available at www.sciencedirect.com
journal homepage: www.europeanurology.com

European Association of Urology

Platinum Priority – Bladder Cancer
Editorial by XXX on pp. x–y of this issue

Prospective Implementation of Enhanced Recovery After Surgery Protocols to Radical Cystectomy

Karl H. Pang[a,b], *Ruth Groves*[c], *Suresh Venugopal*[d], *Aidan P. Noon*[b], *James W.F. Catto*[a,b,*]

[a] *Academic Urology Unit, University of Sheffield, Sheffield, UK;* [b] *Department of Urology, Sheffield Teaching Hospitals NHS Trust, Sheffield, UK;* [c] *Department of Anaesthetics, Sheffield Teaching Hospitals NHS Trust, Sheffield, UK;* [d] *Department of Urology, Chesterfield Royal and North Derbyshire Hospital, Derbyshire, UK*

Article info

Article history:
Accepted July 26, 2017

Associate Editor:
Giacomo Novara

Statistical Editor:
Andrew Vickers

Keywords:
Urothelial cancer
Bladder cancer
Radical cystectomy
ERAS

Abstract

Background: Multimodal enhanced recovery after surgery (ERAS) regimens have improved outcomes from colorectal surgery.
Objective: We report the application of ERAS to patients undergoing radical cystectomy (RC).
Design, setting, and participants: Prospective collection of outcomes from consecutive patients undergoing RC at a single institution.
Intervention: Twenty-six components including prehabilitation exercise, same day admission, carbohydrate fluid loading, targeted intraoperative fluid resuscitation, regional local anaesthesia, cessation of nasogastric tubes, omitting oral bowel preparation, avoiding drain use, early mobilisation, chewing gum use, and audit.
Outcome measurements and statistical analysis: Primary outcomes were length of stay and readmission rate. Secondary outcomes included intraoperative blood loss, transfusion rates, survival, and histopathological findings.
Results and limitations: Four hundred and fifty-three consecutive patients underwent RC, including 393 (87%) with ERAS. Length of stay was shorter with ERAS (median [interquartile range]: 8 [6–13] d) than without (18 [13–25], $p < 0.001$). Patients with ERAS had lower blood loss (ERAS: 600 [383–969] ml vs 1050 [900–1575] ml for non-ERAS, $p < 0.001$), lower transfusion rates (ERAS: 8.1% vs 25%, chi-square test, $p < 0.001$), and fewer readmissions (ERAS: 15% vs 25%, chi-square test, $p = 0.04$) than those without. Histopathological parameters (eg, tumour stage, node count, and margin state) and survival outcomes did not differ with ERAS use (all $p > 0.1$). Multivariable analysis revealed ERAS use was ($p = 0.002$) independently associated with length of stay.
Conclusions: The use of ERAS pathways was associated with lower intraoperative blood loss and faster discharge for patients undergoing RC. These changes did not increase readmission rates or alter oncological outcomes.
Patient summary: Recovery after major bladder surgery can be improved by using enhanced recovery pathways. Patients managed by these pathways have shorter length of stays, lower blood loss, and lower transfusion rates. Their adoption should be encouraged.

* Corresponding author. Academic Units of Urology and Molecular Oncology, G Floor, The Medical School, University of Sheffield, Beech Hill Road, Sheffield, S10 2RX, UK. Tel. +44 0 114 226 1229; Fax: +44 0 114 271 2268.
E-mail address: j.catto@sheffield.ac.uk (James W.F. Catto).

http://dx.doi.org/10.1016/j.eururo.2017.07.031
0302-2838/

1. Introduction

Radical cystectomy (RC) with pelvic lymph node dissection is the gold-standard treatment for muscle invasive bladder cancer (BC) [1], plays a key role in managing local failure after radiotherapy [2], and is an option for high-risk local nonmuscle invasive BC [3]. RC is a morbid procedure that is often performed in older patients with coexisting cardiopulmonary disease. Many patients develop postoperative complications, including 13% (grade 3–5) that require further intervention [4]. Consequently, patients who could benefit from RC do not always receive this option [5,6]. Whilst centralisation of major cancer services increases radical treatments and subsequent outcomes [7], the morbidity from RC still limits its use.

In colorectal surgery, the use of multimodal Enhanced Recovery after Surgery (ERAS) regimens has reduced postoperative morbidity and length of stay [8,9]. ERAS introduces a number of preoperative, perioperative, and postoperative steps to improve the patient pathway [10]. Many ERAS components are generic to abdominal surgery and so have been implemented in RC without prospective evidence [11]. However, RC includes surgery to the urinary and gastrointestinal tracts and so not all ERAS components may be suitable.

There have been several reports of ERAS in RC cohorts [10–14] and one randomised controlled trial (RCT) [15]. This RCT found ERAS improved quality of life and reduced morbidity in patients undergoing RC, but did not shorten postoperative length of stay (LOS). Here we report the prospective adoption of ERAS in a large UK centre, where the opioid receptor antagonist alvimopan [16] is not available and health care design does not incentivise rapid discharge.

2. Materials and methods

2.1. Patients

Consecutive patients undergoing RC and urinary reconstruction were enrolled in a prospective institutional database. From February 2007 to October 2016, a 25-point ERAS regimen was implemented. The regimen (Table 1) was derived from available evidence and practice within colorectal surgery [10]. Data were collected prospectively and all patients undergoing RC were included in the study. The use of ERAS reflected the date of surgery. During the transition period, patients were identified as using the ERAS pathway if they had preoperative carbohydrate loading, were allowed fluids until 2 h prior to surgery, planned to avoid nasogastric tubes (NGT), used a smaller incision had early postoperative mobilisation with diet on the ward.

2.2. ERAS protocol

2.2.1. Preoperative

Counselling in the outpatient setting was performed by the surgeon (JWFC), a cancer nurse specialist, an anaesthetist (RG) when needed, and a stoma therapist. Typical consultations included wide ranging treatment discussions and lasted 30–45 min. Patients were advised to maintain a normal diet until the night before surgery, to reduce cigarette smoking and alcohol intake, and were given an information booklet regarding their expected recovery. Increasing exercise activity (prehabilitation) was stressed as an important aspect of recovery and patients were asked to walk 1 h/d (once or twice) between their initial consultation and surgery. Patients whose anaesthetic fitness was uncertain were reviewed by an anaesthetist and cardiopulmonary exercise (CPEX) testing used in selective cases. Premorbidities were optimised where possible. Anaemia was treated with intravenous iron transfusion. Prior to surgery, patients attended clinic for stoma marking, to obtain six carbohydrate dinks (eg, PreOp, Nutricia), and to collect a single injection of low molecular weight heparin (eg, dalteparin 5000 IU subcutaneously). Patients self-administered dalteparin the evening before surgery and undertook carbohydrate fluid loading for the 18 h prior to surgery. Patients were allowed oral fluids up to 2 h preoperatively and food 6 h preoperatively.

2.2.2. Peroperative

At induction, a preplanned anaesthetic protocol was used (Supplementary Table 1). Important elements included limited fluid administration targeted to losses, the use of vasopressors to maintain blood pressures, the avoidance of NGT, and hypothermia (eg, using Bair Hugger). Typically, only 500–1000 ml intravenous crystalloid was administered prior to bladder removal. Intraoperative steps taken to reduce the impact of surgery included the use of small incisions (typically 10 cm) or robot assisted laparoscopy, the use of vessel sealers (eg, Ligasure impact), clips, and fastidious haemostasis. Postoperative analgesia commenced with the insertion of rectus sheath local anaesthetic blocks (usually 60 ml of 0.125% bupivacaine) and tunnelled cannulae (lateral and superior to the incision prior to wound closure) for a 48-h bupivacaine infusion. Closure was performed using a 2/0 polydioxanone rectus sheath suture and 4/0 monocryl subcuticular skin suture. Antibiotic prophylaxis (1.2 g intravenous coamoxiclav) was administered for 24 h in men and for 48 h in women (due to higher contamination from vaginal flora). Deep vein thrombosis prophylaxis was administered from 6–12 h prior to surgery and for at least 28 d after surgery or until discharge (whichever was longer).

2.2.3. RC

In men, cystoprostatectomy was performed in an antegrade manner to include the seminal vesicles. In women, anterior pelvic exenteration included the uterus, fallopian tubes, and anterior vaginal wall. Ovaries were spared, when possible, in younger women and in those with low-stage disease. Lymphadenectomy was performed after bladder removal and included the obturator, internal, and external iliac chains to the level of the ureteric crossing of the mid common iliac vessels. Ureteroileal anastomosis was by a Bricker technique and the Studer technique used for a neobladder.

2.2.4. Postoperative

Management was undertaken using a prespecified ERAS regimen (Table 1). During the regimen's introduction, an ERAS nurse audited compliance. On postoperative d (POD) 1, patients were allowed chewing gum, one clear boiled sweet/candy per h, and 30-ml clear nonfizzy oral fluids per h, as comfort allowed. Intake was reduced in patients feeling nauseous or uncomfortable. Patients were sat out of bed and encouraged to walk 10–20 m. Additional analgesia was allowed through on demand patient controlled analgesic intravenous opiates. On POD 2, patients aimed to walk 100 m and were allowed to drink clear fluids as tolerated. Nausea or vomiting were treated with reduced fluid intake and rest, rather than NGT. NGT were administered for repeated vomiting with epigastric discomfort or in the presence of ileus/obstruction. Light diet was introduced when the patient passed flatus or had a bowel movement. Patients without flatus or bowel movement on POD 3, had a glycerine suppository administered per rectum. Total parenteral nutrition was started on patients not tolerating diet by POD 7, or sooner if

Please cite this article in press as: Pang KH, et al. Prospective Implementation of Enhanced Recovery After Surgery Protocols to Radical Cystectomy. Eur Urol (2017), http://dx.doi.org/10.1016/j.eururo.2017.07.031