Bladder injuries in emergency/expedited laparoscopic surgery in the absence of previous surgery: a case series

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ABSTRACT

INTRODUCTION The use of laparoscopy as a diagnostic and therapeutic tool is being used increasingly in the emergency setting with many of these procedures being performed by trainees. While the incidence of iatrogenic injuries is reported to be low, we present six emergency or expedited cases in which the bladder was perforated by the suprapubic trocar.

CASES Three cases were related to the management of appendicitis, two to negative diagnostic laparoscopies for lower abdominal pain and one to an ectopic pregnancy. Management of the bladder injuries varied from a urinary catheter alone to laparotomy with debridement of the abdominal wall due to sepsis and later reconstruction. Four of the six cases were performed by registrars.

CONCLUSIONS Although the incidence of bladder injury is low, its importance is highlighted by the large number of laparoscopies being performed. In addition to catheterisation of the patient, care must be taken with the insertion of low suprapubic ports and consideration should be made regarding alternative sites. Adequate laparoscopic supervision and training in port site planning is required for surgical trainees.

KEYWORDS

Laparoscopic – Emergency – Iatrogenic – Training – Trocar – Bladder

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The use of laparoscopy as a diagnostic and therapeutic tool is used increasingly in the emergency setting with many of these procedures being performed by surgical trainees. Complications arising from primary and secondary port insertion in the presence of previous surgery are well recognised and documented.^{1,2} However, in cases with no history of previous surgery, iatrogenic injury of abdominal viscera, particularly the bladder, from secondary laparoscopic ports is low.^{3,4} While previous abdominal or pelvic surgery via a low transverse or low midline incision increases the risk of bladder injury,^{5–7} this is not a prerequisite for this type of injury. Regardless of the presence or absence of previous surgery, various strategies can be employed to reduce the initial risk on port insertion such as catheterisation immediately prior to surgery.

We present six cases of young adults with no previous history of surgery treated in the emergency or expedited setting using laparoscopy that resulted in trocar injuries to the bladder, some with significant morbidity.

Case 1

A 39-year old woman was admitted as an emergency with a suspected cornual ectopic pregnancy. After catheterisation with an in/out catheter, the diagnosis was confirmed at laparoscopy (performed by a consultant) and a laparoscopic salpingectomy was performed. The patient became severely unwell 48 hours post-operatively and on day two underwent a laparotomy for suspected peritonitis. The laparotomy revealed no obvious intra-abdominal trauma or infection. On further inspection, a 5mm through and through injury to the dome of the bladder was diagnosed. The posterior wall was repaired and a suprapubic catheter inserted through the anterior perforation. Thereafter, the patient was transferred to the intensive care unit. Despite this, she remained acutely unwell and septicemic. Computed tomography (CT) demonstrated subcutaneous gas suggesting gangrene of the abdominal wall. This required multiple extensive debridements and later reconstructive surgery. Coliforms and β -haemolytic streptococcus were subsequently cultured.

Case 2

A 35-year old woman underwent a laparoscopic appendicectomy (performed by a registrar), having been pre-catheterised with an in/out catheter prior to the procedure. Three days later, she re-presented with lower abdominal pain as well as suprapubic and bilateral flank bruising. Her haemoglobin was 5.0g/dl. CT of the abdomen showed a suprapubic extraperitoneal collection consistent with blood. The extraperitoneal haematoma was drained radiologically but when the drain fluid became straw coloured, cystography confirmed injury to the bladder. This was repaired at laparotomy.

Case 3

A 29-year-old man underwent an open appendicectomy and was discharged the following day. He was admitted to a different hospital on the second post-operative day with abdominal pain and sepsis. A diagnostic laparoscopy was performed (by a consultant) where a necrotic piece of tissue and purulent peritonitis was found. On extraction of the suprapubic port, it was noted that the suprapubic trocar had perforated the bladder. This was repaired laparoscopically at the time of surgery with no sequelae.

Case 4

A 40-year-old woman underwent a laparoscopic appendicectomy (performed by a registrar). Prior to the procedure, she had an in/out urinary catheter. On removing the suprapubic port, it was noticed that the bladder had been perforated by the trocar. The urologists were called and repaired the injury through a Pfannenstiel incision.

Case 5

A 27-year-old woman underwent a negative diagnostic laparoscopy (performed by a registrar) for lower abdominal pain. Pre-operative catheterisation was performed. The lady re-presented at three days with lower abdominal pain and a C-reactive protein level of 400mg/ml. CT identified an extraperitoneal collection and cystography confirmed a bladder injury. This was treated conservatively by urinary catheterisation without sequelae.

Case 6

A 20-year old woman underwent a negative diagnostic laparoscopy (performed by a registrar) for abdominal pain. Pre-operative catheterisation was not performed. She was readmitted on day two with lower abdominal pain and urine leaking from the umbilical port wound. CT cystography showed contrast leaking from the bladder. This was treated conservatively by urinary catheterisation.

Overview of cases

During the time period in which the six iatrogenic bladder injuries occurred, 1,671 patients underwent a laparoscopic

procedure in the hospitals concerned, making the incidence 0.36%. Four of the iatrogenic bladder injuries were caused during an emergency procedure, two during expedited cases and none during elective surgery. Four of the six cases were performed by training registrars.

Discussion

Laparoscopy plays a useful role in the diagnosis and treatment of patients with acute lower abdominal pain. Its popularity has been attributed to its ability to supersede radiological imaging in terms of diagnostic specificity and to facilitate treatment in the same setting. This case series indicates the risk and potential severity of iatrogenic laparoscopic trocar injuries in young patients with no past significant surgical history. In this series, the incidence of this injury was only 0.36%. When one considers the number of laparoscopies being performed and the potential severity of this complication, its relevance is highlighted.

Furthermore, it is an avoidable injury in patients with no history of previous surgery. All but one of the patients had pre-operative catheterisation, indicating that this does not suffice to prevent bladder injury although it appreciably prevents many more injuries occurring. Despite the appeal of hiding a 5mm port site scar in the pubic hairline, careful attention must be paid to the point of insertion. We would encourage careful laparoscopic examination of the suprapubic area in order to identify the bladder prior to insertion of the suprapubic trocar under direct vision.

Bladder injury may also occur if a urachal remnant is injured by the suprapubic trocar. Although this is rare, with the incidence of a patent urachus reported to be 3 per 100,000 births,⁸ this may have been the cause of bladder injury in Case 6.

The management of the bladder injuries in this series ranged from catheterisation to laparotomy, with the management decision appearing to be mainly related to the perceived size of the bladder defect. The patients treated conservatively by catheterisation in this series recovered with minimal sequelae. The literature is unclear regarding the optimal treatment of this injury. We would argue that the key is early recognition of the injury. For small defects, catheterisation seems sufficient while for larger defects, bladder repair should be carried out laparoscopically with subsequent catheterisation until the bladder has healed. Cystography may be useful prior to removal of the catheter.

Conclusions

Four of the procedures were performed by non-consultant staff. The use of laparoscopy in emergency surgery is a new tool for many trainees. Laparoscopic training for many has been limited and informal. We consider it essential that all surgical trainees are given didactic teaching on diagnostic laparoscopy in the acute setting early in their career. This should include initial training on a formal laparoscopic course prior to clinical work. Following this, it is imperative that trainees are supervised adequately with formal feed-

back following each case until competence is reached. As part of attaining this competence, trusts could set a minimum number of cases (arguably 20 cases) that need to be performed under supervision until trainees are permitted to operate with the supervisor unscrubbed.

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