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BAUS Enhanced Recovery Pathway

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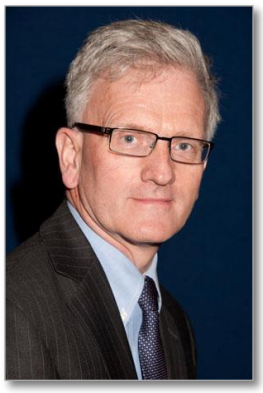
FOREWORD by Mr Mark Speakman, President of BAUS



"This document has been designed as pragmatic guidance for urology units looking to implement enhanced recovery protocols (ERPs) across various types of major urological surgery.

"It is not intended to be proscriptive, because we recognise that many units achieve excellent clinical results despite variation in aspects of clinical care between individual units. Rather, it is designed to share examples of best practice and to give clinicians the confidence to change established ways of working, where evidence suggests more modern approaches may be preferable.

"Although variation in certain aspects of clinical care is inevitable between individual units (which can, of course, foster innovation), there is good evidence that unplanned variation within units is inefficient and may compromise patient safety.

"BAUS is, therefore, fully supportive of the concept that each urology unit should consider its current patient pathways with a view to:

- standardisation of care,
- incorporating best clinical practice and
- ensuring constant appraisal of clinical outcomes.

"Enhanced recovery programmes are known to offer maximum benefit when embedded within these continuous, quality improvement principles.

"Given the continuous cycle of improvement associated with these programmes, it is our intention to review and update this guidance as the evidence base for ERP evolves. We are confident that BAUS members will be active participants in this innovation and in sharing the evidence that it generates. We will, therefore, encourage units to present, publish and disseminate their findings, to encourage the adoption of these improvements in surgical care, for the benefit of all our patients."

December 2015

1 INTRODUCTION

A carefully designed Enhanced Recovery Programme (ERP) is more than just a tool to reduce the duration of inpatient stay in hospital. The aim is for patients under our care to achieve a faster return to normality after surgery. This will be result in a reduced length of stay without any adverse increase in complications or increased readmission rates, and with a quicker return to normal, day-to-day activity. For the urology team providing care, there is a measurable improvement in team working with greater patient engagement and levels of patient satisfaction are measurably higher.

The concept of a formal "fast-track" recovery programme after major surgery was pioneered in colorectal surgery. The work of Kehlet [(1)] is cited as laying the foundation stone for a process that applies best practice at every step of patient care from planning, through surgery, to post-operative recovery and discharge.

There is established expertise in the development and implementation of ERPs within British Urology. Formal programmes already exist for the peri-operative management of patients undergoing cystectomy [(2)] [(3)] [(4)], prostatectomy [(5)] and laparoscopic nephrectomy [(6)] [(7)] [(8)].

This guideline has, therefore, been produced by a group of urologists working in the NHS who have a particular interest in enhanced recovery for both upper tract and pelvic surgery. In preparing it, we have drawn upon best practice already available in the BAUS community. We believe that we have created a simple framework for the safe introduction of an Enhanced Recovery Programme for urological surgery. This is a "real life" guideline, developed from available research (which is sparse in some areas) and from practical measures that we have found to be effective for patients in our departments.

In the Procedure-Specific Checklists section at the end of this document, we have outlined summary pathways for the following procedures, together with suggested medication lists for these procedures:

- radical prostatectomy
- radical cystectomy
- radical nephrectomy
- partial nephrectomy
- pyeloplasty
- nephroureterectomy

There are many common elements in the management of these surgical pathways and many different combinations can be successful. We have described how different units can use pre-operative, peri-operative and post-operative enhanced recovery principles to achieve maximum benefit from their final Enhanced Recovery Pathway.

This is reflected in the pathways and, even though there is an inevitable degree of natural variance between procedures, a common thread is always retained.

2 OVERVIEW

2.1 What is enhanced recovery?

Enhanced recovery (ER) is a process which encompasses the entire clinical pathway for a surgical procedure, starting within primary care and continuing throughout the peri-operative episode, to post-discharge care and the return to normal function.

ER consists of a number of modifications to existing practice, all aimed at reducing the psychological and physiological insult to the patient and, therefore, improving their care. ER has been shown to be effective in both urological pelvic cancer and colorectal surgery, resulting in a reduced length of stay with lower re-admission rates (NHS England).

Acknowledgement of the benefit of ER has led to its widespread uptake across the UK but variations in practice and performance of individual units suggest that there is still room for improvement. The Hospital Episode Statistics (HES) [(Footnote a)] report for 2012 – 2013 shows a mean length of stay (LOS) for radical cystectomy of 15.1 days; the shortest length of stay was 8.9 days and the longest 23.4 days. For radical prostatectomy, the mean LOS for the same period was 2.9 days with a range of 1.3 to 6.3 days [(9)] .

The BAUS Nephrectomy Audit [(Footnote b)] also confirmed significant variation in both LOS and complication rates between departments in the UK.

We hope that, by applying the principles of ER, we can raise standards of care across the country and improve outcomes for all our patients.

2.2 The components of an enhanced recovery programme

Steps in the ERP can be conveniently divided into:

2.2.1 Primary care

At the point of referral, chronic co-morbidity such as hypertension, diabetic control and anaemia should be addressed. Patients should be offered support to stop smoking and to reduce alcohol consumption. In addition, nutritional advice can be initiated and advice given on improving cardiovascular fitness.

2.2.2 Outpatients

This is an opportunity to explain and discuss both treatment options and procedure-specific details. In addition, it is the best time to:

(a) HESOnline provides a complete record of all hospital statistics; click here for 2012 – 2013 datasets
(**b**) BAUS provides details of all official audits. Nephrectomy data for 2010–2011 are available here

- assess and optimise co-morbidity,
- consider cardiopulmonary exercise testing (CPET),
- introduce a Uro-oncology nurse specialist for point of contact & further education and
- discuss ERP in more detail.

2.2.3 Pre-admission

Ideally, this should be performed in a combined surgical/anaesthetic pre-assessment clinic, focusing on:

- management of outstanding medical issues,
- guidance on medication and
- nutritional assessment (and supplying nutritional supplements with carbohydrate loading drinks).

Education and management of expectations are continued with verbal, written or audio-visual information given about the procedure and the expected recovery schedule. Competence with specific, practical skills (where relevant) should also be checked, including:

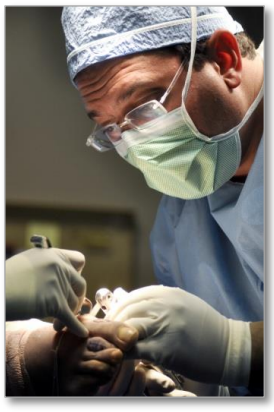
- catheter care,
- clean intermittent self catheterisation (CISC) and
- stoma care.

Social issues should be identified and discharge arrangements made.

2.2.4 Day of surgery

Patients should be admitted on the day of surgery; the main items for attention are:

- minimise fasting (6 hours for solids),
- continue clear fluids up to 2 hours before operation,
- carbohydrate loading on the evening before surgery and 2 hours pre-operatively,
- marking of operative site,
- re-affirmation of consent,
- confirming a contact number for next of kin.



2.2.5 Peri- and intra-operative

- antibiotics and VTE prophylaxis,
- prevention of hypothermia,
- maintain a high inspired oxygen concentration,
- goal-directed fluid therapy,
- local anaesthetic blocks or short duration epidural/spinal anaesthesia,
- possible use of intraoperative cell salvage and
- selective use of catheters and drains.

2.2.6 Post-operative

There is, inevitably, some procedure-specific variability but the factors common to most procedures are:

- minimal or no intravenous fluid,

- free access to diet and fluids, as tolerated, from day 0 (for cystectomy, start with free fluids, then light diet on day 1),
- regular oral analgesics and anti-emetics,
- urine output target (if monitored) of 0.3ml/kg/hr, averaged over 4 hours,
- early mobilisation and motivation,
- review indications for a drain, if present, and remove early,
- review indications for urinary catheter, if placed, and remove on day 1 (N.B. contraindications to early removal include urethro-vesical or neovesical anastomosis and cystotomy),
- immediate stoma or catheter education (as required) and
- prepare discharge medication, including analgesia and laxatives.

2.2.7 Follow-up

Patients should be given:

- an emergency contact number for 24-hour advice,
- a Nurse Specialist telephone contact number and
- a Consultant outpatient review appointment with histology (if appropriate) in 4 - 6 weeks.

2.2.8 Summary

ER in renal and pelvic surgery consists of a series of modifications to existing established practice. Although the majority of these modifications are relatively minor, they do challenge pre-existing surgical dogma. To make ER effective, a team approach and a cultural transformation are required; this should result in motivated clinical teams working together with patients to achieve a common goal.

The successful implementation of ERPs requires input from the whole multi-disciplinary team; integral to that is a **well-informed and motivated patient**. Whilst working towards successful implementation, local *ad hoc* practice may need to be challenged, with unplanned day-to-day variance kept to an absolute minimum.

The establishment of an ERP will allow all the team members to maintain a sharp focus on both the delivery of high quality care and safe practice; the secondary, measureable benefits for the patient will then follow.

3 PREPARATION FOR SURGERY

By accurately reviewing comorbidities before surgery, peri-operative morbidity and mortality can be reduced, unnecessary cancellations avoided [(10)] and hospital stay can be reduced. In addition, patient and family are afforded additional opportunities to ask questions and to improve their understanding of the scheduled procedure.

There are many opportunities for pre-operative assessment and information sharing and the most important are listed below. It is important that the information provided at each stage is clear and accurate, to ensure that a consistent message is reinforced at each stage, and to

improve patient understanding and recollection. This is particularly important for informed consent.

3.1 Primary care

Aim: optimise chronic medical conditions in anticipation of surgery

The process of patient preparation should commence in the community and continue in the outpatient clinic when a cancer diagnosis and treatment plan is confirmed. Working partnerships with primary care should be supported, to encourage effective treatment of chronic conditions such as diabetes, hypertension and anaemia, as well as to run smoking and alcohol cessation clinics [(11)]. The detrimental effects of alcohol and smoking include:

- immunosuppression,
- impaired cardio-respiratory function,
- impaired wound healing,
- coagulopathy and
- muscle dysfunction.

Cessation of smoking and drinking has been proved to reduce peri-operative morbidity [(12)].

3.2 Outpatient clinic

Aim: inform the patient, set expectations and initiate assessment

Pre-operative assessment begins in clinic at the time the decision to operate is made. Information about the likely course of events, before anaesthesia, has clear benefits in terms of patient satisfaction and overall outcome. This should be delivered verbally at the time of outpatient discussion, and in written (patient information leaflet) or audio-visual (DVD or interactive multimedia) format. Failing to impart this information may be a reason for ineffective planned early discharge in up to one-third of patients; similar to the failure rate due to inadequate pain control [(13)].

The outpatient visit is the first opportunity to discuss the proposed procedure, obtain informed consent, assess pre-existing medical conditions and plan pre- and post-operative management of all pre-existing problems. The patients should be introduced to a urology Cancer Nurse Specialist (CNS) who has an important role in explaining the procedure, answering questions, providing information about the ERP, issuing the nutritional supplements and carbohydrate loading drinks, and involving the stoma team when ileal conduit diversion is planned. Specialist Nurse input should also be available those patients undergoing surgery for benign conditions.

If a neobladder is planned, referral for training in clean intermittent self-catheterisation (CISC) should be arranged. For those patients having a cystectomy with ileal conduit diversion (or where a pelvic exenterative procedure resulting in a stoma is planned), pre-operative education is pivotal and has been shown to reduce the length of hospital stay, time to stoma competence and also community stoma "emergencies" [(14)]. An opportunity to see or wear a leg bag can be offered to those who are likely be discharged with a catheter (e.g. cystectomy with neobladder formation or radical prostatectomy).

A date for surgery can be planned, depending on the need for further investigations to assess co-morbidities. Any such problems should be detected in advance because the formal preoperative assessment visit usually occurs only 1 - 2 weeks before surgery, and failure to identify co-morbidities in clinic can lead to avoidable delays in surgery.

An anaesthetic assessment should also be considered at this stage in high-risk patients, possibly with a cardiopulmonary exercise test (CPET) if available locally. The use of CPET in this setting allows identification of those patients with unexpectedly poor cardio-pulmonary reserve. This information is helpful in counselling patients about their degree of risk, and is also useful in planning the appropriate dependency level for post-operative care. For example, in patients undergoing radical cystectomy, poor cardiopulmonary reserve is a predictor of high-grade (≥3) Clavien-Dindo complications [15] [16] . This group has not, however, been specifically studied in the context of a well-constructed ERP; it is possible that reduction in physiological stress associated with ERP is ideally suited to high-risk patients.

The timeline for recovery and the expectations of patient and family during the admission should be discussed. Discharge planning and the provision of additional support, where needed, should be initiated at this early stage. This will require tailoring to the individual patient. It is useful to discuss the following aspects specifically:

- the need for a pre-assessment visit 1-2 weeks pre-operatively,
- the potential need for a urinary catheter,
- the principles of early mobilization,
- potential length of stay – different units should monitor their own length of stay but guideline targets would be:
    - laparoscopic pyeloplasty: 1 day,
    - laparoscopic prostatectomy: 1–2 days,
    - laparoscopic nephrectomy: 1–2 days,
    - laparoscopic partial nephrectomy: 2–3 days,
    - laparoscopic nephroureterectomy: 3–5 days,
    - open partial nephrectomy, open radical nephrectomy or open nephron-ureterectomy: 3–5 days and
    - open radical cystectomy: 7 days.

- the need for venous thrombo-embolism (VTE) prophylaxis,
- establishing support requirements for successful discharge and
- arranging outpatient follow up after 4 – 6 weeks.

Most of these procedures are performed for malignancy and these patients must be introduced to the relevant Uro-oncology Specialist Nurse and given appropriate contact information. All patients should be given procedure-specific patient information leaflets (PILs) together with enhanced recovery documentation, either during this visit or later, in the pre-admission clinic.

3.3 Pre-admission clinic

Aim: ensure patient is informed & in optimal condition to cope with planned surgery

The formal pre-operative assessment visit is usually performed by Specialist Nurses with supervision from Consultant Anaesthetists. In addition to the obvious benefits of assessing fitness for surgery, an anaesthetic review at this stage has been shown to reduce patient anxiety when compared with standard anaesthetic review at the time of admission [(17)].
This is another opportunity for the patient and family to meet their urology Specialist Nurse. The procedure and its potential risks/benefits should again be discussed because patient recall of facts is often poor after initial discussions [(18)]. Recollection can be further impaired by the news of a new diagnosis of cancer given during the initial outpatient clinic visit. The Specialist Nurse will also be able to check that any practical skill training has been undertaken (e.g. CISC, stoma education).

At this stage, all the following should be checked:

- ensure clinical notes are available,
- review notes to confirm correct procedure,
- ensure imaging is available (especially if performed elsewhere),
- a clinical history to re-assess co morbidities,
- review all medications and
    - give advice on stopping anticoagulants (with a bridging protocol as necessary),
    - omit oral hypoglycaemic drugs on the day of surgery,
    - omit ACE inhibitors on the day of surgery,

- make a nutritional assessment, using the Malnutrition Universal Screening Tool (MUST) [(Footnote c)] or Nutritional Risk Screening (NRS-2002) [(Footnote d)],
- consider pre-operative nutritional supplements [(19)],
- identify any problems during previous anaesthesia/surgery (especially difficult intubation),
- assess exercise tolerance,
- perform basic physical examination (pulse, blood pressure, oxygen saturations, temperature, weight, height and calculate BMI),
- perform relevant blood tests (e.g. FBC, U&E, group & save/cross match).
- request MSU (if indicated),
- request ECG,
- CXR (if indicated),
- ECG if a new murmur is detected, symptoms of valvular disease or there is known valvular disease requiring up-to-date assessment,
- bowel preparation instructions [(20)] [(21)] (no mechanical bowel preparation required unless large bowel reconstruction is anticipated although a phosphate enema may be considered in selected patients),
- give written instructions about pre-operative fasting [(22)] [(23)] [(24)],

(c) Full details of the Malnutrition Universal Screening Tool can be downloaded as an Acrobat PDF document here
(d) Full details of the Nutritional Risk Screening (NRS-2002) scoring system can be downloaded as a Word document here

    - solid diet up to 6hrs pre op,
    - clear liquids up to 2hrs pre-operatively,
- supply pre-operative carbohydrate loading drinks [25] [26] [27],
- explain VTE prophylaxis,
- explain the procedure,
- inform the anaesthetist and surgeon if any concerns have been identified,
- book an HDU bed if considered necessary,
- give advice about what clothes to bring in and wear post operatively (to encourage normality and mobilisation),
- identify any social issues and make discharge arrangements.

3.4 Day of surgery admission

Aim: review fitness, information & consent; avoid unnecessary delays or cancellations

The final stage of preparation for surgery occurs on the day of admission, when any changes in health since the pre-operative clinic visit are identified. Informed consent is again covered, imaging is reviewed and the patient is marked for surgery (for laterality or stoma site). Final measures should include:

- initiate VTE prophylaxis (TED stockings or pneumatic compression),
- arrange review by anaesthetist and surgeon.
- obtain written consent (or confirmation of consent when already obtained),
- mark the operative site after review of imaging when laterality is relevant and
- check group and save/cross match is available

Once these checks are complete, the surgeon and anaesthetist should carry out a theatre team brief to discuss the following in a manner allied to the WHO checklist:

- anticipated critical steps from both a surgical and anaesthetic perspective,
- the anticipated blood loss,
- any specialist equipment such as intraoperative cell salvage [28] [29], oesophageal Doppler or specialised surgical instruments,
- prophylactic antibiotics (if indicated),
- patient warming,
- hair removal,
- glycaemic control and
- VTE prophylaxis.

Ideally, the theatre team brief should follow the standard format laid down in the World Health Organisation checklist [30].

4 ANALGESIA & ANAESTHESIA

The principles in ER are:

- to optimise analgesia whilst minimising opiate use,
- to minimise the stress response,
- to use short acting agents where possible and
- to use goal-directed fluid therapy to minimise fluid shifts.

4.1 Pre-operative

Aim: educate, set expectations & reduce opiate requirements post-operatively

Pre-operative analgesia should be considered part of a multimodal strategy designed to help decrease the initial stress response and to reduce post-operative pain. It is recognised that long-acting benzodiazepines can cause psychomotor disturbance and, as a result, are not advised [(31)]. Premedication recommendations include paracetamol, non steroidal anti-inflammatories [(32)] and, in some cases, gabapentin/pregablin [(33)] [(34)]. Gabapentin should be used with caution in the elderly who may be at increased risk of postoperative confusion. These medications affect the formation of new pain pathways and are beneficial in reducing both immediate post-operative pain and the formation of chronic pain pathways.

4.2 Operative

Aim: maximise pain control & minimise the use of opiate-based analgesia

The general principle in operative analgesia is to reduce usage of long acting opiates by incorporating local anaesthetic blocks and other techniques.

4.2.1 Intraoperative neural blockade

This forms the mainstay of intra-operative and early post-operative analgesia. The anaesthetist is guided by both the procedure and the operative approach in deciding the most appropriate type of block(s). A number of techniques for peri-operative analgesia have been described, including:

- direct wound local anaesthetic infiltration,
- transversus abdominis plane (TAP) blocks [(35)],
- local anaesthetic infusion with rectus sheath catheters (RSC) [(36)] and
- spinal/thoracic epidural anaesthesia (TEA).

Studies have shown success for ERPs in open radical cystectomy using thoracic epidural anaesthesia [(37)], rectus sheath catheters [(36)] and patient-controlled analgesia (PCA) alone [(38)]. With increasing experience of RSCs and the rapid adoption of minimal access surgery, a shift away from TEA is being observed [(39)]. For

minimal access nephrectomy and prostatectomy, either RSC or direct wound infiltration with local anaesthetic is effective, reduces opiate requirements and allows early mobilization [(35)] [(40)]. Simple measures, such as the use of long-acting local anaesthetic instilled into port incisions at the time of placement, also help to decrease analgesic requirements in the early post-operative period [(41)].

Because patients having spinal infiltrated opiates require a period of 24 hours post-operative monitoring (due to risk of respiratory depression), this technique is not recommended in "23-hour stay" pathways.

4.2.2 Fluid management

Individual goal-directed fluid therapy (IGDFT), with cardiac output monitoring, allows maintenance of a "near physiological" state with, as a result, better outcomes. Avoiding hypoperfusion of bowel and other organs has a number of beneficial effects, including avoidance of sepsis, early return of bowel function and improved renal function.

There has been wide uptake of IGDFT across different specialties in ERP programs. The aim is to optimise perfusion and oxygen delivery, by maintaining physiological fluid balance and avoiding fluid shifts. Fluid depletion may lead to splanchnic hypoperfusion, whereas fluid overload can lead to bowel oedema. Both can result in paralytic ileus and delayed return to normal bowel function, with associated morbidity and increased length of stay [(42)]. Radical prostatectomy and upper tract surgery, however, are associated with low levels of bowel problems so, in these procedures, the role of IGDFT remains uncertain. In radical cystectomy, consensus opinion is in favour of IGDFT [(43)] and, within the confines of a small trial and exclusion of ASA Grade ≥3, there is proven benefit in reducing nausea, vomiting and paralytic ileus in the IGDFT group [(44)]. Its importance may be even greater in patients with ASA Grade ≥3.

4.2.3 Anaesthetic agents

The use of isofluorane is to be avoided, in favour of shorter acting agents such as desflurane or sevofluorane where possible due to its hangover like effect.

4.2.4 Antiemetics

Routine administration of anti-emetics is to be encouraged including the use of dexamethasone at induction.

4.2.5 Avoidance of hypothermia

Routine use of patient warming is mandatory to avoid intra-operative hypothermia and has been shown to help prevent wound infection, perioperative coagulopathy and myocardial ischaemia. This should include warm-air blankets and warmed intravenous fluids coupled with intra-operative temperature monitoring [(45)]. Warming should continue in recovery as post-operative shivering increases oxygen consumption [(46)].

4.2.6 Antibiotic prophylaxis

A single dose of antibiotic prophylaxis (determined by local microbiological guidance) should be given before "knife-to-skin" in patients undergoing major renal and pelvic surgery. In prolonged pelvic procedures, the dose can be repeated after 4 hours. A prolonged course of antibiotics should only be considered after nephrectomy for a severely infected kidney and should be

guided by microbiological sensitivities. Extended antibiotic therapy may also be considered for ileal bladder replacement.

4.2.7 Extended VTE prophylaxis

In accordance with NICE guidance, low molecular weight heparin should be continued for 28 days post-operatively in patients undergoing major pelvic exenteration.

4.3 Post-operative

Aim: use multimodal analgesia to avoid the use of PCA and minimise the use of opiates, whilst ensuring adequate pain relief

4.3.1 Avoiding opiates

In particular, opiate-related effects (drowsiness, nausea and ileus) should be avoided. The secondary effects of opiates can also mean that multiple intravenous cannulae, pump delivery devices and supplemented oxygen need to be introduced; these all limit early mobilisation.

4.3.2 Avoiding patient-controlled analgesia (PCA)

Despite popularity with patients, nursing staff and pain specialists, the use of PCA analgesia has been shown to delay fast-track discharge. If opiates are required in the early post-operative period, they can be given by intravenous bolus or as less sedating synthetic derivatives, taken by mouth, which may provide effective analgesia without the need for pumps, cannulae or PCA.

4.3.3 Post-operative analgesic strategy

It is well established that minimal access surgery results in lower analgesic requirements and, with the dominance of minimal access renal and prostate surgery, post-operative analgesia can be less complex. Patients are immediately able to tolerate diet and a combination of perioperative local anaesthetic regional block with oral paracetamol and NSAIDs has been shown to eliminate the need for opiates almost completely [(5)]. The continued use of gabapentin or pregablin in the early post-operative period can also limit the need for opiates although the most effective dosing and duration of use remain to be proven [(34)].

For those undergoing open radical prostatectomy via a lower midline incision, the use of rectus sheath catheters for ongoing local anaesthetic infusion has been shown to reduce the overall need for additional analgesia and to reduce length of stay [(36)].

In patients undergoing open nephrectomy, the principles of multimodal analgesia should also be applied. The choice between thoracic epidural analgesia, either by bolus or as an infusion, or local anaesthetic wound catheters will be guided by the anaesthetist, surgeon and the site of incision.

In patients undergoing radical cystectomy, minimal access surgery has been shown to have significantly lower opiate requirements [(47)] [(48)]. The majority of cystectomies in the UK, however, are still being carried out via the open approach [(49)]. Different units, with established ERPs, are

achieving neural blockade with either thoracic epidural anaesthesia or regional blockade using either transversus abdominis plane (TAP) blocks or rectus sheath catheters (RSC). These are being used in combination with paracetamol and NSAIDs, with significant benefits to pain control and length of stay [3] [5] [37]. There have been concerns regarding NSAID use. The cardiac risk of chronic NSAID use has not been quantified in the acute perioperative setting [50] but colorectal studies have concluded that diclofenac is associated with a statistically higher anastomotic leak rate and the same trend is seen with ibuprofen though it does not reach statistical significance. It is thought that COX-2 selective NSAIDs (diclofenac) may have a higher microthrombotic effect than COX-1 selective NSAIDs (ibuprofen/ketorolac) which can adversely affect the anastomotic blood supply [51]. These concerns have not been specifically studied or substantiated in cystectomy series but the incidence of anastomotic complications is low [52].

5 DRAINS

Aim: minimise the use of abdominal wound drains, reduce analgesic requirements and increase the degree of mobilisation

5.1 Renal surgery

Drain insertion has generally been considered a "no harm", safe practice. Various reasons have been cited for drain insertion after renal surgery:

- early identification of ongoing bleeding,
- reducing the incidence of post-operative collections,
- routine practice learned during training years,
- removal of pyonephrotic kidney,
- concerns about pancreatic or splenic injury on the left side and
- concerns about possible bowel injury.
- urine leak in cases of partial nephrectomy or pyeloplasty.

There is no established evidence to support the routine drain placement. There is however support for the practice of not placing a drain routinely after total nephrectomy, partial nephrectomy, nephron-ureterectomy and laparoscopic pyeloplasty.

Patient surveys commonly report pain and discomfort from the drain whilst it is present and during its removal. The potential risks of hospital-acquired infection as a result of current practice with drains remain unknown.

We recommend that clinical judgment is used if a drain is being placed. The aim is to avoid the habit of routine placement of a renal bed drain after total or partial nephrectomy and nephro-ureterectomy. The use of a drain after pyeloplasty or nephro-ureterectomy is, however, currently accepted. When a drain has been used, always consider early removal (either the same evening or early on the first post-operative day).

5.2 Pelvic surgery

Traditional surgical dogma has driven the routine practice to use pelvic drains, primarily to drain blood and lymph from the pelvis (and prevent a collection), or to identify and drain a urine leak from the uretero-ileal anastomosis. The incidence of urine leak is now very low [53] [54] [55] [56]. Studies from colorectal surgery have shown no benefit from pelvic drains [57]. However, this topic has not been specifically addressed after urinary reconstruction.

The use of uretero-ileal stents is not associated with an increased stricture rate [58] but has been shown to improve drainage of the upper urinary tract, to decrease metabolic acidosis during the immediate postoperative phase, and is associated with earlier return of bowel function [59] [60].

For patients who have undergone neobladder reconstruction, the duration of catheterisation is undefined. From the ER perspective, the catheter is to reduce morbidity from a urinary leak; the presence of a catheter on a leg bag, to aid patient mobility, is unlikely to slow progress.

5.3 Summary of recommendations

5.3.1 Renal surgery

- Avoid routine placement of a renal bed drain after radical nephrectomy and nephro-ureterectomy,
- If a specific intraoperative complication is suspected, a drain may be placed,
- If a drain has been used, consider early removal (e.g. early on first post-operative day),
- Placement of drain is considered appropriate in certain situations (e.g. partial nephrectomy or pyeloplasty).

5.3.2 Pelvic surgery

- Cystotomy for nephro-ureterectomy is not an indication for a pelvic drain unless specific difficulty is encountered with closure of the bladder defect; the urinary catheter acts as a "drain".
- Routine placement of a pelvic drain after radical prostatectomy is not required if the urethro-vesical anastomosis is watertight.
- Consider omission of a pelvic drain (or early removal) after cystectomy and urinary reconstruction.

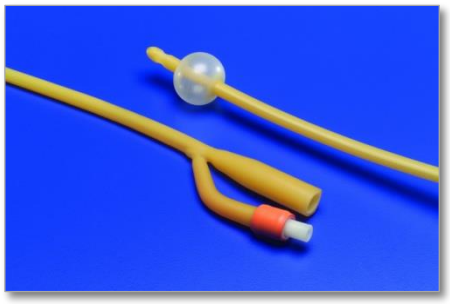
6 URINARY CATHETERS

Aim: minimise the routine use of urethral catheters, thereby improving mobilisation and reducing the risk of catheter-related infection

6.1 Renal surgery

Placement of an indwelling urethral catheter for any renal surgery has always been accepted as standard practice (i.e. it has become a "routine" part of the procedure). The following are often used as justification for "routine" bladder catheterisation:

- to measure urine output,
- to aid bladder drainage while the patient is immobile,
- to avoid potential reflux after pyeloplasty and
- to promote bladder healing after nephro-ureterectomy.



There are no published data to support this routine practice. There are, however, data to support a "no-catheter" approach after laparoscopic nephrectomy [(55)] and laparoscopic pyeloplasty [(56)]. There is also support for early removal (post-operative day 1) after partial nephrectomy and nephro-ureterectomy. Practice review in high volume UK centres supports the avoidance of a routine catheter in all cases of renal surgery. Surveys indicate that patients would like to be involved in a discussion about routine catheter placement; no catheter or early removal accelerate post-operative mobilisation and allow early discharge.

If a decision to place a catheter is made, for example in patients undergoing nephro-ureterectomy or those requiring accurate urine output measurement in critical care, a discussion on the merits of a catheter should occur before surgery.

We recommend that the routine placement of a urethral catheter is no longer essential. If a patient is unable to void in the post-operative period, clean intermittent self-catheterisation is an alternative

6.2 Pelvic surgery

Catheters to maintain low pressures after cystotomy (in nephro-ureterectomy) and catheters to protect the urethro-vesical anastomosis (in prostatectomy) or in neobladder reconstruction remain indicated.

6.3 Summary of recommendations

- Avoid a urinary catheter in all cases of renal surgery,
- A urinary catheter is indicated after nephro-ureterectomy, radical prostatectomy and neobladder reconstruction,
- Consider catheter insertion in selected patients (e.g. male patients with risk factors for retention or frail patients with limited mobility),
- Consider catheters in prolonged or complex procedures (e.g. difficult nephrectomy or laparoscopic partial nephrectomy) with a view to removal at the end of the procedure, if appropriate,
- Consider early removal to increase mobility and reduce the risks of infection (except after nephron-ureterectomy) and
- Avoid excessive intravenous fluids during laparoscopic surgery to prevent undue bladder distension.

7 MOBILISATION

Aim: return to normal activity as soon as possible

A prolonged period of bed rest after surgery should be avoided. Immobility is associated with an increased risk of:

- venous thromboembolism (DVT & PE),
- loss of muscle strength,
- respiratory compromise,
- bowel (paralytic) ileus,
- reduced tissue oxygenation and
- insulin resistance [(25)].

Early post-operative mobilisation is essential to reduce these risks. With active nursing support, patients should be out of bed for 2 hours on the day of surgery and for 6 hours on subsequent days [(20)]. To promote this, patients should be reminded to bring appropriate clothing and footwear into hospital.

8 NUTRITION

Aim: optimise nutrition, reduce time without nutrition, maintain good nutrition throughout the pathway and, thereby, reduce complications

The prevalence of malnutrition in patients undergoing major urological procedures has been estimated to be as high as 46% [(61)]. It is a recognised risk factor for surgical morbidity and prolonged hospital stay. It is recommended that an assessment be made using validated tools such as the Malnutrition Universal Screening Tool (MUST) [c] or Nutritional Risk Screening (NRS) [d]. Patients should also be considered for pre-, peri- and post-operative nutritional supplements.

8.1 Pre-operative

8.1.1 Fasting

There is no need for extended pre-operative fasting before any urological surgery. Current guidance is to withhold solid food for 6 hours, and clear fluids for 2 hours, before induction of anaesthesia [(24)]. Prolonged fasting offers no additional protection against the complications of retained gastric contents, such as pulmonary aspiration [(22)]. It is safe to apply the same fasting guidelines to "high-risk" groups such as the obese, diabetics and patients with known delayed gastric emptying [(23)].

8.1.2 Carbohydrate supplementation

Clear fluids containing complex carbohydrates may be given up to 2 hours before induction of anaesthesia. They reduce insulin resistance by up to 50%, as well as reducing thirst, hunger and anxiety [(62)]. Insulin resistance is important in post-operative metabolism because it results in hyperglycaemia and decreased glucose uptake in skeletal muscle and adipose tissue [(63)]. Insulin

resistance correlates with the magnitude of surgery, and the protective effects of carbohydrate loading have been shown to reduce length of stay after major abdominal surgery [64].

Diabetic patients have an increased risk of further insulin resistance. Traditionally, diabetics have been denied carbohydrate loading drinks for fear of delayed gastric emptying. However, a small study of well-controlled, type 2 diabetics has suggested that they may also benefit from carbohydrate loading [65].

Data are limited on the use of carbohydrate loading in patients undergoing short duration, upper abdominal laparoscopic procedures. It is assumed, however, that because these are low-cost, low-risk interventions associated with a major benefit, they too should form part of a structured ERP.

8.1.3 Prevention of ileus

Strategies to avoid post-operative ileus are multimodal and include:

- avoidance of opiates,
- early enteral nutrition,
- sham feeding with chewing gum,
- minimising intravenous fluids,
- anti-emetic medication and
- early mobilisation.

For patients undergoing **radical prostatectomy and renal surgery**, ileus is rarely a problem and rapid return to normal function can be accomplished by ensuring balanced fluid management, prevention of nausea, resumption of normal diet, oral non-opiate medication and early mobilisation.

For patients undergoing **radical cystectomy**, the incidence of paralytic ileus is between 12 and 23% [66] [67]. Traditional approaches to the management of ileus after cystectomy included a nasogastric tube and "nil by mouth" status. There is, however, Level 1a evidence from colorectal studies that nasogastric tubes are not only unnecessary but also harmful [68]. After 24 hours of starvation, the body develops insulin resistance, further compounding the surgical stress response. Early feeding can reduce this insulin resistance, thereby helping muscle function and wound healing while avoiding sepsis [69]. Extrapolating data from meta-analyses of non-urological abdominal surgery, suggests that pneumonia, anastomotic dehiscence, wound infection and death were all less in the early feeding group. Furthermore, benefits were observed in terms of time to passing flatus, time to first bowel motion and reduced length of stay [70]. Post-operative fluid intake, however, must be rationalised and oral fluids are preferred to parenteral fluids. In circumstances where intravenous fluids are required, balanced crystalloid such as Hartmann's solution, rather than 0.9% saline, minimises hyperchloraemic metabolic acidosis [71].

Chewing gum has been specifically studied in both open and robotically-assisted cystectomy and results in a decrease in time to first flatus and to first bowel motion [72] [73]. Without swallowing the gum itself, chewing gum together with a regular oral laxative, increases the speed at which normal bowel function returns after major abdominal and pelvic surgery [74]. The addition of antacids with prokinetic benefit (e.g. ranitidine) is beneficial by reducing time to discharge [75]. This does, however, need to be balanced against the theoretical increased risk of significant *Clostridium difficile* infection.

Metoclopramide or erythromycin as prokinetics has been shown to have little benefit [76] [77]. However, metoclopramide is effective in combating nausea which, in turn, improves tolerance of oral intake [78].

There has been recent interest in the use of alvimopan, a peripherally active μ-opioid receptor antagonist. A well-conducted, multicenter RCT in patients undergoing radical cystectomy demonstrated a reduction in the length of hospital stay and cost savings, primarily as a result of a reduced incidence of ileus [79]. Alvimopan is not licensed in the UK (nor has it been studied within ERPs) but is unlikely to have a role in renal or prostate surgery, where paralytic ileus is uncommon.

8.2 Post-operative

Careful attention must be paid to the prevention of post-operative nausea and vomiting (PONV). This will permit immediate access to normal diet and fluids. Patients should be encouraged to eat and drink appetizing, nutritious food on their return from theatre.

After cystectomy, patients should be encouraged to have nutritious fluids, as tolerated, immediately on their return from theatre and to start a sloppy diet from day 1. There is no requirement for routine post-operative intravenous fluid supplementation and over-hydration should be avoided. If intravenous fluids are given during the operative procedure, the need for them should be reviewed regularly with the aim of stopping them as soon as an adequate oral intake is tolerated.

In a patient who is well-nourished pre-operatively (MUST score 0) and eating/drinking normally after surgery, additional nutritional supplementation can be omitted [80]. If the establishment of normal eating and drinking is delayed by more than 24 hours, high-energy oral nutritional supplements should be given.

9 DISCHARGE CRITERIA

It should be emphasised that the primary aim of an ERP is early return to normal function. Discharge criteria rely on the achievement of this basic goal.

The patient must be tolerating a normal diet, have adequate pain control using oral analgesia and be comfortably mobile. Where applicable, they must also be competent with their stoma (conduit) or catheter (neobladder). Patients who have undergone radical cystectomy should open their bowels before discharge.

Equally important, however, is the confidence of the patient and his/her family in the support mechanisms provided by the hospital and community services. The minimum standard of care should involve a follow-up telephone consultation (often nurse-led) and a 24-hour emergency point of contact.

Finally, patients should be informed of “red flag” symptoms, and should have a mechanism for readmission to specialist care.

10 IMPLEMENTATION

A natural resistance to change is inevitable. Introduction of an ERP, therefore, requires education and transformational change across the whole multidisciplinary team: including primary care, anaesthetists, surgeons, specialist nurses, ward staff and allied health professionals. The key to success is full engagement of the team, constantly driven by a core group of ERP leaders (or "champions") whose influence should be expected to outperform simple authority in this area of quality improvement. The group would usually include a lead anaesthetist, surgeon and specialist or ward nurse.

Local consensus, based on the recommendations above, should define an agreed pathway for both patients and staff on a daily basis, and this pathway should be used for prospective audit and service evaluation.

Patient experience should be assessed throughout the journey: spot assessments are more easily carried out than continuous data collection. These assessments are probably best achieved using a patient diary or survey. These can define pre-admission goals and daily post-operative targets; they can also incorporate validated QOL questionnaires for completion on day 7, and after 1 & 3 months [(81)].

11 REFERENCES

1. Kehlet H. Multimodal approach to control postoperative pathophysiology and rehabilitation. Br J Anaesth 1997; 78: 606-617. [Abstract][Back to text]

2. Blick C, Hadway P, Patel N, Lal S, Kelleher, Haldar N, Muneer A. The use of a multimodal enhanced recovery program for patients undergoing radical cystectomy. J Clin Urol 2013; 234: 234-238. [Abstract][Back to text]

3. Smith J et al. The evolution of the Southampton Enhanced Recovery Program for radical cystectomy and the aggregation of marginal gains. BJU Int 2014;114(3): 375-83. [Abstract][Back to Introduction][Back to Post-operative analgesic strategy]

4. Dutton TJ, Daugherty MO, Mason RG, McGrath JS. Implementation of the Exeter enhanced recovery programme for patients undergoing radical cystectomy. BJU Int 2014;113(5): 719-25. [Abstract][Back to Introduction][Back to Post-operative analgesic strategy]

5. Dudderidge TJ, Doyle P, Mayer EK, Taylor J, Agrawal S, Stolzenburg JU, Winkler MH. Evolution of care pathway for laparoscopic radical prostatectomy. J Endourol 2012; 26(6): 660-5. [Abstract][Back to Introduction][Back to Post-operative analgesic strategy]

6. Stewart A, Khafagy R, Lewis RG, Barrie J, Cartledge J. Prolonging the post-op length of stay following laparoscopic nephrectomy. A cautionary tale on the introduction of an integrated care pathway. World Congress of Endourology 2009 (No abstract available). [Back to text]

7. Gordon K, Khan F, McMeekin F, Burns-Cox N. A multi-disciplinary approach to an enhanced recovery programme for nephrectomies. What have we achieved? BAUS Endourology Section Meeting 2014 (No abstract available). [Back to text]

8. Ilie CP, Luscombe CJ, Smith I, Boddy J, Mischianu D, and Golash A. Day case laparoscopic nephrectomy: initial experience. J Med Life 2011; 4(1): 36–39. [Abstract][Back to text]

9. Enhanced recovery length of stay annual summary 2012-2013 available at http://www.hscic.gov.uk/hesdata. [Website][Back to text]

10. Rai MR, Pandit JJ. Day of surgery cancellations after nurse-led pre-assessment in an elective surgical centre: the first 2 years. Anaesthesia 2003; 58(7): 692-9. [Abstract][Back to text]

11. Pre-operative assessment and patient preparation: the role of the anaesthetist. ASGBU Safety Guidelines 2010 available on the website of the Association of Anaesthetists of GB & I at http://www.aagbi.org/sites/default/files/preop2010.pdf. [Website][Back to text]

12. Tonnesen H, Nielsen PR, Lauritzen JB, Moller AM. Smoking and alcohol intervention before surgery: evidence for best practice. Br J Anaesth 2009; 102: 297–306. [Abstract][Back to text]

13. Snowden CP, Prentis J, Jacques B, Anderson H, Manas D, Jones D, Trenell M. Cardiorespiratory fitness predicts mortality and hospital length of stay after major elective surgery in older people. Ann Surg 2013; 257(6): 999-1004. [Abstract][Back to text]

14. Chaudhri S, Brown L, Hassan I, Horgan AF. Preoperative intensive, community-based vs. traditional stoma education: a randomized,controlled trial. Dis Colon Rectum 2005; 48: 504–9. [Abstract][Back to text]

15. Prentis JM et al. Impaired cardiopulmonary reserve in an elderly population is related to postoperative morbidity and length of stay after radical cystectomy. BJU Int 2013; 112: E13-9. [Abstract][Back to text]

16. Wilson RJT, Davies S, Yates D, Redman J, Stone M. Impaired functional capacity is associated with all-cause mortality after major elective intra-abdominal surgery. Br J Anaesth 2010; 105: 297-303. [Abstract][Back to text]

17. Klopfenstein CE, Forster A, Van Gessel E. Anesthetic assessment in an outpatient consultation clinic reduces preoperative anxiety. Can J Anaesth 2000; 47(6): 511-5. [Abstract] [Back to text]

18. Sherlock A, Brownie S. Patients' recollection and understanding of informed consent: a literature review. ANZ J Surg 2014; 84(4): 207-10. [Abstract][Back to text]

19. McClave SA et al. Summary points and consensus recommendations from the North American Surgical Nutrition Summit. J Parenter Enteral Nutr 2013; 37: 99S-105S. [Abstract][Back to text]

20. Guenaga KF, Matos D, Castro AA, Atallah AN, Wille-Jorgensen P. Mechanical bowel preparation for elective colorectal surgery. Cochrane Database Syst Rev 2003; 2: CD001544. [Abstract][Back to Pre-admission clinic][Back to Mobilisation]

21. Xu R, Zhao X, Zhong Z, Zhang L. No advantage is gained by preoperative bowel preparation

in radical cystectomy and ileal conduit: a randomized controlled trial of 86 patients. Int Urol Nephrol 2010; 42: 947-50. [Abstract][Back to text]

22. Brady M, Kinn S, Stuart P. Preoperative fasting for adults to prevent perioperative complications. Cochrane Database Syst Rev 2003; **4**: CD004423. [Abstract][Back to Pre-admission clinic][Back to Pre-operative fasting]

23. Smith I, Kranke P, Murat I et al. European Society of Anaesthesiology. Perioperative fasting in adults and children: guidelines from the European Society of Anaesthesiology. Eur J Anaesthesiol 2011; 28: 556-69. [Abstract][Back to Pre-admission clinic][Back to Pre-operative fasting]

24. Pre-operative assessment and patient preparation, the role of the anaesthetist. Available on the website of the Association of Anaesthetists of Great Britain and Ireland (AAGBI) at http://www.aagbi.org/sites/default/files/preop2010.pdf. [Website][Back to Pre-admission clinic][Back to Pre-operative fasting]

25. Ljungqvist O. Jonathan E. Rhoads lecture 2011: Insulin resistance and enhanced recovery after surgery. J Parenter Enteral Nutr 2-12; 36: 389-98. [Abstract][Back to Pre-admission clinic][Back to Mobilisation]

26. Nygren J. The metabolic effects of fasting and surgery. Best Pract Res Clin Anaesthesiol 2009; 20: 429-38. [Abstract][Back to text]

27. Awad S, Varadhan KK, Ljungqvist O, Lobo DN. A meta-analysis of randomised controlled trials on preoperative oral carbohydrate treatment in elective surgery. Clin Nutr 2013; 32: 34-44. [Abstract][Back to text]

28. Aning J et al. Towards bloodless cystectomy: a 10-year experience of intra-operative cell salvage during radical cystectomy. BJU Int 2012; 110: E608-E613. [Abstract][Back to text]

29. Waters JH, Yazer M, Chen YF, Kloke J. Blood salvage and cancer surgery: a meta-analysis of available studies. Transfusion 2012; 52: 2167-73. [Abstract][Back to text]

30. WHO surgical safety checklist and implementation manual available at http://www.who.int/patientsafety/safesurgery/ss_checklist/en/. [Website][Back to text]

31. Walker KJ, Smith AF. Premedication for anxiety in adult day surgery. Cochrane Database Syst Rev 2009; 7: CD 002192. [Abstract][Back to text]

32. Larson DW, Lovely JK, Cima RR et al. Outcomes after implementation of a multimodal standard care pathway for laparoscopic colorectal surgery. Br J Surg 2014; 101(8): 1023-30. [Abstract][Back to text]

33. Alayed N, Alghanaim N, Tan X, Tulandi T. Preemptive use of Gabapentin in abdominal hysterectomy. Obstet Gynecol 2014; 123(6): 1221-9. [Abstract][Back to text]

34. Schmidt PC, Ruchelli G, Mackey SC, Carroll IR. Perioperative gabapentinoids: choice of agent, dose, timing, and effects on chronic postsurgical pain. Anesthesiology 2013; 119(5): 1215-21. [Abstract][Back to Pre-operative analgesia][Back to Post-operative analgesia]

35. Hosgood SA, Thiyagarajan UM, Nicholson HF, Jeyapalan I, Nicholson ML. Randomized clinical trial of transversus abdominis block versus placebo in live donor nephrectomy.

Transplantation 2012; 94(5): 520-525. [Abstract][Back to text]

36. Dutton TJ, McGrath JS, Daugherty MO. Use of rectus sheath catheters for pain relief in patients undergoing major pelvic urological surgery. BJU Int 2014;113(2): 246-53. [Abstract][Back to Intra-operative neural blockade][Back to Post-operative analgesia]

37. Mukhtar S, Ayres BE, Issa R, Swinn MJ, Perry MJA. Challenging boundaries: an enhanced recovery program for radical cystectomy. Ann R Coll Surg Engl 2013; 95: 200-206. [Abstract][Back to Intra-operative neural blockade][Back to Post-operative analgesia]

38. Pruthi RDS, Chun J, Richman M. Reducing time to oral diet and hospital discharge in patients undergoing radical cystectomy using a perioperative care plan. Urology 2003; 62: 661-665. [Abstract][Back to text]

39. Smith J, Pruthi RS, McGrath JS. Enhanced recovery programmes for patients undergoing radical cystectomy. Nat Rev Urol 2014; 11(8): 437-44. [Abstract][Back to text]

40. Biglarnia AR, Tufveson G, Lorant T, Lennmyr F, Wadstrom J. Efficacy and safety of continuous local infusion of ropivacaine after retroperitoneoscopic live donor nephrectomy. Am J Transplant 2011;11(1): 93-100. [Abstract][Back to text]

41. Mathuram Thiyagarajan U, Bagul A, Nicholson ML. Pain management in laparoscopic donor nephrectomy: a review. Pain Res Treat 2012; 201852. doi: 10.1155/2012/201852. [Abstract][Back to text]

42. Bundgaard-Nielsen M, Secher NH, Kehlet H. Liberal vs restrictive perioperative fluid therapy-a critical assessment of the evidence. Acta Anaesthesiol Scand 2009; 53: 843-851. [Abstract][Back to text]

43. Knott A et al. Consensus views on implementation and measurement of enhanced recovery after surgery in England: Delphi study. BMJ Open 2012; 2 pii: e001878. [Abstract][Back to text]

44. Pillai P et al. A Double-blind randomized controlled clinical trial to access the effect of Doppler optimized intraoperative fluid management on outcome following radical cystectomy. J Urol 2011; 186: 2201-2206. [Abstract][Back to text]

45. Moola S, Lockwood C. Effectiveness of strategies for the management and/or prevention of hypothermia within the adult perioperative environment. Int Evid Based Healthcare 2011; 9: 337-45. [Abstract][Back to text]

46. Camus Y, Dleva E, Cohen S, Lienhart A. The effects of warming intravenous fluids on intraoperative hypothermia and postoperative shivering during prolonged abdominal surgery. Acta Anaesthesiol Scand 1996; 40: 779-782. [Abstract][Back to text]

47. Li K et al. Systematic review and meta-analysis of comparative studies reporting early outcomes after robot-assisted radical cystectomy versus open radical cystectomy. Cancer Treat Rev 2013; 39: 551-60. [Abstract][Back to text]

48. Nix J, Smith A, Kurpad, R, Nielsen ME, Wallen EM, Pruthi RS. Prospective randomized controlled trial of robotic versus open radical cystectomy for bladder cancer: perioperative and pathologic results. Eur Urol 2010: 57: 196-201. [Abstract][Back to text]

49. BAUS complex operations audit 2011 & 2012. Available on the BAUS website at http://www.baus.org.uk. [Website][Back to text]

50. Coxib and traditional NSAID trialists' collaboration. Vascular and upper gastrointestinal effects of non-steroidal anti-inflammatory drugs: meta-analyses of individual participant data from randomised trials. Lancet 2013; 382: 769-79. [Abstract][Back to text]

51. Klein M, Gogenur I, Rosenberg J. Postoperative use of non-steroidal anti-inflammatory drugs in patients with anastomotic leakage requiring reoperation after colorectal resection: cohort study based on prospective data. BMJ 2012; 345: e6166. [Abstract][Back to text]

52. Ng CK, Kauffman EC, Lee MM, Otto BJ, Portnoff A, Ehrlich JR, Schwartz MJ, Wang GJ, Scherr DS. A comparison of postoperative complications in open versus robotic cystectomy. Eur Urol 2010 Feb; 57(2): 274-81. [Abstract][Back to text]

53. Ilie CP1, Luscombe CJ, Smith I, Boddy J, Mischianu D, Golash A. Day case laparoscopic nephrectomy. J Endourol 2011; 25(4): 631-4. [Abstract][Back to text]

54. Abaza R, Shah K. A single overnight stay is possible for most patients undergoing robotic partial nephrectomy. Urology 2013; 81(2): 301-6. [Abstract][Back to text]

55. Khemees TA, Nasser SM, Abaza R. Clinical pathway after robotic nephroureterectomy: omission of pelvic drain with next-day catheter removal and discharge. Urology 2014; 83(4): 818-23. [Abstract][Back to Drains in pelvic surgery][Back to Urinary catheters in renal surgery]

56. Ilie CP1, Luscombe CJ, Smith I, Boddy J, Mischianu D, Golash A. Routine day-case laparoscopic pyeloplasty: a paradigm shift? J Endourol 2011; 25(5): 797-801. [Abstract][Back to Drains in pelvic surgery][Back to Urinary catheters in renal surgery]

57. Karliczek A, Jesus EC, Matos D, Castro AA, Atallah AN, Wiggers T. Drainage or nondrainage in elective colorectal anastomosis: a systematic review and meta-analysis. Colorectal Dis 2006; 8: 259–265. [Abstract][Back to text]

58. Kouba E, Sands M, Lentzx A, Wallen E, Pruthi RS. A comparison of the Bricker versus Wallace ureteroileal anastomosis in patients undergoing urinary diversion for bladder cancer. J Urol 2007; 178: 945-8; discussion 948-9. [Abstract][Back to text]

59. Mattei A, Birkhaeuser FD, Baermann C, Warncke SH, Studer UE. To stent or not to stent perioperatively the ureteroileal anastomosis of ileal orthotopic bladder substitutes and ileal conduits? Results of a prospective randomized trial. J Urol 2008; 179(2): 582-6. [Abstract][Back to text]

60. Mullins JK, Guzzo TJ, Ball MW, Pierorazio PM, Eifler J, Jarrett TW, Schoenberg MP, Bivalacqua TJ. Ureteral stents placed at the time of urinary diversion decreases postoperative morbidity. Urol Int 2012; 88(1): 66-70. [Abstract][Back to text]

61. Cerantola Y, Valerio M, Hubner M, Iglesias K, Vaucher L, Jichlinski P. Are patients at nutritional risk more prone to complications after major urological surgery? J Urol 2013; 190: 2126-32. [Abstract][Back to text]

62. Hausel J, Nygren J, Lagerkranser M, Hellström PM, Hammarqvist F, Almström C, Lindh A, Thorell A, Ljungqvist O. A carbohydrate-rich drink reduces preoperative discomfort in elective surgery patients. Anesth Analg 2001; 93(5): 1344-50. [Abstract][Back to text]

63. Svanfeldt M et al. Randomized clinical trial of the effect of preoperative oral carbohydrate treatment on postoperative whole-body protein and glucose kinetics. Br J Surg 2007; 94: 1342-1350. [Abstract][Back to text]

64. Awad S, Varadhan KK, Ljungqvist O, Lobo DN. A meta-analysis of randomised controlled trials on preoperative oral carbohydrate treatment in elective surgery. Clin Nutr 2013; 32: 34-44. [Abstract][Back to text]

65. Gustafsson UO, Nygren J, Thorell A, Soop M, Hellström PM, Ljungqvist O, Hagström-Toft E. Pre-operative carbohydrate loading may be used in type 2 diabetes patients. Acta Anaesthesiol Scand 2008; 52(7): 946-51. [Abstract][Back to text]

66. Yuh BE, Nazmy M, Ruel NH, Jankowski JT, Menchaca AR, Torrey RR, Linehan JA, Lau CS, Chan KG, Wilson TG. Standardized analysis of frequency and severity of complications after robot-assisted radical cystectomy. Eur Urol 2012; 62(5): 806-13. [Abstract][Back to text]

67. Ng CK, Kauffman EC, Lee MM, Otto BJ, Portnoff A, Ehrlich JR, Schwartz MJ, Wang GJ, Scherr DS. A comparison of postoperative complications in open versus robotic cystectomy. Eur Urol 2010; 57(2): 274-81. [Abstract][Back to text]

68. Nelson R, Edwards S, Tse B. Prophylactic nasogastric decompression after abdominal surgery. Cochrane Database of Systematic Reviews 2007; 3: CD004929 (2007). [Abstract][Back to text]

69. Schroeder D, Gillanders L, Mahr K, Hill GL. Effects of immediate postoperative enteral nutrition on body composition, muscle function, and wound healing. J Parenter Enter Nutr 1991; 15: 376–83. [Abstract][Back to text]

70. Osland E, Yunus RM, Khan S, Memon MA. Early versus traditional postoperative feeding in patients undergoing resectional gastrointestinal surgery: a meta-analysis. J Parenter Enter Nutr 2011; 35: 473-487. [Abstract][Back to text]

71. Mythen MG, Swart M, Acheson N, Crawford R, Jones K, Kuper M, McGrath JS, Horgan A. Perioperative fluid management: consensus statement from the enhanced recovery partnership. Perioperative Medicine 2012; 1: 2. [Abstract][Back to text]

72. Choi H et al. Chewing gum has a stimulatory effect on bowel motility in patients after open or robotic radical cystectomy for bladder cancer: a prospective randomized comparative study. Urology 2011; 77: 884–890. [Abstract][Back to text]

73. Kouba EJ, Wallen EM, Pruthi RS. Gum chewing stimulates bowel motility in patients undergoing radical cystectomy with urinary diversion. Urology 2007; 70: 1053–1056. [Abstract][Back to text]

74. Fitzgerald JE and Ahmed I. Systematic review and meta-analysis of chewing-gum therapy in the reduction of postoperative paralytic ileus following gastrointestinal surgery. World J Surg 2009; 33: 2557–2566. [Abstract][Back to text]

75. Recart A, Duchene D, White PF, Thomas T, Johnson DB, Cadeddu JA. Efficacy and safety of fast-track recovery strategy for patients undergoing laparoscopic nephrectomy. J Endourol 2005; 19(10): 1165-9. [Abstract][Back to text]

76. Traut U et al. Systemic prokinetic pharmacologic treatment for postoperative adynamic ileus following abdominal surgery in adults. Cochrane Database Syst Rev 2008; 1: CD004930. [Abstract][Back to text]

77. Lightfoot AJ, Eno M, Kreder KJ, O'Donnell MA, Rao SS, Williams RD. Treatment of postoperative ileus after bowel surgery with low-dose intravenous erythromycin. Urology 2007; 69: 611-5. [Abstract][Back to text]

78. Pruthi RS, Nielsen M, Smith A, Nix J, Schultz H, Wallen EM. Fast track program in patients undergoing radical cystectomy: results in 362 consecutive patients. J Am Coll Surg 2010; 210: 93–99. [Abstract][Back to text]

79. Lee CT, Chang SS, Kamat AM et al. Alvimopan accelerates gastrointestinal recovery: a multicenter randomized placebo-controlled trial. Eur Urol 2014; 66(2): 265-72. [Abstract][Back to text]

80. Andersen HK, Lewis SJ, and Thomas S. Early enteral nutrition within 24h of colorectal surgery versus later commencement of feeding for postoperative complications. Cochrane Database Syst Rev 2006; 18: CD004080. [Abstract][Back to text]

81. Karl A, Buchner A, Becker A, Staehler M, Seitz M, Khoder W, Schneevoigt B, Weninger E, Rittler P, Grimm T, Gratzke C, Stief C. A new concept for early recovery after surgery for patients undergoing radical cystectomy for bladder cancer: results of a prospective randomized study. J Urol 2014; 191(2): 335-40. [Abstract][Back to text]

12 APPENDIX

12.1 Procedure-specific checklists

12.1.1 Renal surgery checklist

Procedure-specific checklists have been prepared as summary aids for clinicians and nurses managing patients undergoing minimal access renal surgery for the procedures below:

- Minimal access radical & partial nephrectomy (including robotic)
- Minimal access pyeloplasty
- Minimal access nephro-ureterectomy

12.1.2 Pelvic surgery checklist

Procedure-specific checklists have been prepared as summary aids for clinicians and nurses managing patients undergoing major pelvic surgery for the procedures below:

- Minimal access radical prostatectomy (including robotic)
- Radical cystectomy (including minimal access & robotic assisted)

12.2 Information for clinicians

- Each procedure-specific checklist consists of two pages of A4-sized paper with information about the various stages in ER, from primary care to discharge and follow-up, on the first page, and information about medications recommended at the various stages on the second. We suggest that each checklist should be printed double-sided (and, perhaps, laminated) for quick reference in clinics, wards, operating theatres & GP surgeries.
- The information about medications is intended primarily for both junior doctors and for urology trainees as an aid to prescribing in patients undergoing urological surgery on an ER pathway. As such, they should be used both in conjunction with existing local protocols, and after discussion with senior surgeons/anaesthetists.
- Always check for allergies or drug sensitivity, and for interactions with existing medications before prescribing [(e)].

13 DISCLAIMER

While every effort has been made to ensure the accuracy of the information contained in this guideline, no guarantee can be given that all errors and omissions have been excluded.

No responsibility for loss occasioned by any person acting, or refraining from action, as a result of the material in this publication can be accepted by the British Association of Urological Surgeons Limited.

(e) An easy-to-use drug interaction website (by Medscape) can be accessed here