

Iatrogenic Urinary Tract Injuries During Obstetrical and Gynecological Operations: A Five Year Tertiary Care Hospital Experience in Nepal

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ABSTRACT

Iatrogenic injury to the urinary tract stands as uncommon yet potential lethal complications following all gynecological and obstetric surgeries amounting to 0.2-1% prevalence. Due to close anatomical proximity of urinary tract with the pelvic organs these complications can unwillingly occur among patients with risk factors in a worst case scenario. Although injuries to the urinary bladder can be identified and repaired during primary surgery, ureteral injuries are usually treacherous and go undetected needing surgical repair when infection and sepsis supervene. A retrospective study was performed on 19721 patients who underwent surgery at the Department of Gynecology and Obstetrics, Patan Hospital for the period of 5 years (April 10, 2010 to April 09, 2015). Operation theatre records were reviewed to identify patients and analyzed for demographic information. Total number of Gynecologic and Obstetrics surgeries performed at Patan Hospital during the study period of 5 years was 19721. During the study period 15 patients suffer iatrogenic trauma to the urinary tract and 9 patients suffered gastro-intestinal tract injuries. Mean age of women who suffered from urinary tract injury during surgery was 36.8 years. The incidence of urinary bladder injury was 0.08% (15 cases). Out of 15 cases, 7 (1.04%) injuries occurred during TAH, 6 (0.03%) injuries during cesarean sections, one during laparotomy (0.6%) and in one case bladder injury occurred during tubal ligation (7.69%). Out of 15 bladder traumas, 13 (86.7%) were promptly recognized repaired immediately during surgery. Incidence of iatrogenic urinary tract injuries decrease with adequate pre-operative preparation, comprehensive knowledge of pelvic anatomy, associated risk factors and meticulous surgical techniques.

Key Words: Gynecology, Obstetrics, Iatrogenic injury, Surgery.

INTRODUCTION

Iatrogenic injuries to the urinary tract (urinary bladder and ureter) during gynecologic and obstetric surgeries though uncommon are potentially lethal complications contributing to the significant morbidity. Almost 0.2% to 1% iatrogenic urinary tract injury has been reported in all gynecologic and obstetric surgeries.¹ Iatrogenic injuries to the urinary tract during procedures like dilatation and curettage, total abdominal hysterectomy, vaginal hysterectomy, Cesarean sections, laparoscopic and hysteroscopic surgeries occurs due to close anatomical proximity of urinary tract to the pelvic organs. Studies have demonstrated that almost two third of the urinary tract injuries occur during gynecologic and obstetric surgery.^{2,3,4} Risk factors significantly contributing to such injuries include obesity, previous history of pelvic surgery, pelvic adhesions, distorted pelvic anatomy due to pelvic infections, careless surgical dissection, and malignancy of pelvic organs and limited knowledge of pelvic anatomy. Every gynecologic surgeon must be aware of such high risk factors pre-operatively and

anticipate difficult surgery. Iatrogenic trauma to GI tract and urinary tract should be promptly identified and repaired. Tarek *et al.*⁵ suggested that the majority of the bladder injuries were easily detected by the operating obstetrician and gynecologists during the primary surgery whereas two third cases of ureteric injuries were detected during the post operative period. Intra-operative identification and proper management of such injuries can significantly decrease morbidity and will be beneficial for surgeons from legal perspectives as well. Therefore, one should be familiar with pelvic anatomy, perform careful surgical dissection and be aware of basic principles and management, whenever injuries occur.

This study aims to analyze the incidence, various complications and management of iatrogenic urinary tract injury which occurred during gynecologic and obstetric surgery at Patan Hospital.

MATERIALS AND METHODS

This was a retrospective study of 19708 patients who underwent surgery at the Department of Gynecology

and Obstetrics at Patan Hospital for the period of 5 years from April 10, 2010 to April 09, 2015. Permission for the study and ethical clearance was taken from Institutional Review Committee of Patan Academy of Health Sciences (PAHS).

Iatrogenic urinary tract injuries were defined as injury to ureter, urinary bladder and/or urethra during any gynecologic and obstetrics surgery. Operation theatre records were reviewed to identify different gynecologic and obstetric surgeries performed over the period of five years. The records of all the patients who suffered iatrogenic trauma to the urinary tract were retrieved from the record department and were analyzed for demographic information which included age, parity, diagnosis, indications for surgery, surgical approach, history of previous surgery, site of injury and time of diagnosis and management.

RESULTS

Total number of Gynecologic and Obstetrics surgeries performed at Patan Hospital during the study period of 5 years was 19708. Majority of the surgery performed were cesarean sections, 18700 (94.8%) followed by Total Abdominal Hysterectomy, 673 (3.4%), Vaginal Hysterectomy, 169 (0.85%), exploratory laparotomy, 166 (0.8%) performed for various indications and 13 Bilateral tubal ligation (0.06%) (Table 1).

Table 1: Types of major gynecological & obstetrical surgeries performed over 5 years

Surgery	Number	Percentage
Cesarean Section	18700	94.8%
TAH	673	3.4%
VH	169	0.9%
Laparotomy	166	0.84%
Bilateral Tubal ligation	13	0.06%
Total	19721	100%

There were 15 cases with iatrogenic injuries to urinary

tract and 9 cases to the GI tract. Mean age of women who suffered from urinary tract injury during surgery was 36.8 years. No ureteric and urethral injuries were reported during the study period. The incidence of urinary bladder injury was 0.08% (15 cases). Out of 15 cases, 7 (1.04%) injuries occurred during TAH, 6 (0.03%) injuries during cesarean sections, one during laparotomy (0.6%) and one bilateral tubal ligation (7.69%) (Table 2).

As shown in table 3, dense adhesion due to previous pelvic surgery as the underlying risk factor was reported in 53.4% of the patients whereas pelvic infection leading to distorted pelvic anatomy was seen in 40% of the patients. Intra-operative severe bleeding obscuring operative visibility was reported in one (6.7%) cesarean section which led to bladder injury. Emergency surgeries were performed in 40% of the cases. Eight (53.4%) surgeries were performed by lecturers and the other 7 were performed by Assistant Professors and above. Also, 13 out of 15 bladder traumas (86.7%) were promptly recognized during the primary surgery and repaired immediately by the surgeons (Table 2).

Late diagnosis of bladder injury in one patient was done on the fourth day following TAH with BSO whereas one patient presented with complaints of per vaginal urinary leakage 32 days following TAH with BSO which was diagnosed as Vesico-Vaginal Fistula (VVF). Bladder injuries which were immediately recognized during the initial surgery were repaired in 2 layers with vicryl 2-0. Continuous bladder drainage with indwelling urethral catheter was done for 14 days in all patients with bladder injury.

DISCUSSION

Many gynecologists and obstetricians have the common fear for iatrogenic urinary tract injuries which at times are unavoidable during pelvic surgeries. Literatures have reported the incidence of urinary tract injuries during pelvic surgery to be between 0.5%-1.5%, of which bladder injury is most common.^{2,6,7} The incidence of such injuries was 0.08% in our study, all of which was injuries related to urinary bladder. None of the

Table 2: Distribution of Urinary tract injuries

Surgery	Bladder Injury	Ureteric Injury	Intra-operative Diagnosis	Post-operative Diagnosis
Cesarean Section	6 (0.03%)	-	6	-
TAH	7 (1.04%)	-	5	2
VH	-	-	-	-
Laparotomy	1 (0.6%)	-	1	-
Bilateral Tubal Ligation	1 (7.69%)	-	1	-
Total	15		13	2

cases involving ureter and urethral injury was reported. In our series the incidence of urinary tract injuries is much lower compared to other studies.^{6,7} The reason may be because of very few surgeries involving pelvic malignancies were performed during the study period. However, the actual incidence of urinary tract injuries would have been much higher if all patients were followed up for longer.

Raut *et al.* described the incidence of bladder injury in 1.23% in gynecologic surgery and 0.67% in obstetrics surgery.⁸ Out of 15 bladder injuries in our study, 1.04% patients suffered injuries during TAH and 0.03% during cesarean section. Bilateral tubal ligation and laparotomy performed for missed intra-uterine contraceptive device (Cu-T) comprised of each case leading to bladder injury. Dense adhesion associated with history of previous pelvic surgery was seen in 53.4% of patients with urinary tract injury whereas pelvic infection with distorted pelvic anatomy was the major risk factor in 40% of patients. Only one case was complicated by severe hemorrhage associated with bladder injury.

Cesarean section at Patan hospital is by far the commonest surgery performed on women. Over the time, incidence of cases with history of previous cesarean section has increased significantly. Phipps *et al.* reported that the bladder injury were more common in patients with prior cesarean delivery compared with controls (67% Vs 32%).⁹ In our study, bladder injuries were the only urologic injuries, most of which occurred during separation of bladder from the uterus due to difficult dissection resulting from adhesion and scarring from the previous surgery which causes obliteration of safe surgical plane. Intra-operative findings that suggests bladder injury was gross hematuria in the urinary bag, direct visualization of Foley's bulb and extra vasation of urine and visible laceration.¹⁰ As continuous bladder catheterization prior to the pelvic surgery causes decompression of urinary bladder providing better visualization and exposure to the surgeon. At Patan hospital all the patients undergoing any gynecologic and obstetrics surgery irrespective of any risk factor are catheterized.

Out of 15 cases of urinary tract injury, 6 cases were performed as emergency surgeries. All the cases with urinary tract injury were performed by gynecologists and obstetricians. In contrary to the study by Jehan *et al.*¹¹ where most of the cases of urinary tract injury were performed by junior surgeons with less experience, our study showed similar incidence of injuries in surgery performed by junior and senior surgeons. Such result was possible because all the elective cases are fully evaluated pre-operatively and any surgery with associated

risk factors, where difficult surgery is anticipated is performed by the consultants.

Primary repair during the surgery has an excellent outcome and helps reduce the morbidity and mortality significantly. Consistent with other studies,^{12,13} we reported 86.7%(13 out of 15) of iatrogenic bladder injuries diagnosed intra-operatively. Though majority of the patients with injuries were identified during the primary surgery by the operating gynecologist and obstetrician, any suspected injuries to the urinary tract were consulted with surgeons immediately. Bladder defect was sutured in 2 layers with absorbable sutures (vicryl-2-0) followed by continuous Foleys catheterization for 14 days. European urology association further advises cystography to be done before catheter removal to exclude any extravasation of contrast.¹⁴ However; none of the cases underwent cystography before the removal of Foley's catheter in our study.

One of our cases developed abdominal distention on the Fourth day of Total abdominal Hysterectomy with bilateral salpingo-Oophorectomy (TAH with BSO) performed for chronic pelvic inflammatory disease. She was suspected to have suffered bladder injury during the primary surgery. Ultrasonography on the fourth day revealed moderate amount of fluid in the pouch of Douglas for which re-exploration was done. Intra-operative finding revealed bladder injury of about 3x3 cm at the postero-superior aspect of the bladder and was repaired. Another case which was performed by a lecturer with assistance of consultant presented to us in the form of vesicovaginal fistula (VVF) with complaints of urinary leakage from vagina after 32 days following TAH with BSO done for cervical fibroid. She must have sustained bladder injury during the surgery which went unnoticed. She underwent fistula repair.

Siow *et al.* and Ostrezenski *et al.* in their respective studies observed increased incidence of urinary tract injury during laparoscopic gynecologic surgery.^{15,16} In our series, none of the cases which underwent laparoscopic surgery suffered any urinary tract injuries because only few laparoscopic surgeries were performed during the study period.

Iatrogenic injuries to the urinary tract during obstetrics and gynecology surgeries cause major anxiety to surgeons and patients. Occurrence of injury to the urinary bladder is more common as compared to ureteral injury. Incidence of such injuries rises with increase in complexity of the surgery and decreases with experience of the surgeon. Adequate pre-operative preparation, comprehensive knowledge of pelvic anatomy, associated risk factors and meticulous surgical techniques helps

to prevent such injuries. Early diagnosis and prompt management of any urological complications have good prognosis and significantly limits post operative morbidity. Therefore, all the gynecologists and obstetricians must be trained in techniques to prevent and repair these injuries.

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