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RESEARCH ARTICLE

LAPROSCOPY-ASSOCIATED URINARY BLADDER INJURY: CASE REPORT

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ABSTRACT

Background: Bladder injury is a rare complication of laparoscopic surgery, but it can have severe consequences. Therefore, timely and efficient management of such iatrogenic bladder injuries is important. The present case report describes the occurrence, diagnosis, and management of an iatrogenic bladder injury that was diagnosed after laparoscopic appendectomy. **Case Report:** a 17-year-old girl, presented to emergency department with lower abdominal pain shifted to right iliac fossa. After full investigation she was diagnosed as acute appendicitis. Then was taken to operating theatre and underwent laparoscopic appendectomy. Post-operative course was uneventful and she was discharged home in good condition. Patient presented again to the emergency department complaining of severe lower abdominal pain and peritoneal signs. After investigations she was diagnosed to have bladder injury right below suprapubic trocar insertion site. Diagnoses of iatrogenic bladder injury was made and patient was treated accordingly. **Conclusion:** Iatrogenic injury to the bladder during laparoscopic procedure is a known complication, especially when inserting a suprapubic trocar. It is important that during a procedure such as laparoscopic appendectomy to decompress the urinary bladder prior to procedure. Insertion should always be under direct visualization. And to know alternative ports insertion site to avoid bladder injury. Intraoperative identification of bladder injury is critical to achieve best outcomes, but if injury was occult then patient can present delayed with non-specific symptoms. Once a diagnosis is reached then treatment will depend on size of defect and symptoms of the patient.

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INTRODUCTION

Minimally invasive surgical techniques, such as laparoscopy, have been of tremendous benefit for patients as they have reduced the level of postoperative pain and length of hospital stay. However, laparoscopic surgery has also introduced new dilemmas and pitfalls for surgeons. The complications associated with laparoscopic surgery are potentially serious, as the instruments used can cause visceral organ injury, including perforation and damage to deep structures.(2) In fact, the National Patient Safety Association (NPSA) reported in 2010 that in the preceding seven years, there were 48 serious incidents and 11 deaths caused by deterioration of the patient's condition postoperatively. (3) Bladder injury is a rare complication of laparoscopic surgery that is estimated to occur in 0.5% of all general surgery laparoscopic procedures (4) and in 2% of gynecology procedures. (1) Often, these injuries are diagnosed intraoperatively and a bladder suture is performed. However, there are reports of delayed diagnosis of bladder injury after gynecological surgery.(5) Here, we add to the literature on this rare laparoscopy-associated complication by reporting an unrecognized complication that occurred after a routine laparoscopic procedure for a perforated appendix, and discuss the measures that can be taken to minimize the risk of iatrogenic visceral injury.

CASE REPORT

A 17-year-old female presented to the emergency department with abdominal pain that she had been experiencing for 1 day. The pain had started in the periumbilical region and shifted to the right iliac fossa. It was not relieved by oral over-the-counter analgesics, and it was aggravated by even minimal physical activity. Additionally, the pain was associated with nausea, vomiting, and loss of appetite. However, the patient did not have fever, diarrhea, dysuria, or vaginal discharge. Her last menstrual period had occurred 2 weeks before presentation, and she did not report any menstrual irregularities. In the past, she had been diagnosed with familial Mediterranean fever and was placed on a regimen of anakinra (Kineret) and colchicine with good compliance. She had no previous history of abdominal surgeries. On examination, she appeared dehydrated and was in pain, but her vital signs were normal. Her abdomen was soft and lax, and tenderness and rebound tenderness were noted in the right iliac fossa. Bowel sounds were also audible. The initial blood workup revealed a normal white cell count of $9.0 \times 10^9/L$. Urinalysis showed that she was negative for β -human chorionic gonadotrophin, nitrites, and leucocytes, and the findings of abdominal radiography were unremarkable. Computerized tomography scan of the abdomen showed dilation of the appendix at 1.3 cm in diameter accompanied by minimal fat stranding and multiple reactive lymph nodes.

These findings were indicative of acute appendicitis. She was admitted to the general surgery department for laparoscopic surgery for acute non-complicated appendicitis. Patient and family was informed about the procedure and the possible complication and informed consent were obtained. In the operating room, patient received intravenous antibiotics and a Foleys catheter was inserted. As for any laparoscopic procedure, the abdomen was prepped in a sterile manner. First, a supra-umbilical incision was made, and then, using a modified Hasson technique, a 5-mm bladeless trocar was inserted and used as an access for a 5-mm 30-degree scope. Then, a 5-mm bladed trocar was inserted under direct observation in the suprapubic region. Finally, a 10-mm bladed trocar was inserted in midpoint between left anterior superior iliac spine and umbilicus "reverse Mcburney's point" Laparoscopic exploration revealed a grossly inflamed appendix with minimal pus in the pelvic region and minimal adhesions. Meticulous dissection of the appendix from the surrounding structures was carried out using a laparoscopic Maryland grasper, which was also used to dissect and strip the mesoappendix from the appendix. The base of the appendix was identified, and two endoloops were applied. The appendix was then dissected and divided using laparoscopic scissors and removed through the left 10mm port protected with an endobag. This was followed by local abdominal washout, and removal of all the trocars under direct visual observation. There were no complications, and the skin was closed with skin clips and a simple dressing was applied.

The following day, the patient was improving clinically and biochemically. She had no active complaints, and was tolerating orally well, passed flatus and bowel motion. She was discharged from the hospital with a prescription of oral antibiotics. Her histopathology report was indicative of acute gangrenous appendicitis, which confirms the preoperative diagnosis. Three days later, the patient presented to the emergency department with abdominal distension and generalized abdominal pain that was radiating to the back, along with nausea and vomiting. She complained of severe burning micturition, urinary urgency, and oliguria. On examination, the abdomen was found to be mildly distended, and marked tenderness was noted in the lower abdomen, mainly in the suprapubic region, with evidence of localized peritonitis. Blood workup indicated high urea (9.8 mmol/L) and creatinine (296 μ mol/L) levels, but she did not have leukocytosis and her hemoglobin level was normal. Abdominal and pelvic CT scan with no contrast showed the presence of a considerable amount of high-density fluid that occupied an area 5 cm \times 4 cm anterior to the urinary bladder, beneath the site of the suprapubic port, and had multiple air pockets (Figure 1).



Figure 1. CT scan showing a significant amount of free fluid in the abdomen

Urinary catheter insertion was performed for drainage of urine, and the patient's abdominal pain significantly improved. Next, ultrasound-guided insertion of an abdominal pigtail catheter was performed for drainage of the abdominal fluid, which had a clear yellow appearance (Figure 2 & 3). Analysis of the drained fluid showed that it had high levels of urea (10.2 mmol/L) and creatinine (586 μ mol/L). The following day, the patient showed dramatic improvement, and her abdominal pain and distention had subsided. Further, the abdominal fluid drainage rate was 3.5 L/24 h, and the fluid had a clear yellow appearance. Delayed computerized tomography scan with intravenous contrast administration done after abdominal fluid drainage to rule out bladder injury and indicated a small wall defect in the bladder dome with intraperitoneal leakage of contrast (Figure 4).



Figure 2. Fluid drainage from the abdomen and urinary bladder. The upper bag contains the fluid drained from the abdomen, and the lower bag contains urine



Figure 3. The color of aspirated fluid sample from the abdomen

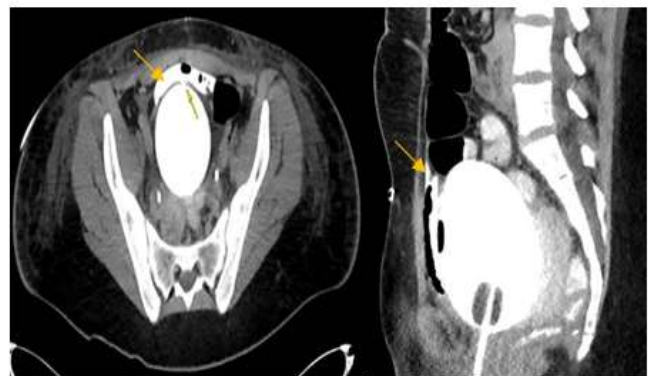


Figure 4. Delayed contrast CT scan demonstrating contrast leak (indicated by the yellow arrow) from the wall of the urinary bladder

The urology surgery team assessed the patient, and decided to continue with conservative management with the abdominal and urinary catheters and drainage in place. During her hospital stay, urine output and renal function were monitored and found to be within normal limits, and the abdominal drain output decreased to 50 ml/day. The abdominal drain was removed, and the patient was discharged with the urinary catheter in place. A follow-up cystogram taken after 2 weeks revealed that the urinary bladder had a regular outline with no evidence of contrast leakage into the abdomen (Figure 5). The urinary catheter was removed, as the patient showed good recovery.

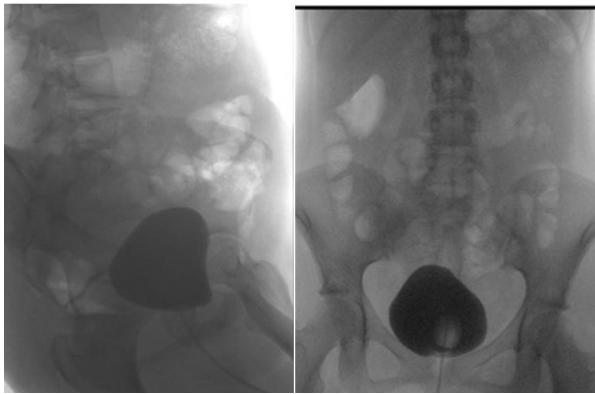


Figure 5. Two-week follow-up cystogram showing normal filling of the bladder with no contrast leak

DISCUSSION

The present report describes a rare case of iatrogenic bladder injury that was diagnosed after laparoscopic appendectomy. We believe that the findings from this case will make a valuable contribution to the diagnosis and management of such laparoscopy-associated injuries. Postoperative iatrogenic bladder injury usually presents with gross hematuria, suprapubic tenderness, inability or difficulty in voiding urine, low urine output, and increased serum BUN and creatinine levels secondary to peritoneal absorption of free urine in the abdomen. Irritation from intraperitoneal urine leak can lead to persistent abdominal pain, peritonitis, ileus, and possibly, sepsis. In the presented case, the patient complained of lower abdominal pain, burning micturition, nausea, vomiting and localized peritoneal signs.

Although iatrogenic bladder injury can be diagnosed based on clinical presentation, definitive diagnosis requires either direct identification of the injury at the time of surgery or imaging of the bladder by, for example, cystography (6). In the present case, the injury was not identified intraoperatively. The reason being that at the time inflammation and free fluid in the peritoneal cavity noted at the start of the procedure had hidden the possibility of having bladder injury. Also injury could have been miniscule and unidentifiable at the time of procedure which lead to delayed presentation of such injury. Bladder injury is managed according to the time of diagnosis, location, size, and clinical condition of individual patients. Small iatrogenic intraperitoneal bladder injuries can be managed conservatively with urinary bladder catheterization, provided no ileus or peritonitis is found after the procedure. However, such patients should be closely observed, and the surgeon should have a low index of suspicion for proceeding with surgical repair. Often, once a large defect of the bladder is diagnosed. Surgical primary repair (open or laparoscopic) is required for these injuries, as they are unlikely to heal with catheter drainage alone. Repeat cystography for reassessment is recommended 2–3 weeks after repair.

Avoiding and eliminating predisposing factors is the key to preventing laparoscopy-associated bladder injury. For example, in laparoscopic appendectomy, instead of placing a suprapubic port another port positioned away from the bladder dome can be used, such as RLQ, RUQ, R-mid abdomen, or LUQ port, as described by SAGES (Society of American Gastrointestinal and Endoscopic Surgeons). (7) Additionally, during laparoscopic appendectomy, the bladder should be kept decompressed with the help of a urinary catheter for the duration of the procedure, to minimize the chances of bladder injury (7).

CONCLUSION

Bladder injury in laparoscopic procedure is an uncommon complication but can be devastating to deal with. Causing increased risk for patient complication and increase in morbidity rate. Early identification intraoperatively is the key for best management either if needs to be sutured immediately and keep a urinary drainage catheter inserted for proper drainage or need urgent surgical intervention to close the defect. Emergency procedure always have a higher risk of complications in relation to elective procedures, it is imperative in emergency procedure to have a high index of suspicion for especially bladder injuries for a patient that presented post appendectomy with such presentation should always raise the attention to a missed bladder injury imaging diagnostics like a CT scan will concur such a diagnosis. Treatment differs variably w but most important factors are the size of the defect and presence of peritoneal signs will decide whether to go for conservative management or operative procedure for correction.

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