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### Diuresis renography: which radiopharmaceutical?

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**Introduction:** $^{123}$I-hippuran has been shown to be a superior radionucleotide for standard and diuresis renography over $^{99m}$Tc-DPTA and $^{131}$I-hippuran. Recently $^{99m}$Tc-MAG3 has been introduced to clinical practice. We report a prospective blind study comparing $^{123}$I-hippuran with $^{99m}$Tc-MAG3 for diuresis renography in suspected obstructive uropathy.
**Patients and methods:** Twenty-one patients with 41 kidneys underwent diuresis renography with both agents. In all cases except one the examinations were performed within a 48-h period. Adequate hydration was ensured before all studies. The resulting curves were compared in a 'blinded' qualitative manner by one radiologist and one urologist. Renal function and drainage was compared statistically by Wilcoxon analysis.
**Results:** Identical curves were obtained in 19 of the 21 patients. In two patients the $^{123}$I-hippuran curves were equivocal while the $^{99m}$Tc-MAG3 study gave an unequivocal diagnosis of non-obstruction. The $^{99m}$Tc-MAG3 curves were generally of better quality and showed less statistical 'noise' than $^{123}$I-hippuran. Statistically, no difference was found in relative renal function between the radiopharmaceuticals. Tracer uptake was significantly greater at 2 min with $^{123}$I-hippuran than with $^{99m}$Tc-MAG3 ($P = 0{\cdot}001$). There was no difference in the peak times between the agents but the $^{99m}$Tc-MAG3 activity was significantly greater 10 min after the peak ($P = 0{\cdot}004$). Eight kidneys were proved to be obstructed on both studies and there was no statistical difference in either relative renal function or drainage in these cases.
**Conclusion:** Overall, $^{99m}$Tc-MAG3 provides as good a renogram as $^{123}$I-hippuran and in equivocal cases, a management decision is made more easily using the $^{99m}$Tc-MAG3. Given the disadvantages of $^{123}$I-hippuran (cyclotron production, transportation problems), $^{99}$Tc-MAG3 can be welcomed into clinical use as an alternative agent of choice for diuresis renography.

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### Screening for bacteriuria in patients with upper urinary tract calculi

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**Introduction:** Several studies have shown that urine reagent strips provide a reliable indicator for the presence of significant bacteriuria. We report a rapid strip-test screening method using the detection of protein, nitrite, blood and leucocyte esterase as indicators of bacteriuria in patients with upper urinary tract calculi.
**Materials and methods:** Two hundred and ninety-two midstream urine specimens from asymptomatic patients attending the Southmead Stone Unit for lithotripsy were assessed for the presence of significant bacteriuria by routine culture and sensitivity. All specimens were tested with the Multistix 8SG reagent strip for protein, nitrite, blood and leucocyte esterase, before laboratory assessment. The sensitivity and specificity of the strip tests were calculated for the Multistix 8SG according to the methods of Galen and Gambino.
**Results:** All four parameters tested negative in 65 specimens, two of which showed significant bacteriuria on culture. One or more parameters tested positive (more than a trace) in 227 specimens, of which 25 showed significant bacteriuria on culture. The sensitivity and specificity are shown below.

| | Sensitivity (%) | Specificity (%) |
|---|---|---|
| All strips | 92·5 | 23·7 |
| Leucocyte esterase + nitrite | 81·4 | 49 |
| Protein + leucocyte esterase + nitrite | 92·5 | 43 |

**Conclusions:** Multistixs 8SG reagent strips provide an immediate and reliable indicator for the presence of significant bacteriuria. The specificity of the test is increased by the exclusion of blood, with no loss of sensitivity.

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### Allopurinol improves renal blood flow following release of ureteric obstruction

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**Introduction:** Renal blood flow (RBF) is reduced during ureteric obstruction and does not return to normal immediately after its release. Free radicals produced following the release of obstruction cause vascular injury which may contribute to these changes. This study assessed the effect of allopurinol (ALL), a free-radical blocking agent, on porcine RBF following release of 6h of complete unilateral ureteric obstruction.
**Materials and methods:** In a female porcine model, a peri-vascular flow probe was inserted around the left renal artery; the left ureter was ligated; a 9Ch nephrostomy tube was passed retrogradely into the renal pelvis and exteriorized, forming a ureterostomy. After 24h of recovery, RBF was measured continuously, mean RBF was also recorded for 2h before commencement (pre-obstructed value). In six control animals, ureterostomal manipulation was performed at $t = 0$ and there were six obstructed animals undergoing ureteric occlusion. To assess the effect of ALL, two additional groups of five animals were studied, each receiving ALL 400 mg intravenously at $t = 0$. The percentage change in RBF from pre-obstructed levels was calculated in the 2h after the release of obstruction.
**Results:**

| Group | Mean % change RBF | SEM | CI |
|---|---|---|---|
| Control | + 5·4 | 2·5 | −4 to −14 |
| Obstructed | − 13·3 | 4·4 | −34 to −5 |
| Control + ALL | + 4·0 | 4·6 | −21 to −7 |
| Obstructed + ALL | + 0·6 | 3·9 | −7 to −13 |

Mann–Whitney analysis between the Control and Obstructed groups identified a significant reduction in RBF following the release of obstruction ($P = 0{\cdot}04$). There was no difference between Control + ALL and Obstructed+ALL groups. Obstructed and Obstructed+ALL groups were significantly different (Kruskall–Wallace one-way-ANOVA $P = 0{\cdot}0015$).
**Conclusion:** ALL significantly improved renal blood flow following the release of ureteric obstruction.

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### Medium-term result of the ENDOBRST procedure for pelvi-ureteric junction

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**Objectives:** To report the medium-term results of endoballoon pyelolysis for PUJ obstruction.
**Patients and methods:** Twenty-two patients (13 male, 9 female; age 17–68 years, mean 36) with renographically confirmed PUJ obstruction underwent endoscopic balloon rupture and stenting (ENDOBRST) of the PUJ in three urological units. Eleven patients underwent a one-stage procedure and were stented with a standard 7–8 Ch JJ stent. In seven patients, the ureter was pre-dilated with a standard 7–8 Ch stent inserted 2 weeks before ENDOBRST. After balloon pyelolysis, the

ureter was stented with an expanded (7–14 Ch) JJ stent. Two patients had the procedure percutaneously. All JJ stents were removed 6–8 weeks after pyelolysis. The procedure was abandoned in two patients due to technical difficulty.
**Results:** Symptomatic improvement occurred in 11 patients (follow-up 28–58 months, mean 33), renographic improvement in 11 and divided function improved in six. Four patients subsequently underwent pyeloplasty, one underwent nephrectomy and one patient was commenced on haemodialysis. Overall, there was objective improvement (renographic drainage and/or divided function) in 13 patients. Two-stage ENDOBRST using the expanded JJ stent appeared to produce a better result (7/9 objective improvement) compared with one-stage procedure (6/11 objective improvement).
**Conclusion:** The overall results of ENDOBRST were disappointing compared with those from open pyeloplasty and it should be reserved for patients who are unfit for open pyeloplasty.

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### Reliable upper urinary tract surveillance in children with spina bifida

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**Introduction:** This study a) assessed the incidence of potential renally damaging upper urinary tract changes in a cohort of children with the spina bifida (SB) anomaly and b) attempted to establish minimum safe guidelines for assessment and follow-up.
**Patients and methods:** Sixty-three children were available for continuous long-term study, with a mean follow-up of 6 years, ranging from 9 months to 14 years. The children underwent renal ultrasonography (US) and micturating cystourethrography at birth then, if normal, were followed on a programme of renal US surveillance. Those with abnormal US were started on clean intermittent catheterization (CIC) with or without anticholinergics. Those with reflux had prophylactic antibiotics. Urodynamic assessment was indicated where (a) hydronephrosis persisted despite medical management, or (b) incontinence persisted into the 3–4 year age group.
**Results:** Of the 63 children, 10 were hydronephrotic at birth. Two with high-grade reflux were managed by ureterostomies. Six of the remaining patients were managed by CIC. Two have required augmentation cystoplasty for refractory hyper-reflexia. Of the remaining 53 children with normal kidneys at birth, 4 (7·5%) progressed to develop hydronephrosis on surveillance, when aged 1·5, 2·5, 5 and 12 years. The two younger children were easily managed by CIC. The two older children required augmentation cystoplasty.
**Conclusions:** (a) The majority of SB children at risk of renal damage can be identified at birth (72%). (b) If the kidneys are not dilated at birth, there is a low risk of progression to hydronephrosis (7·5%). (c) Surveillance US permits early identification and allows appropriate intervention of developing hydronephrosis. (d) Routine urodynamic assessment is unnecessary and can safely be reserved for those children in whom conservative management of neuropathic bladder is a problem.

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### Antegrade stenting for iatrogenic ureteric injury: long-term results

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**Introduction:** We have previously reported the technique of antegrade ureteric stenting in the management of iatrogenic ureteric injuries. This involves a percutaneous nephrostomy and the placement of a ureteric stent, with or without balloon dilatation, performed by an interventional radiologist. We now report our long-term results.
**Patients and methods:** Ten patients (three men and seven women) with a median age of 37 years (range 31–82) with unilateral ureteric injuries were treated with antegrade ureteric stenting. Gynaecological surgery was the most common cause. In one patient the injury was recognized and repaired at the time of operation, but the primary repair failed. In the remaining nine patients, the diagnosis was delayed by a mean period of 14 days (range 3–42). The modes of presentation were loin pain, pyrexia and/or urinary leakage. Antegrade stenting was successful in seven cases but failed in three, all of whom, subsequently underwent reconstructive surgery.
**Results:** The mean follow-up was 18 months (range 12–48). A combination of isotopic renography and/or IVP was used to assess the long-term results. There was no radiographic evidence of ureteric stricture and no loss of renal function or drainage on renography.
**Conclusion:** The results show that antegrade ureteric stenting for ureteric injuries is a safe and effective method with good long-term results. It is minimally invasive and can avoid the need for further open surgery.