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Lower Urinary Tract Injuries During Gynecological Operations

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ABSTRACT

INTRODUCTION: The purposes of the present retrospective study were to (1) evaluate the outcomes of emergency urological interventions during gynecological operations, and (2) offer management guidelines for the practicing urologist.

METHODS: The authors evaluated the records of 20 female patients with urinary tract injuries that occurred during gynecological operations between May 2003 and May 2005. The mean patient age was 28 years (range, 20-40 years). The patients were evaluated preoperatively by routine investigations, intraoperatively by ureteric catheterization and/or cystoscopy and ureteric catheterization, and postoperatively by sonography every 3 months for 1 year and by intravenous urography 6 months after surgery.

RESULTS: Urologic injury occurred during cesarean section (n = 12) and hysterectomy (n = 8). Six patients had bladder injuries that were repaired intraoperatively, followed by urethral catheterization. Fourteen patients had distal ureteral injuries that were repaired by ureteric catheterization and/or ureterovesical neoimplantation. Catheters were removed after 1 week. Six months after surgery, all patients had an intact upper urinary tract with no back pressure changes. No reflux or ureteric stricture was observed 1 year after surgical intervention.

CONCLUSION: Iatrogenic injuries to the urinary tract may occur during gynecological surgery. The bladder and distal ureters are the most commonly involved organs. Ureteral catheterization via a cystoscope or directly through the orifices should be used to assess the intactness of the ureter. Key factors to obtaining optimal results are early recognition and immediate repair of the damage.

KEYWORDS: Cesarean section; Ureter; Bladder injury; Cystoscopy; Ureteric catheterization; Ureterovesical reimplantation

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INTRODUCTION

Iatrogenic injuries to the urinary tract may occur during gynecologic surgery. The bladder and distal ureter are the most commonly involved organs [1-3].

Cesarean sections are associated with lower rates of urological complications than other types of abdominal or pelvic surgery. Injuries include inadvertent cystostomy, ureteral angulations, occlusion by improperly placed sutures, and direct ureteral damage (eg, crush, ischemia, and partial or complete transaction) [3-5]. Early recognition of the injury and repair during primary surgery most often result in less morbidity for the patient, a more successful outcome, and increased ease of repair [3,6].

The purposes of the present retrospective study were to (1) evaluate the outcomes of emergency urological interventions during gynecological operations, and (2) offer management guidelines for the practicing urologist.

METHODS

Participants

The authors evaluated the records of 20 female patients with urinary tract injuries that occurred during gynecological operations between May 2003 and May 2005. The mean patient age was 28 years (range, 20-40 years).

Procedures

All patients were evaluated preoperatively by medical history, urine analysis and culture, complete blood profile, liver function tests, serum urea, creatinine, blood sugar, and blood profile. Ureteric catheterization and/or cystoscopy and ureteric catheterization were done intraoperatively.

All patients had gynecological operations in the obstetric section at Cairo University Hospitals. The urologist received an emergency consult. All repairs were managed intraoperatively at the time of the initial surgery.

The patients were evaluated postoperatively by sonography every 3 months for 1 year and by intravenous urography (IVU) 6 months after the surgical procedure.

RESULTS

Urologic injury occurred during cesarean section (n = 12) and hysterectomy (n = 8).

Bladder injury. Six patients had bladder injury during a cesarean section (n = 2) or hysterectomy (n = 4). The bladder injuries were repaired intraoperatively, followed by fixation of a urethral catheter.

Distal ureteral injury. Fourteen patients had distal ureteral injuries during a cesarean section (n = 4) or hysterectomy (n = 10). Patency of ureteric orifices was confirmed by observation of urine leakage from ureteric orifices or by ureteric catheterization. The catheterization was done by direct introduction of a 7 Fr ureteral catheter during open surgery or through cystoscope and retrograde catheterization. Two patients needed removal of ligature. Twelve patients needed ureterovesical neoimplantation by direct simple implantation (n = 6), Boari flap (n = 4), or psoas hitch (n = 2). All patients had fixation of a 7 Fr ureteric catheter and Foley urethral catheter.

Follow-up. Retrograde ureterography was done 1 week after surgery. An ascending cystogram revealed no urinary leak in any patient. Therefore, ureteric catheters were removed 1 week after surgery. Urethral catheters were removed 1 day after removal of the ureteric catheter.

Sonography completed every 3 months for 1 year revealed no back pressure changes. An IVU performed 6 months after surgery revealed that all patients had an intact upper urinary tract with no back pressure changes. No reflux or ureteric stricture was observed 1 year after surgical intervention.

DISCUSSION

Surgical injuries to the urinary tract during abdominal gynecological operation are relatively rare [5,6-9]. Previous studies of injuries to the urinary tract during cesarean section indicate an incidence of 0.0016% to 0.94% for bladder injuries and 0.09% for ureteral injuries [3,5,10,11]. Although bladder injury is almost always recognized at surgery, the intraoperative diagnosis of ureteral injury is difficult and requires a high index of suspicion.

Van Ham et al [12] reported that emergency cesarean section carries a greater risk of maternal complications than elective cesarean procedures. These findings can be explained by the rapid and possibly uncontrolled development of the bladder flap over the lower uterine segment and by the need for a wide uterine opening to facilitate immediate fetal extraction. Wide uterine incisions may extend into the broad ligament, so hemostatic sutures can injure the ureter. Additionally, several investigators have claimed that previous cesarean section healing might be associated with an increased risk of bladder injury due to dense adhesions formed between the bladder and lower abdomen as well as the lower uterine segment [10].

Management Guidelines

The most important factor for appropriate management of urologic injury during gynecological surgery is prompt damage control. Despite their rare occurrence, every effort must be made to identify and treat all injuries intraoperatively. If left unrecognized and not repaired during surgery, injuries to the bladder or ureter may lead to late complications. The most common complications are renal damage and genitourinary fistulas [13-15].

Initial assessment by the urologist should include the patient's pertinent medical history (eg, previous pelvic surgery, renal diseases) and the hemodynamic and general status of the patient during the operation. Hemodynamic instability or impaired clotting, which is frequently associated with preeclampsia or eclampsia, mandates the termination of anesthesia and a rapid and efficient urological evaluation. If significant hypotension occurred during the gynecological operation, urine flow may be decreased due to potential renal tubular dysfunction [16].

The next step is damage assessment. Anticipated findings are a bladder tear, ureteral angulations, occlusion by improperly

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placed sutures, or direct ureteral damage. An isolated small bladder tear at the dome can be sutured and no additional evaluation required. A larger tear may be associated with a concomitant injury to the ureter, particularly if damage involves the posterior bladder wall, approximates the ureteral orifice, or is associated with lateral extension of the uterine incision. In these cases ureteral catheterization is advisable, even at the cost of expanding the primary bladder tear toward the trigone in order to clearly identify the orifices.

When injury to the ureter is suspected and the bladder is intact, assessment strategies may include cystoscopy or fluoroscopy. Open dissection and exploration of the ureters may cause more risk than benefit. Therefore, inserting a ureteral catheter in a retrograde manner through the cystoscope or directly into the ureteral orifices following anterior cystostomy is probably the preferred diagnostic method. To avoid damage to the ureter while introducing the catheter, stent advancement over a hydrophilic guidewire is recommended [17].

Intraoperatively, failure to advance the catheter easily through the ureter into the kidney may be indicative of ureteral kinking or ligation caused by improperly placed sutures. In this case, dissection of the ureter to the level of obstruction to release the offending suture is mandatory.

CONCLUSION

Iatrogenic injuries to the urinary tract may occur during gynecological surgery. The bladder and distal ureters are the most commonly involved organs. Ureteral catheterization via a cystoscope or directly through the orifices should be used to assess the intactness of the ureter. Key factors to obtaining optimal results are early recognition and immediate repair of the damage.

Conflict of Interest: none declared

REFERENCES

[1] Chan JK, Morrow J, Manetta A. Prevention of ureteral injuries in gynecologic surgery. *Am J Obstet Gynecol*. 2003;188(5):1273-1277.

[2] Daly JW, Higgins KA. Injury to the ureter during gynecologic surgical procedures. *Surg Gynecol Obstet*. 1988;167(1):19-22.

[3] Kaskarelis D, Sakkas K, Aravantinos D, Michalas S, Zolotas J. Urinary tract injuries in gynecological and obstetrical procedures. *Int Surg*. 1975;60(1):40-43.

[4] Kritchevsky SB, Braun BI, Gross PA, Newcomb CS, Kelleher CA, Simmons BP. Definition and adjustment of Cesarean section rates and assessments of hospital performance. Int *J Qual Health Care*. 1999;11(4):283-291.

[5] Rajasekar D, Hall M. Urinary tract injuries during obstetric intervention. *Br J Obstet Gynaecol*. 1997;104(6):731-734.

[6] Thomas DP, Burgess NA, Gower RL, Peeling WB. Ureteric injury at cesarean section. *Br J Urol*. 1994;74(1):122-123.

[7] Michielsen DP, Wyndaele JJ, Batchvarov YA. Vesico-uterine fistula secondary to cesarean section. *Acta Urol Belg*. 1998;66(3):21-23.

[8] Buchholz NP, Daly-Grandeau E, Huber-Buchholz MM. Urological complications associated with caesarean section. *Eur J Obstet Gynecol Reprod Biol*. 1994;56(3):161-163.

[9] Faricy PO, Augspurger RR, Kaufman JM. Bladder injuries associated with cesarean section. *J Urol*. 1978;120(6):762-763.

[10] Eisenkop SM, Richman R, Platt LD, Paul RH. Urinary tract injury during cesarean section. *Obstet Gynecol*. 1982;60(5):591-596.

[11] McAninch JW, Santucci RA. Genitourinary trauma. In: Walsh PC, Retik AB, Vaughan ED Jr, Wein AJ, eds. *Campbell's Urology*, 8th ed. Philadelphia, PA: WB Saunders Co.; 2002(4):3707-3732.

[12] van Ham MA, van Dongen PW, Mulder J. Maternal consequences of cesarean section. A retrospective study of intra-operative and postoperative maternal complications of cesarean section during a 10-year period. *Eur J Obstet Gynecol Reprod Biol*. 1997;74(1):1-6.

[13] Lenkovsky Z, Pode D, Shapiro A, Caine M. Vesicouterine fistula: a rare complication of cesarean section. *J Urol.* 1988;139(1):123-125.

[14] Nabi G, Hemal AK, Kumar M, Ansari MS, Dorairajan LN. Diagnosis and management of post-cesarean ureterouterine fistulae. *Int Urogynecol J Pelvic Floor Dysfunct*. 2000;11(6):389-391.

[15] Hemal AK, Kumar R, Nabi G. Post-cesarean cervicovesical fistula: technique of laparoscopic repair. *J Urol*. 2001;165(4):1167-1168.

[16] Yossepowitch O, Baniel H, Livne PM. Urological injuries during cesarean section: intraoperative diagnosis and management. *J Urol*. 2004;172(1):196-199.

[17] Baniel J, Schein M. The management of penetrating trauma to the urinary tract. *J Am Coll Surg*. 1994;178(4):417-425.