8 and THC only for weeks 9–16. Diary data were recorded at baseline (before treatment), at 7 and 8, and 15 and 16 weeks. Cystometry was performed at baseline, 8 and 16 weeks.

Results The daily dose of CBME was consistent for each patient, but ranged widely from 1 spray/24 h to 30 sprays/24 h across the group. The diary data were:

Mean variable	*Baseline*	*THC : CBD*	*THC only*
No. incontinence episodes/day	2.4	1.5*	0.5*
Volume incontinence, mL	86	49.7*	34
No. nocturia episodes	2.7	1.4	1.3*
Daytime frequency	9	7.4*	6.7*
No. urinary urgency episodes/day	2.4	0.5*	0.3*

*$P < 0.05$, from baseline, paired samples *t*-test.

There was no significant difference in the total daily urinary output. The maximum cystometric capacity increased from 263 mL at baseline to 339 and 392 mL after 8 weeks of treatment with THC : CBD or THC, and to 424 and 391 mL after acute dosing of THC : CBD or THC, respectively. Undesirable side-effects included dry mouth in all patients and taste alterations (in two).

Conclusions The results from this open-label trial suggest that patient-controlled dosing of CBME may be an effective additional treatment.

Funding: Medicinal Cannabis Research Foundation

Thursday 27 June 15.00–16.00
Poster Session 15. Prostate Cancer
Chairmen: P. Alken and J. Bramble

P140

Serum PN1P assay aids identification of bone metastases in prostate cancer

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Introduction In prostate cancer, a major clinical consideration is whether the disease has metastasized at diagnosis. We evaluated serum aminoterminal propeptide of type 1 procollagen (PN1P), a marker of elevated bone turnover, to determine whether it could discriminate between metastatic and non-metastatic prostate cancer.
Patients and methods In all, 227 patients were recruited, of whom 98 had benign prostatic disease (control group) and 129 had newly diagnosed prostate cancer. All patients with cancer had bone scans at diagnosis, of which 98 were negative (BS –ve), 21 positive (BS +ve) and 10 equivocal (BSeq). Serum specimens were obtained for radioimmunoassay of PN1P. Serum PSA and tumour grade were also recorded.
Results The mean serum PSA in controls was 37.9 mg/L, while levels in the BS–ve, BSeq and BS+ve groups were 36.5, 48.5 and 103.7 mg/L, respectively. The BS+ve group had significantly higher serum PN1P than all other groups ($P<0.001$). ROC curve analysis revealed an optimum threshold of 58.3 mg/L, which gave a sensitivity of 91% and specificity of 89% for detecting bone metastases (PSA had a sensitivity of 76% and specificity of 97% if a threshold of 105 ng/mL was used). In combination with serum PSA, specificity increased to 100% with reduced sensitivity to 71%.
Conclusion Serum PN1P aids the identification of bone metastases in patients with prostate cancer and has a potential role in clinical management.

P141

Trends in international prostate cancer mortality in the 'PSA era'

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Introduction Incidence and mortality from prostate cancer were increasing in most countries until the late 1980s. After the introduction of PSA testing there was a decline in mortality in North America. To investigate whether this pattern occurred in other developed countries we used routine data to test for changes in death rates.
Methods Mortality data were extracted from the WHO mortality database for 1979–97. Age-standardized death rates were calculated for the age range 50–79 years. Trends in age-specific and age-standardized mortality were estimated using join-point regression, which allows the estimation of the annual percentage change in death rates, and the timing of significant changes in trend.
Results Data from 24 developed countries were included in the analyses. Age-standardized mortality increased at 1–2% per year in most countries. Mortality rates were highest in Scandinavian countries and North America, and lowest in Japan and southern European countries. In seven countries (Austria, Canada, France, Germany, Italy, UK and USA) there was a significant decrease in age-standardized mortality in 1988–91. Changes in age-specific trends happened at similar times, consistent with a period effect.
Conclusions The burden of prostate cancer continues to increase in most countries. However, significant decreases in mortality have occurred in some countries. There are inconsistencies in the relationship between mortality trends and uptake of PSA screening. Changes in death rates may result from artefact or changing incidence, but are most likely to reflect developments in therapy for prostate cancer.

P142

Survival prediction in the management of clinically localized prostate cancer

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Introduction Predicting survival is one of the most critical endpoints in the management of prostate cancer. We have used a genetic adaptive neural network to predict overall survival at up to 20 years of follow-up in patients undergoing watchful waiting, radiation therapy and radical prostatectomy.
Patients and methods In all, 5091 patients with clinically localized patients who underwent treatment at Henry Ford Health System and who were followed for up to 20 years form the subject of this study. Most important variables, e.g. age, race, grade, clinical stage, serum PSA, Charlson index, socio-economic status and overall and cancer-specific survivals were noted in this cohort. Predictive modelling techniques were used to construct practically useful 'look up' tables for calculating survival.
Results The model was validated in 1500 patients and the results were as follows: the accuracy of the model was 80%, sensitivity 80%, specificity 79% and the area under the ROC curve was 0.854. These tables allow patients to calculate their risk of mortality on the basis of their race, grade, age, PSA and clinical stage.
Conclusions This model can quite accurately predict the ultimate survival in patients with clinically localized prostate cancer.

P143

Setting up of a regional radical prostatectomy database

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Introduction The incidence of prostate cancer in the Yorkshire Cancer Network region has increased to 62.6 per 100 000 population; 37% of the patients underwent radical prostatectomy in 1998. Objective data about the patient journey, complications and outcome in the region after radical prostatectomy are lacking. To address this deficiency we set out to establish a regional radical prostatectomy database involving the eight centres in Yorkshire where this procedure is performed. The aims were to achieve a consensus about the data to be collected, to collect data for all patients who had undergone radical prostatectomy in the past, to prospectively enter data from 1 March 2001 and to move towards standardization.
Methods A database was constructed in 'Microsoft Access'; a research registrar was designated to co-ordinate the activity of

installing the databases in the respective institutions. The database comprised three broad sections. It was agreed that data from each database would be exported as a 'query' designed specifically to remove patient identification details and pooled centrally.
Results The idea was adopted and initially tried in four centres. The problems encountered were mainly logistical, particularly with the use of the software. In many places, the database was not compatible with programmes like Win95 and Windows NT. The other main hurdle was the manpower required to collate the data retrospectively.
Future directions The results of about 150 patients are available, which show some interesting values. This presentation will introduce the database to the BAUS audience and seek their comments on the appropriateness of the data being collected, ease of use and utility of such a database.

P144

Transdermal oestrogens for advanced prostate cancer – a role revisited?

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Introduction Conventional androgen deprivation for prostate cancer is associated with significant morbidity, including andropause and osteoporosis. Oral oestrogens avoided these problems but were abandoned because of their cardiovascular toxicity. By contrast, parenteral oestrogens are cardioprotective, and transdermal oestrogens are used against menopausal symptoms and osteoporosis in women. We report the first results on the effects of transdermal oestradiol in men with prostate cancer.
Patients and methods Twenty patients with advanced prostate cancer were enrolled in the study. Six oestradiol patches were applied weekly for 8 weeks, then reduced to maintain castrate levels of testosterone. Hormones, PSA and thrombophilic assays were assessed before treatment and at regular intervals thereafter. Vascular flow, CT and isotope bone scanning, and bone densitometry were undertaken 6-monthly to monitor for thrombosis, disease progression and osteoporosis, respectively. All patients completed cancer and prostate-specific quality-of-life (QoL) questionnaires.
Results The median follow-up was 14 months; oestradiol levels of >1000 pmol/L were achieved using two patches and higher levels by increasing their number. All patients achieved castrate levels of testosterone within 3 weeks and had biochemical evidence of disease regression (range 84.2–99.8%). One patient relapsed and died at 14 months; one patient had fluid retention and was withdrawn. No other cardiovascular complications occurred. Vascular flow and thrombophilic factors were unaffected and bone density was maintained. Mild or moderate gynaecomastia occurred in 70% of patients, but none had hot flushes. All other functional and symptomatic QoL domains had improved at 6 months.
Conclusions Transdermal oestrogens are effective and acceptable to patients with minimal morbidity. Transdermal oestrogens cost a tenth of the current therapy, potentially saving the NHS >£10 000 000 annually.
Funding: Unrestricted educational grant from Schering Health Care.

P145

A bicalutamide 'lead-in' prevents the initial adverse effects of a gonadotrophin analogue in advanced prostate cancer

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Introduction Administration of a GnRH analogue in advanced prostatic carcinoma can cause disease 'flare' in 4–33% of cases. Cyproterone acetate (CPA) is currently the antiandrogen of choice to prevent this, although its adverse effects may limit its use. Bicalutamide is well tolerated but peripherally selective and lacks progestational activity. We conducted a pilot study to evaluate its efficacy by serial measurements of biochemical variables.
Patients and methods Twenty-two men were randomized equally to bicalutamide (50 mg daily) or CPA (100 mg three times daily) 5 days before a 3.6-mg dose of goserelin acetate, and continued for 21 days thereafter. Serum PSA, LH, FSH and testosterone were measured before treatment and at 6, 8, 10, 16, 21 and 28 days.
Results Both groups were of similar age and disease stage. The continuous decrease in the median percentage change in PSA from baseline was almost identical in the two groups. There was no significant difference in the median number of days it took for the PSA to decrease by >75% (15 vs 12.5 days). All patients in the bicalutamide arm had an initial LH/FSH increase, compared with five of 11 receiving CPA ($P<0.01$). As a result, the bicalutamide group all had a testosterone peak, whereas only three on CPA did ($P<0.001$).
Conclusion Despite the rise in testosterone and LH/FSH, bicalutamide can suppress the initial PSA surge after GnRH analogue therapy as effectively as CPA, and therefore provides a useful alternative in preventing flare.
Funding: Astra Zeneca

P146

Overall survival after biochemical failure following neoadjuvant androgen deprivation and radical radiotherapy for prostate cancer

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Introduction The prognostic significance of biochemical failure after neoadjuvant androgen deprivation (NAAD) and radical radiotherapy (RT) for prostate cancer has not been described.
Patients and methods Of 825 patients with localized prostate cancer (T1–4N0M0) who received 3–6 months NAAD and RT to a median dose of 64 Gy between 1989 and 2000, 407 developed biochemical failure, defined as three consecutive rising PSA values. These 407 patients (median age 69 years) had a median pretreatment PSA level of 22 ng/mL, and 59% had T3/4 disease.
Results At a median follow-up of 25 months from the date of the third consecutive rising PSA (PSA3), 100 patients had died. The median (95% CI) overall survival, calculated from the date of PSA3, was 49 (40–58)% at 5 years. On univariate analysis, T stage, grade, PSA nadir, time from RT to PSA3, PSA doubling time (PSAdt) and PSA3 were strongly associated ($P<0.001$) with overall survival. On multivariate analysis, only a shorter PSAdt ($P<0.001$), higher PSA nadir ($P<0.001$), and higher PSA3 ($P=0.002$) were associated with an increased risk of death. There was no association between overall survival and either age or presenting PSA level.
Conclusions PSAdt, PSA nadir and PSA3 are important determinants of overall survival after biochemical failure following NAAD and RT for localized prostate cancer. These three variables should be used to stratify clinical trials involving this patient population. The results will also provide prognostic information for individual patients.

P147

Cytoreduction for brachytherapy – not all antiandrogens are equal

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Introduction Cytoreduction using antiandrogens allows large prostate glands to be reduced in volume, which may be essential

before brachytherapy. We compared the efficacy of bicalutamide and goserelin in reducing prostate volume.
Patients and methods Data were collected prospectively on 72 patients; all were assessed using TRUS for consideration of prostate brachytherapy. Patients were given no antiandrogen, bicalutamide 150 mg once daily, or monthly goserelin 3.6 mg subcutaneously. Active treatment was given with neoadjuvant or cytoreductive intent. The prostate volume was reassessed using the same TRUS probe during the planning ultrasonography (US) before brachytherapy.
Results The volume changes over time with different antiandrogen regimes were:

Group	*n*	*Time between US (days)*	*Mean volume change*	*P for change in volume (%)*
No treatment	22	120	+20	< 0.001
Bicalutamide	31	149	−9	< 0.001
Goserelin	19	176	−30	< 0.001

Statistical analysis using paired *t*-tests showed a statistically significant increase in volume over time in the untreated group. Bicalutamide and goserelin both produced statistically significant decreases in prostate volume, although the decrease in prostate volume was significantly greater with goserelin ($P < 0.001$). Differences persisted when data were controlled for initial prostate volume and treatment time.
Conclusions Goserelin provides better cytoreductive efficacy than bicalutamide for patients undergoing brachytherapy, irrespective of initial prostate volume. If the beneficial effects of neoadjuvant hormone therapy in EBRT rely on a reduction in prostate volume, then goserelin may also be preferable to bicalutamide in this setting.
Funding: Research Grant From PPP Foundation

P148

The role of anastomotic biopsy in evaluating patients with a rising PSA level after radical prostatectomy

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Introduction Men with a rising PSA level after radical prostatectomy (RP) may have local recurrence, treated with radiotherapy with curative intent, and/or metastases treated systemically. Investigating such patients may include TRUS-guided transrectal anastomotic biopsy of the vesico-urethral anastomosis. This study evaluates the usefulness of this invasive procedure.
Patients and methods The case histories were reviewed of 12 patients after RP with either a rising PSA level or an abnormal DRE who had undergone anastomotic biopsy.
Results The mean (range) PSA at biopsy was 1.2 (0.1–6.2) ng/mL. Malignant acini were reported in four patients, benign glands in two and no prostate tissue was obtained in six. Where cancer was diagnosed all patients received immediate salvage radiotherapy (sRT). Two patients with negative biopsies received immediate sRT for clinical or radiological suspicion, and the remaining six underwent watchful-waiting. In the latter group, five had sRT at a later date because of continued PSA rises, and one patient has had a stable PSA, with no treatment to date (24 months). Of the 10 patients who proceeded to sRT for presumed local recurrence, only four had had positive biopsies, giving 40% sensitivity and 100% specificity. No biopsy complications were recorded.
Conclusions In this small series, for most patients biopsy did not assist the diagnosis and in five a false-negative biopsy delayed treatment. Positive anastomotic biopsies assisted in management but negative biopsies could not exclude recurrence. While anastomotic biopsies may be useful in some cases, for most they are unlikely to repay the effort of obtaining them.

P149

What is the impact of erectile dysfunction on the quality of life after a radical retropubic prostatectomy?

P.J. Meyer and D.A. Gillatt *Bristol Urological Institute, Southmead Hospital, Bristol, UK*

Introduction The aim of this study was to assess the incidence of erectile dysfunction (ED) in men after a radical retropubic prostatectomy (RRP) and to assess the impact that ED had on their quality of life.
Patients and methods Before 1995, one surgeon performed RRPs on 81 patients; this group was sent an 'ED-EDQoL' quality-of-life questionnaire, with a second questionnaire enquiring whether they were counselled before surgery about ED, and whether they were potent before and after surgery.
Results The response rate for the questionnaire was 89%, with 90% stating that they were told before RRP that they may have erectile difficulties afterward; 91% reported that they were able to obtain erections (with no treatment) sufficient for intercourse before RRP, and afterward 22% reported that they were potent. Of those who lost potency after RRP, 12% reported that they felt 'somewhat' sad or tearful and 22% felt 'somewhat' less desirable as a result of their ED; 15% described feeling 'somewhat' angry or bitter that they could not produce an erection and 12% felt that their identity was altered by ED; 74% reported that their partner did not feel let down by their inability to produce an erection.
Conclusions The incidence of impotence after RRP in this series is higher than in other series, but despite this the impact of ED on the quality of life is surprisingly low.

Thursday 27 June 15.00–16.00
Poster Session 16. Bladder Cancer
Chairmen: D. Gillatt and C. Heyns

P150

Fluorescence diagnosis: evaluating its role in enhancing detection of bladder tumours

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Introduction The recurrence rate of superficial bladder cancer, which can be as high as 70% within 5 years, is partly caused by incomplete TURBT. We therefore determined the ability of fluorescence diagnosis (FD) to enhance the detection of bladder tumours, especially carcinoma *in situ*, compared with conventional cystoscopy.
Patients and methods Forty-one patients with previously diagnosed TCC of the bladder were given an instillation of intravesical 5-aminolaevulinic acid. All patients were then examined cystoscopically using FD. After this a second surgeon, unaware of the first surgeon's findings and using white light only, proceeded to resect all visible tumours. The first operator then rechecked the bladder using FD and resected any residual lesions. Random biopsies were also taken.
Results FD revealed additional lesions in 27 of 41 patients; in 11 of these patients the lesions were confirmed to be malignant. The additional tumours were G3Tis in five, G2 T1b in one and G1,2Ta in five patients. The sensitivity, specificity and positive predictive values of FD in identifying additional malignant areas were 92%, 45% and 41%, respectively.
Conclusion FD enhanced the detection of bladder tumours in 27% of patients and identified carcinoma *in situ*, that had been missed by conventional cystoscopy, in 9.5% of patients.

P151

Prognostic value of P53 and c-erbB-2 in TCC of the urinary bladder

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Introduction p53 is a well established tumour-suppressor gene. Under normal circumstances, p53 exists in an inactive form with a short half-life, but when p53 is mutated neoplasia can occur. Mutated p53 increases the stability of the protein, increasing the half-life from 6–30 min to a few hours, allowing overexpression to be detected using immunohistochemistry. The oncogene c-erbB-2 belongs to a family of growth factor receptors; the protein product shows extensive sequence homology with EGFRs and is itself thought to be a growth factor receptor. Amplification or overexpression of c-erbB-2 is found in a variety of cancers, including high-grade TCC of the bladder. The aim of the study was to determine the prognostic value of p53 and c-erbB-2 in the recurrence rate of bladder TCC.
Materials and methods Using 87 cases of newly diagnosed primary TCC from 1989 and 1990, paraffin sections were cut at 4 µm, stained using the standard HRP-labelled streptavidin-biotin method and visualised with 3–3′-diaminobenzidine tetrachloride. Scoring was based on a method previously validated and used for oestrogen receptors, and combines the proportion of cells stained (0–5) with the intensity of staining (0–3). These were combined to give an overall score of 8 which was then converted to 0, 1+(2–3), 2+(4–6) and 3+(7–8) [*J Clin Path* 2000; **53:** 634–5]. This method has not been used previously for bladder cancer. The patients' medical records were then assessed to determine the recurrence rates.
Results p53 analysis showed significant differences between grades 1 and 2, and between grades 1 and 3 (both $P<0.001$) but not between grades 2 and 3. p53-negative patients had 70% recurrence over a 10-year period (85% for 1+ scoring, 90% for 2+ scoring and all those with 3+ scoring). C-erb-B2 analysis showed no significant differences between the grades but c-erb-B2-negative patients had 38% recurrence over a 10-year period, with recurrence in all those with 3+ staining. C-erb-B2 was therefore an independent prognostic marker.
Conclusion This study adds to the evidence that p53 and c-erbB2 are prognostic markers for TCC, but also shows that a simple standard scoring system can be easily applied for managing patients with bladder cancer. C-erbB-2 immunostaining is recommended as a prognostic marker in TCC.

P152

A novel tri-specific antisense oligonucleotide enhances chemosensitivity in T24/83 bladder cancer cells

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Introduction Inhibitors of apoptosis proteins (IAPs) are a group of structurally homologous proteins that function to inhibit caspases and prevent apoptosis. This study examined the effects of a novel antisense oligonucleotide designed to be tri-specific for c-IAP1, c-IAP2 and XIAP on the T24/83 cell line. Cells were incubated with the antisense oligonucleotides and mitomycin C for 1 h, to mimic the clinical application.
Materials and methods T24/83 cells on coverslips were treated with antisense oligonucleotide to IAP, scrambled antisense oligonucleotide, lipofectin, or combinations of these, or no treatment for 1 h. After 23 h mitomycin C was added to 48 coverslips for 1 h. Coverslips were Giemsa stained after either a further 3 or 24 h. Apoptotic scores were assessed independently by two observers from triplicate coverslips. Scores for apoptosis, apoptotic dust and cell density were summed. Apoptotic scores among the 10 treatment groups were statistically compared using the Kruskal–Wallis and Mann–Whitney tests.
Results Apoptotic scores ranged from 3 to 12. Cells treated with antisense oligonucleotides with or without lipofectin had apoptotic scores of <6. There was no significant difference between cells treated with mitomycin C only and those treated with scrambled antisense oligonucleotide plus mitomycin C (apoptotic scores 9 and 9.4, respectively). However, after 24 h there was a significant difference between cells treated with 100 nmol/L antisense oligonucleotide to IAP plus mitomycin C (apoptotic scores 11.3 and 11.0) and those treated with mitomycin C alone ($P=0.043$ and 0.034, respectively, for the two observers).
Conclusions Antisense oligonucleotide to IAP enhanced chemosensitivity to mitomycin C in the T24/83 cell line.
Funding: Royal Victoria Hospital Belfast & Royal College of Surgeons (Edinburgh)

P153

Electrical impedance spectroscopy measurements for the diagnosis of human bladder pathology

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Introduction Erythematous areas are seen frequently at cystoscopy; these represent a variety of pathologies from simple inflammation through to carcinoma *in situ* (Cis). A definitive diagnosis can be made only by biopsy. Biological tissues have an electrical impedance, which is a function of frequency, and contain components that have both resistive and charge-storage properties. This impedance is known to differ with cell morphology and has been used to detect pre-cancerous changes in the cervix. In a previous study we showed the separation of benign and malignant points in the *ex vivo* bladder. In this study we correlated electrical impedance spectroscopy measurements with histopathological findings, *in vivo*.
Material and methods A total of 154 measurements were taken on 61 patients, during cystoscopy under general anaesthesia, using a custom-designed probe. Several areas were assessed in each bladder. Biopsies were then taken at each measurement point.
Results A detailed histopathological analysis divided the epithelium into one of seven groups, and provided a score for the severity of oedema and inflammation seen in the tissues. Correlation with histopathological findings showed a clear separation between benign and malignant changes when tested as a group ($P<0.05$). However, on an individual-point basis there was overlap.
Conclusions In a preliminary set of *in vivo* measurements we established patterns of electrical impedance in the human bladder. Early results suggest that this simple and minimally invasive technique can be used to differentiate between benign and malignant bladder pathology. Although there is an overlap at higher frequencies, a group of points was identified with low impedance values in which no malignancy was found.
Funding: BUF/MSD Scholar, 2000/1, EPSRC, Royal College of Surgeons of Edinburgh, Sheffield Hospital Trust

P154

The use of Raman spectroscopy to distinguish between normal tissue, carcinoma *in situ* and TCC within the bladder

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Introduction Raman spectroscopy is a technique that uses molecular-specific scattering of light photons to interrogate biological tissues. The tissue is illuminated with monochromatic light, some of which interacts with the intermolecular bonds, changing their vibrational state. This in turn changes the wavelength of the light emitted, thereby producing a spectrum directly related to the molecular composition of the tissue. Using these spectra, it is possible to identify and differentiate between different pathologies. This study evaluates the ability of the technique to differentiate between different bladder pathologies *in vitro*.
Materials and methods Bladder tissue, representing a spectrum of disease, was obtained from 12 patients at TURBT and snap-frozen. The samples were scanned on an optimised Raman system, with up to 20 readings taken from each sample. The spectra obtained were correlated with the histological diagnosis using multivariate analytical techniques.
Result Principle-component-fed linear discriminant analysis was used to express the information held in each spectrum numerically and produce a diagnostic algorithm to distinguish between different pathologies. The model was tested for its accuracy in correctly identifying each pathology. The specificity and sensitivity achieved for each pathology was

Pathology	*Sensitivity, %*	*Specificity, %*
Normal	93	99
CIS	83	97
TCC:		
G1	96	96
G2	78	98
G3	98	96

Conclusion Raman spectroscopy can be used to accurately differentiate between different bladder pathologies *in vitro*. Work is underway to develop this model further and prepare for *in vivo* studies.

P155

Is there a role for anti-HER2 therapy in bladder cancer?

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Introduction Over-expression of the HER2 oncogene, on chromosome 17, may be a negative prognostic factor in bladder cancer. The clinical use of anti-HER2 therapeutic agents necessitates the application of accurate and reproducible laboratory methods to assess protein over-expression and gene amplification.
Materials and methods Fluorescence *in-situ* hybridization and immunohistochemistry (using an approved anti-HER2 antibody and scoring system) were used to assess HER2 abnormalities in tumours, which were re-staged and re-graded by a uropathologist.
Results Seventy-five tumours with evidence of muscle invasion at presentation and 26 pairs of tumours progressing from superficial disease to muscle invasion were included. Gene amplification rates were low in all groups (<10%), whereas protein over-expression rates were higher (50–73%).
Conclusions Evidence form other tumours that over-express HER2 suggest that only gene-amplified tumours (which usually have high protein over-expression) respond to anti-HER2 therapy with agents like the mAb herceptin. However, the high protein over-expression rates in this study suggest that anti-HER2 therapy might have a role in the management of bladder cancer.
Funding: BUF, The Royal College of Surgeons of Edinburgh

P156

Response to mitomycin C in TCC is by a p53-dependent pathway

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Introduction Unresponsive TCC cell populations often have aberrant expression of p53 that may lead to impaired apoptosis. In *in vitro* and *in vivo* studies we examined TCC cells after exposure to mitomycin C at several times.
Methods RT4, RT112/84, T24/83 and HT1376 bladder cancer cell lines were treated with mitomycin C (200 μg) for 1 h and assessed at 4 h intervals over 24 h. Five patients with TCC were admitted three times, 1 week apart, before tumour resection. Bladder

washings were taken before intravesical mitomycin C (40 mg for 1 h) and at 1.5, 4 and 6 h afterward.
Results After mitomycin C apoptosis induction and p53 expression gradually increased in RT4 cells, whilst peaks in apoptosis and p53 were evident in RT112/84. P53 protein expression in RT112/84 cells localised to the nuclei of cells that had characteristic nuclear apoptotic morphology. Less than half the maximal apoptosis detected in RT4 and RT112/84 sensitive cell lines was detected in T24/83 and HT1376 resistant cell lines. The percentage of cells positively staining for p53 was lower but was more intense within cells in resistant cell lines. *In vivo*, p53 expression increased after mitomycin C therapy in four of the five tumours. There was no evidence of apoptosis in the cells from the tumour that did not invoke increased p53 levels. DNA aneuploidy detected in samples from one tumour was concomitant with increased p53 expression and apoptosis.
Conclusion Mitomycin C induces the expression of p53 and apoptosis in sensitive tumour cells, sometimes cyclically. The p53-dependent pathway is an important mode of action for mitomycin C.
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Dilution of intravesical mitomycin C during the instillation period – a comparison of pre-treatment fasting vs fasting plus desmopressin

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Introduction Dilution of intravesical chemotherapy might be a significant cause of treatment failure. Both a 6-h fast and desmopressin have previously been shown to reduce the dilution of mitomycin C during the instillation period. This study compared the effect of fasting alone against a combination of fasting and desmopressin on urine production during the treatment period.
Patients and methods Ten patients undergoing a 6-week course of mitomycin C (40 mg in 40 mL water) fasted for 6 h before their first, third and fifth treatments. On their other three visits they were also given 200 μg desmopressin 1 h beforehand. Urine production during the 1 h instillation period was measured.
Results Nine patients completed the full course and one underwent only the first two instillations, giving a total of 56 studies. The median (range) urine production was 121 (0–430) mL for fasting alone and 90 (0–410) mL for fasting plus desmopressin. Individuals tended to produce similar amounts of urine in each of their visits.
Conclusion This study confirms that some patients produce large volumes of urine during the instillation period, despite fasting; adding desmopressin did not reduce this significantly. Urine production during intravesical chemotherapy should be measured routinely and alternative instillation protocols adopted for those who relapse and are identified as high-volume producers.

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The use of intravesical meglumine γ-linolenic acid in superficial bladder cancer: a phase IIa efficacy study

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Introduction γ-Linolenic acid (GLA) has been known to be cytotoxic to various tumour cell lines, including urothelial cells, since the early 1980s. Its mechanism of action relies on both direct cell-wall toxicity and disruption of metabolic pathways, and it has been shown to be effective against parental and multidrug-resistant cell lines. We assessed the efficacy of the novel intravesical formulation, meglumine GLA (MeGLA) in patients with recurrent superficial bladder cancer.
Patients and methods Thirty patients with recurrent superficial TCC (pTa or pT1) of the bladder were recruited. The tumour pattern was recorded at flexible cystoscopy and recorded using a standardized bladder chart. Patients were randomized to receive a single intravesical instillation of 50 mL of either 50 mg (1 mg/mL) or 125 mg (2.5 mg/mL) of MeGLA in water, retained for 1 h. At subsequent cystoscopy, 2 months later, the bladder appearance and tumour pattern were recorded, before undertaking routine TURBT. Biopsies were obtained for histological assessment. Responses were divided into complete, partial or none.
Results All 30 patients retained the drug for 1 h with no significant local or systemic side-effects. There were four (13%) complete responses, nine (30%) partial responses and 17 (57%) with no response. Histology showed no evidence of damage to surrounding urothelium.
Conclusion These results confirm the safety and tolerability of MeGLA, which is consistent with findings from a previous phase 1 trial. A response rate of 43% also indicates that MeGLA has a significant cytotoxic effect against TCC and the results are comparable with those obtained using standard, single-dose intravesical regimens. These results suggest that a definitive controlled trial, with time to recurrence and progression as endpoints, should be undertaken.
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Flexible cystoscopy and holmium laser ablation of bladder tumours (HoLABT)

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Introduction This was a prospective study to evaluate the use of the holmium laser to ablate small bladder tumour recurrences using flexible cystoscopy in a day-case setting.
Patients and methods Fifty-three patients (37 men and 16 women, mean age at first HoLABT, 75 years, range 41–92) with known superficial TCC of the bladder had 102 treatments for recurrent tumours from January to October 2001 (treatments/patient 1.9, range 1–5). The tumour grades were: G1 35 (66%), G2 13 (25%), G3 five (9%); and stages Ta 31 (59%), T1, 17 (32%) and Tx, five (9%). An Olympus CYF-4a flexible cystoscope was used in all cases, with the Coherent Slimline 365 μm laser fibre used for ablation of tumour recurrences. Patients were given a written and verbal explanation of the procedure before and a completed a questionnaire after the treatment.
Result The total tumour recurrences treated was 219 (recurrences/treatment 2.1, range 1–11). The mean (range) time/treatment was 6.4 (1–24) min, the mean time to treat a recurrence 3 min and the mean holmium laser energy used/treatment 0.40 (0.01–3.6) kJ. In 92 (90%) patients the treatment was completed successfully; in the remaining 10 the treatment was incomplete and required another HoLABT or TURBT. Ninety-eight patients completed the questionnaire. On the pain score scale of 1–10, 72 (73%) patients experienced discomfort/pain at or below score 4. Procedure tolerability was 'the same' as flexible cystoscopy only in 78 (80%) and less in 20 (20%) patients. In reply to the question that 'if necessary would you like to have the same procedure done again?' 94 (96%) patients said 'yes'.
Conclusion HoLABT using the flexible cystoscope is an effective treatment and is well tolerated by patients. It also has potential cost benefits comparable with cystodiathermy under general anaesthetic as a day-case or inpatient procedure.