Lower urinary tract injury during gynaecological and obstetric surgeries: Two years’ experience in our centre

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Abstract

Introduction: Operative injuries to the lower urinary tract during gynaecological and obstetric surgery are common due to its anatomic proximity with the reproductive system. The purpose of this article is to report our centre’s experience with these iatrogenic injuries over a period of 2 years.

Methods: We retrospectively reviewed our medical records during the years 2016 and 2017 in our department, to identify patients that were treated for lower urinary tract injury during or after gynaecological and obstetric surgeries.

Results: 11 females were treated in our hospital, with trauma to the bladder, or ureter following gynaecological or obstetric surgeries. The most common type of urinary tract injury was bladder injury, occurring in 8 patients followed by ureteric injury in 1 patient and bladder along with ureteric injury in 1 patient. One patient presented with right ureterovaginal fistula.

Conclusion: Bladder injury occurred very frequently as opposed to ureteral injury. The most significant risk factor for bladder injury during cesarean section seems to be previous cesarean delivery due to adhesive disease.

Introduction

Operative injuries to the lower urinary tract during gynaecological and obstetric surgery are common due to its anatomic proximity with the reproductive system. Urinary tract injury complicates an estimated 0.2 to 1% of all gynaecological procedures and pelvic operations [1]. Urinary tract injuries due to obstetric and gynaecological surgery are classified into two categories: acute
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complications such as bladder or ureter laceration that can be identified immediately during the operation, and chronic complications such as vesicovaginal fistula, ureterovaginal fistula, or ureteric stricture, which can be identified days to months after primary surgery [2]. It must be noted that gynaecological operations are the commonest cause of iatrogenic trauma to the ureters, while the bladder is the urological organ that most often suffers iatrogenic injury [3]. To avoid injury to the urinary tract, the gynaecologist must have an accurate understanding of pelvic anatomy, use a meticulous and methodical surgical technique, and maintain a constant high degree of vigilance.

Herein, we retrospectively report a single-center experience with these iatrogenic injuries over a period of 2 years.

Materials and methods
We performed a retrospectively review of our medical records, between January 2016 and December 2017 and identified 11 females (mean age 39.45 years; range 26-56 years) that were treated in our hospital, with trauma to the bladder or ureter following gynaecological or obstetric surgeries.

Urological complications were defined as laceration, transection, rupture, or ligation of the genitourinary tract found during surgery or as hydronephrosis, and leakage of urine or contrast media out of the urinary tract found after surgery. Success of the repair was the criterion for successful treatment.

Patients were followed-up regularly in the outpatient clinic with detailed history, physical examination, complete urinalyses, and urine cultures at each visit. For patients with bladder injury follow-up retrograde cystography was performed 10-14 days after treatment, while for patients with ureteric injury follow-up CT Urography was performed 3 months after treatment.

Results
In our series 10 out of 11 patients had acute complications, while chronic complications were identified in one patient. The most common type of acute urinary tract injury was bladder injury, occurring in 8 patients (73%) followed by ureteric injury in 1 patient (9%) and bladder along with ureteric injury in 1 patient (9%). Regarding chronic complications 1 patient (9%) presented with right ureterovaginal fistula.

In all cases of bladder injury, the diagnosis was made intraoperatively. Overall, cesarean section accounted for the most injuries (6 out of 8), followed by hysterectomy (2 out of 8). All 6 patients that underwent cesarean section had a history of at least one previous cesarean delivery. Seven bladder injuries occurred at the dome of the bladder with the remaining one occurring at the trigone. Bladder repair was accomplished with an open two-layer vesicorrhaphy with absorbable sutures. Bladder integrity was then confirmed by filling the bladder with methylene blue dye. Omentum was then placed on suture line. In all cases, a 20Fr 3-way Foley catheter was used for bladder drainage and a tube drain was placed down to the closure line. In one case, in which injury was at the bladder trigone, we performed retrograde pyelography intraoperatively, as there was concern about ureteral involvement in the injury. Bladder catheterization was maintained for 10 to 14 days, depending on the extent of repair. Conventional cystography was performed, before catheter removal, to ensure bladder integrity.

Ureteral injuries were repaired in 2 patients (1 patient required concomitant vesicorrhaphy). Hysterectomy was the cause of ureteral injury in all cases. Both injuries involved the distal part of the right ureter and were managed at the time of the initial surgery by standard refluxing ureteral re-implantation, as a tension-free anastomosis was possible. The two patients had complete ureteric transection close to vesicoureteric junction, therefore an end-to-end anastomosis was not an option. In both patients there was no need for a psoas hitch between the bladder and the ipsilateral psoas tendon. A JJ stent was placed, a 20Fr 3-way Foley catheter was used for bladder drainage and a tube drain was placed in the peri-vesical space. Bladder catheterization was maintained for 10 days and the JJ stent was removed 8 weeks after surgery. CT Urography was performed 3 months after treatment.

Regarding chronic complications one patient presented 40 days after surgery (laparoscopic abdominal hysterectomy for benign disease) complaining of urine

Key words
urological trauma; lower urinary tract injury; bladder trauma; ureteric injury; iatrogenic injury
leakage through vagina. CT Urography revealed a right hydronephrosis and hydrourerter caused by a stricture in the pelvic ureter but did not identify the fistula. Subsequent MRI revealed a possible right-sided ureterovaginal fistula. The patient was initially managed by placement of a percutaneous nephrostomy tube on the affected side. Subsequently, 3 months after the injury, uretero-neocystostomy (ureteral re-implantation) was performed. As with ureteral injuries, a JJ stent was placed, a 20Fr 3-way Foley catheter was used for bladder drainage and a tube drain was placed in the peri-vesical space. Bladder catheterization was maintained for 7 days and the JJ stent was removed 8 weeks after surgery. Follow-up CT Urography was performed 3 months after treatment and revealed progressive recovery of the right hydronephrosis.

Discussion
Urinary tract injuries are a known complication of obstetrical and gynaecological surgeries because of their anatomical proximity. Bladder injuries are more common than ureteral injuries, although ureteral injuries are more often unrecognized intraoperatively [4]. The observed higher incidence of bladder injury may be because such injuries are easier to detect intraoperatively than injuries occurring at other sites [5]. Most ureteral injuries result from electrosurgery, whereas most bladder injuries result from lysis of adhesions [4]. In our series the most commonly injured organ was urinary bladder in 73% of patients and most occurred in repeat cesarean deliveries. All cases were successfully treated. Various risk factors have been identified to increase the chance of bladder injury during abdominopelvic and vaginal surgeries, including acute and chronic processes, prior surgery or adhesions, bladder diverticula, malignancy, or any other procedure causing anatomical distortion or inflammation [6]. One of the largest studies looking at bladder injury during cesarean section comes from Phipps et al. [7], which found that women with a prior cesarean delivery are 4.22 times as likely to have a bladder injury at delivery versus those who did not have a previous cesarean delivery [Odds Ratio (OR) 4.22, 95% Confidence Interval (95% CI) 1.79–10.1].

Regarding ureteric injury, the pelvic ureter is involved in 80% or iatrogenic ureteral injuries, making it the most commonly involved segment [8]. Gynaecological surgery accounts for over half of all iatrogenic ureteric injuries [9]. Ureteral injury recognized at time of hysterectomy occurs most commonly with radical abdominal hysterectomy (7.7 per 1000) and total abdominal hysterectomy (1.2 per 1000) and least commonly with laparoscopic assisted vaginal hysterectomy (0 per 1000) [10]. In our series, total abdominal hysterectomy was the cause of ureteral injury in both cases. They were treated successfully with no major complications (one patient presented with recurrent urinary tract infections post-operatively, one with stent related pain and both with mild hydronephrosis on follow up without decrease in renal function). The use of prophylactic pre-operative ureteral stent insertion in complex cases is debatable, as it assists in visualisation and palpation of the ureter, making it easier to detect ureteral injury however, it does not decrease the rate of injury [9].

In the literature, ureterovaginal fistulae are usually associated with variable degrees of hydroureteronephrosis, so preliminary diversion of urine by means of a percutaneous nephrostomy tube before definitive repair will preserve kidney function, as well as accelerating resolution of the oedema and inflammation [11]. In our patient, we followed this concept then performed open ureteroneocystostomy. The patient is currently at 4 months of follow-up and has no major complications.

Conclusion
It is mandatory for gynaecologists and obstetricians to understand the anatomy of the urinary tract in order to avoid iatrogenic injury. Bladder injury occurred very frequently as opposed to ureteral injury. The most significant risk factor for bladder injury during cesarean section seems to be previous cesarean delivery due to adhesive disease. As a result, gynaecologists must recognize and plan for possible complications associated with operating on patients with a history of multiple cesarean deliveries. When a urologic complication develops, early diagnosis and early urologic intervention are necessary to prevent the occurrence of delayed urologic complications. [11]

Conflicts of interest
The author declared no conflict of interest.
Περίληψη

Σκοπός: Να περιγράψουμε την εμπειρία μας στην αντιμετώπιση των ιατρογενών κακώσεων του κατώτερου ουροποιητικού που προκλήθηκαν σε γυναικολογικές ή μαιευτικές επεμβάσεις.

Μέθοδος: Η αναδρομική μελέτη των αρχείων μας κατά τα έτη 2016 και 2017 ανέδειξε 11 ασθενείς με τραύμα του κατώτερου ουροποιητικού κατά την διάρκεια γυναικολογικών ή μαιευτικών επεμβάσεων.

Αποτελέσματα: Ο συνηθέστερος τύπος ιατρογενούς κάκωσης αφορούσε τραύμα της ουροδόχου κύστεως (8 ασθενείς), ουρητηρική κάκωση παρατηρήθηκε σε μία ασθενή, ενώ συνδυασμός κάκωσης ουροτηρία και ουροδόχου κύστεως σε μία ασθενή επίσης. Τέλος μία ασθενής εμφάνισε υπουροκολπικό συρίγιο.

Συμπεράσματα: Η ιατρογενής κάκωση της ουροδόχου κύστεως είναι συνηθέστερη επιπλοκή σε σχέση με την κάκωση του ουροτηρία. Ο πιο σημαντικός παράγοντας κινδύνου κάκωσης ουροδόχου κύστεως κατά την διάρκεια καισαρικής τομής φαίνεται να είναι οι προηγηθείσες καισαρικές.

References