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Iatrogenic genitourinary system injury during gynecological and obstetric surgery: ten-year results

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Summary

Purpose of investigation: The authors' objective was to investigate the predisposing factors and treatment results of genitourinary (GU) system injuries that occur following gynecological and obstetric surgery (GOS). *Materials and Methods:* They evaluated retrospectively 87 consecutive patients who had GU tract injury occurring with GOS between 2005 and 2015. *Results:* There were 87 patients that had GU tract injury, in which 57 had bladder injury, and 30 had ureteral injury. Of the patients who had bladder injury, 38 had only bladder injury and underwent primary repair. Nineteen patients had vesicovaginal fistula and all underwent open transabdominal transvesical repair after three months. Among the 30 ureteral injuries, four were ligation, nine incomplete cut, ten complete cut, and seven fistula. Two patients who had ligation underwent nephrectomy, and two underwent deligation. Nine patients with incomplete cuts underwent primary repair and stenting; end-to-end anastomosis was performed in ten patients with incomplete cuts. Three patients with ureterovaginal fistula underwent ureteroneocystostomy and Boari flaps were performed in four patients. *Conclusion:* GU system injuries may occur following GOS. When treated early and properly, recovery without complications is possible.

Key words: Genitourinary tract injury; Cesarean; Bladder injury; Ureteral injury; Hysterectomy.

Introduction

Genitourinary system (GU) injury is a known complication of gynecological and obstetric surgery (GOS). According to previous reports, its frequency changes between 0.79% to 8.3% and the bladder is the organ most frequently affected [1].

The most important risk factors for GU injury are malignity, previous pelvic surgery distorted pelvic anatomy, inflammatory disease, and radiotherapy [2-4]. GU system injuries may occur due to cuts, ligation or thermal damage during both open and laparoscopic surgery [5]. Delayed diagnosis and improper treatment leads to morbidity and even mortality.

In the present study, the authors aimed to investigate the predisposing factors, treatment modalities, and treatment results in iatrogenic GU system injuries that develop following GOS.

Materials and Methods

The present study enrolled 87 patients that were evaluated at the authors' clinic after GOS due to GU tract injury between 2005 and 2015. The patient data was evaluated retrospectively. The surgery performed, factors that predisposed the injury, the type of injury, the treatments given, and their results were evaluated.

Results

Eighty-seven patients were evaluated in the study. The ages of the patients ranged between 18 and 70 (mean 43±15) years of age. There were 57 patients who had bladder injuries and 30 ureteral injuries. Bladder injuries were developed during cesarean section in 37 patients, during hysterectomy in 16, and at prolapse surgery in two. Twenty-seven patients who have bladder injury during cesarean section had one or more previous cesareans. All of the 16 hysterectomies were performed during gynecologic oncological surgery. All of the 36 bladder injuries were at the dome of the bladder. The injury type was a cut. They were treated by primary repair and transurethral catheter placement. The injury was on the lower posterior wall of the bladder in the two patients that underwent prolapse surgery. To treat these injuries, the bladder was opened and a transurethral catheter was inserted. All of vesicovaginal fistulas were repaired by an open transabdominal transvesical approach. While the cuts on the dome of the bladder healed without complications, a vesicovaginal fistula developed in one of the lower posterior wall cuts. The fistula was treated surgically later.

In the ten-year period, thirty ureteral injuries following GOS were detected. Ten of the injuries occurred after cesarean section surgery and 20 after oncological surgery. Ligation was detected in four patients, complete cut in ten,

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incomplete cut in nine, and ureterovaginal fistula in seven. Two patients who had ureteral ligation and admitted to the authors' clinic in the late stage underwent nephrectomy. Other two patients with ligation underwent deligation. End-to-end anastomosis was made in the ten patients with complete cuts, and the nine patients with incomplete cuts underwent primary repair and stenting. Ureteroneocystostomy was performed in three of the seven patients that developed ureterovesical fistula, and Boari bladder flaps were performed in four patients. No complications developed after the one-year follow-up of the present patients.

Discussion

Despite the ongoing advance in surgical techniques, iatrogenic GOS is still considered a potential complication of GOS [6]. Intraoperative bladder and ureter injuries identified can be repaired immediately during surgery. Delayed complications such as vesicovaginal fistula and ureterovaginal fistula can develop days to months after primary surgery. The bladder is the most frequently injured organ during GOS [7]. In cases with deformed bladder anatomy, the most important factors predisposing injury are adhesions, particularly those due to previous surgical interventions or radiotherapy. An empty bladder before surgery can make bladder injury easier [8, 9]. Most of the bladder injuries developed in cesarean section cases. Most of these cases were repeated cesarean and the most important cause of the injury was adhesion. All of the bladder injuries detected after hysterectomy occurred at surgery performed due to malignity. Bladder injury after transvaginal interventions was detected in two patients. The most common type of bladder injury is laceration. Vesicovaginal fistula may develop in lower wall lacerations. In one patient with a cut in the lower wall, a vesicovaginal fistula developed in the following period.

The most significant sign of bladder injury is urinary extravasation. Drainage of bloody urine from the transurethral catheter and a cut visible are diagnostic for bladder injury. After the injury is detected, the bladder can easily be repaired using absorbable sutures and by inserting a transurethral catheter [6, 10, 11]. Postoperative urine coming from the vagina or permanent incontinence is suggestive of vesicovaginal fistula. Nineteen patients of vesicovaginal fistula were treated with transabdominal transvesical open repair.

The ureters are small, mobile, and flexible. They are protected anatomically by dorsal muscles, the spinal column, and the lateral and anterior sides of the abdominal muscles. Therefore, the ureters have a low probability of injury. Similar to bladder injuries, ureteral injuries are also common in oncological cases. Malign tissue may surround the ureter entirely [6]. This is one of the factors that make the ureter prone to injury. Adhesions after previous pelvic surgery disrupt normal anatomy and reduce the mobility of the ureters, and consequently, ureteral injury becomes easier [12]. In pathologies that cause massive bleeding, rapid maneuvers of the surgeon to stop the bleeding also cause ureteral injury. A large uterus and inexperience of the surgeon are also among the predisposing factors. Ureteral ligation mostly occurs at the level of the uterine artery. Ureteral ligation may also occur at the level of the uterosacral, transverse uterine ligament, and the suspensory ligament. One of the most important conditions for preventing these injuries is adequate knowledge of pelvic and abdominal anatomy [13].

Ureteral injury may occur due to thermal causes or cuts. Small and athermal injuries may be treated with primary repair and stent placement. Stents are inserted to prevent narrowing [14]. In complete cuts or thermal injuries, edges of the wound are cleansed, and end-to-end anastomosis is made if the lower end is found. If the lower end cannot be found, a Boari bladder flap may be developed to close bladder to the ureter in cases where it is difficult to bring the ureter closer to the bladder while performing reimplantation [9, 15]. Prior treatments may make it difficult to perform these procedures. The present authors treated nine patients who had incomplete cut by performing primary repair and stenting and ten patients who had complete cut by end-to-end anastomosis. Three patients presented with ureterovaginal fistula in which the ureter reached the bladder and underwent ureteral reimplantation, and Boari bladder flaps were performed in four patients in which the urethra was too short to reimplant.

Suspicion of injury is the most important aspect of diagnosing ureteral injury. Perioperative injuries are more simple to treat and better results are obtained. The loss of renal function is more common late cases [6, 16, 17]. Two patients with delay in presentation to the authors' clinic had to undergo nephrectomy due to pyonephrosis.

Some authors recommend routine ureteral stenting before surgery because it facilitates visualization and palpation of the ureter. Others, however, discourage its use because stents reduce the mobility and flexibility of the ureter and change its location [16, 18]. Stents had not been inserted during surgery in which injury occurred in any of the patients that were admitted to the present authors' clinic.

The present study has some limitations. The most important disadvantage is the retrospective nature of the study. Other limitation of this study is the inadequate long-term follow-up of patients.

In conclusion, GU system injuries may occur during GOS. Suspicion of injury is the most important aspect of management of injury. After diagnosis, if patients are treated early and adequately, they may recover without complications.

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