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Laparoscopic Hernia Repair and Bladder Injury

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ABSTRACT

Background: Bladder injury is a complication of laparoscopic surgery with a reported incidence in the general surgery literature of 0.5% and in the gynecology literature of 2%. We describe how to recognize and treat the injury and how to avoid the problem.

Case Reports: We report two cases of bladder injury repaired with a General Surgical Interventions (GSI) trocar and a balloon device used for laparoscopic extraperitoneal inguinal hernia repair. One patient had a prior appendectomy; the other had a prior midline incision from a suprapubic prostatectomy. We repaired the bladder injury, and the patients made a good recovery.

Conclusion: When using the obturator and balloon device, it is important to stay anterior to the preperitoneal space and bladder. Prior lower abdominal surgery can be considered a relative contraindication to extraperitoneal laparoscopic hernia repair. Signs of gas in the Foley bag or hematuria should alert the surgeon to a bladder injury. A one- or two-layer repair of the bladder injury can be performed either laparoscopically or openly and is recommended for a visible injury. Mesh repair of the hernia can be completed provided no evidence exists of urinary tract infection. A Foley catheter is placed until healing occurs.

Key Words: Laparoscopic bladder injury.

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INTRODUCTION

Current indications for laparoscopic hernia repairs are bilateral or recurrent hernias in patients who have a good cardiovascular risk status. Bladder injury secondary to needle, trocar, or balloon dissector insertion is a potential complication in laparoscopic surgery. We describe two cases of laparoscopic bladder injury in extraperitoneal hernia repairs and address ways to recognize the injury and how best to treat and avoid the problem.

CASE REPORT 1

A 49-year-old patient with a history of heavy lifting and a several-month history of symptomatic bilateral inguinal hernias elected to have bilateral laparoscopic extraperitoneal hernia repairs. He had a history of a prior appendectomy and was otherwise healthy. The patient received general endotracheal anesthesia, nasogastric (NG) tube insertion, and Foley catheter insertion. The General Surgical Interventions (GSI) trocar and balloon device were used and appeared to insert easily without resistance. On removal of the balloon and insertion of the laparoscope, a tear in the anterior dome of the bladder was noted as well as a large amount of gas in the Foley bag. Based on a urology consult, a transverse suprapubic incision was made to enter the peritoneal cavity. A two-layer bladder repair was performed. The hernias were repaired by suturing the transversus abdominus arch to Cooper's ligament. The Foley catheter was left in place for two weeks, and a cystogram was performed at the end of two weeks. No leakage was revealed. The patient recovered and was doing well at the last follow-up one year after his repairs.

CASE REPORT 2

An elderly patient with a history of three prior right inguinal hernia repairs and a prior open prostate resection via a midline incision elected to have an extraperitoneal laparoscopic right inguinal hernia repair. The patient received general endotracheal anesthesia, and a Foley catheter was placed. The GSI trocar and balloon device were used, and insertion of the device appeared to go easily without resistance. On removal of the bal-

loon and insertion of the laparoscope, the operating room nurse noted a large amount of air in the Foley bag. The bladder injury was not immediately apparent, but after careful inspection with the laparoscope, a small tear measuring approximately one cm was noted in the anterior bladder wall. Laparoscopic two-layer repair of the bladder injury was performed, and the hernia was repaired laparoscopically with mesh. The Foley catheter was left in place for two weeks, and a voiding cystogram showed no leak. The Foley catheter was removed, and the patient recovered without further problems.

DISCUSSION

In a review of the urology, gynecology, and general surgery literature, we found that bladder injury with laparoscopic surgery is reported in the general surgery literature to be 0.5% and in the gynecology literature to be 2%.[1-6] Typical laparoscopic surgeries discussed in the literature reviewed were bladder neck suspensions, pelvic lymphadenectomy, nephrectomies, laparoscopically assisted vaginal hysterectomies, and transabdominal preperitoneal and total extraperitoneal laparoscopic herniorrhaphies, which is a recognized complication in laparoscopic hernia repair that may be underreported.

To help avoid bladder injury, a Foley catheter is placed prior to a laparoscopic procedure or the patient is asked to void immediately prior to a short laparoscopic procedure. Therefore, the likelihood of encountering an enlarged bladder is reduced. Despite this precaution, injuries to the bladder still occur. This can result from the Veress needle insertion, trocar insertion, balloon dissector insertion, or simply during the laparoscopic procedure itself. In patients with prior lower abdominal procedures, especially in the midline, one must proceed with more caution. In the review by Ramshaw et al[1] comparing the transabdominal preperitoneal (TAPP) hernia repair to the total extraperitoneal (TEP) repair, the incidence of bladder injury was the same, although the overall incidence of complications was higher with the TAPP repair (10.7%) versus the TEP repair (3.7%). Ramshaw et al noted that the bladder injury in the TEP group was in a patient that had a prior lower abdominal operation. This is considered to be a relative contraindication to the laparoscopic approach due to potential dense adhesions to the bladder and a greater likelihood of bladder injury.[1]

If a bladder injury occurs, it may be immediately visualized. At this time, repair of the bladder injury is indicated. However, a bladder injury may not be immediately apparent. Hematuria must raise the suspicion of bladder injury, and if an injury is not clearly seen laparoscopically, cystoscopy is recommended. An injury in the space of Retzius is less apparent than in the bladder dome. Gaseous distension of the Foley bag during laparoscopy also should alert the surgeon to a bladder injury.[7,8]

Next, consideration must be given to the type of bladder repair. An open two-layer repair is one way to repair the bladder. However, laparoscopic repair of the bladder injury is entirely possible with a one- or two-layer closure of 3-0 or 4-0 chromic suture or polydioxone with either the running or interrupted technique.[7-13]

Bladder injury in total extraperitoneal repair of hernias deserves special discussion. In some educational videotapes, it is recommended that the balloon dissector with obturator in place be moved down to the pubic tubercle and then actually be placed below the pubic tubercle. In our experience, this increases the risk of bladder injury from the obturator. By staying anterior to the preperitoneal space and away from the bladder, and letting the balloon do the dissection, rather than the obturator, it is less likely that bladder injury will occur. It is also possible to create the preperitoneal space using blunt dissection with the laparoscope only, which has the theoretical advantage of not having to insert an obturator blindly into the preperitoneal space. In addition, balloon rupture can occur with loose fragments entering the peritoneal cavity or underlying viscus. Inflation volumes should not be exceeded, and slow insufflation pressures are safer than high insufflation pressures. With some commercially available balloons, one can actually see the cavity as it is being dilated, and some recommend the use of such a device although it may be more expensive. A debate also exists as to whether the type of medium used to distend the balloon should be air or water. Water is heavier and may cause peritoneal or viscus disruption. However, if the balloon ruptures, compressed air is said to have a more energetic force and potential for injury.[14]

Once the bladder injury is repaired, one can complete the laparoscopic hernia repair with mesh provided one does not suspect a urinary tract infection. A Foley catheter is left in place for approximately 10 days to two weeks, and a voiding cystogram is performed to confirm that no leakage of urine is occurring. The Foley catheter is then removed. As more laparoscopic procedures are performed, complications like bladder injury are being

reported. One must be able to recognize and treat these injuries laparoscopically if possible and complete the procedure. By adhering to the technical strategies detailed here, the incidence of bladder injury may be reduced. As more experience is gained, the incidence of significant complications after laparoscopic hernioplasty can be substantially reduced according to Felix et al,[15] who reported that overall complications in the first 3 years were 5.6% compared with 0.5% in the last three years, and 90% of the complications developed in the first 50% of a total of 1,087 patients. The bladder injuries reported here occurred early in the learning curve, during the first 100 repairs. Also, as more experience with laparoscopic extraperitoneal herniorrhaphy is gained, the need for balloon dissectors and Foley catheters is reduced.[16]

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