

## Urological Injuries during Obstetrical and Gynecological Surgeries

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### Abstract

**Object:** Review the urological injuries encountered in gynecological and obstetrical procedures in respect of frequency, predisposing factors, location, recognition of time and management.

**Place and Duration:** Department of Urology and Obstetrics and Gynecology at Peoples Medical College Hospital Nawabshah from 2007-2008.

**Study Design:** Prospective study.

**Material and Methods:** In this Prospective study of two (02) years 3400 obstetrical and gynecological surgeries were performed. Medical records of all patients who sustained urological injuries were reviewed for frequency, predisposing factors, location, and type of injury, recognition time and management.

**Results:** Thirty injuries were documented in 2930

obstetrical and 470 gynecological procedures. Twenty (20) injuries occurred in obstetrical procedures, where as 10 (ten) injuries occurred in gynecological surgeries. Twenty four (24) were bladder injuries, four (04) were ureteric injuries and two (02) were urethral injuries. The predisposing factors were previous C-Section, pelvic adhesions, huge fibroids, distorted anatomy and massive haemorrhage.

**Conclusion:** These iatrogenic injuries were preventable by paying careful attention to anatomy of urogenital organs, avoid blind application of clamps and excessive use of diathermy for haemostasis. These are due to delay of the patient, poor surgical monitoring facilities, improper training and supervision of post graduate trainees.

**Keywords:** Iatrogenic Urological injuries – Obstetric and Gynecological surgeries.

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### Introduction

The close embryologic development and anatomic proximity of the urinary and genital organs, predisposes the urinary tract to injury during surgical procedures in the female pelvis<sup>1</sup>. Injury to urinary tract in medical practice was first described on 1030 AD in the opus called “Al-Kanoun”.<sup>2</sup> Injuries to urinary bladder and ureter are not uncommon complication after obstetric or gynecological surgeries.<sup>3-5</sup> Many obstetricians and gynecologists share a common fear of injury to the ureter<sup>6</sup>. The morbidity arising from ureteric injury, includes increased hospital stay, secondary invasive

interventions, reoperation, potential loss of renal function and deterioration women’s quality of life.<sup>7,8</sup> Urological injury is serious complication in gynecological operations.<sup>9</sup>

Intra-operative injury to the ureter is possible not only during complicated surgical procedures but also during uncomplicated procedures.<sup>6</sup> Such complication can occur even in the hands of experienced surgeons.<sup>9</sup> The purpose of this study is to review frequency, predisposing factors, location, time of recognition and management of the urological injuries during both obstetrical and gynecological surgeries.

### Material and Methods

From January 2007 to December 2008, the medical records of the patients who had undergone obstetric and gynecological surgeries were analyzed for urological injuries. Thirty injuries were documented in 3400 surgeries. The age ranged from 17 to 60 years. These patients were analyzed in terms of frequency predisposing factors, location, recognition time and management. Urological injuries for malignant and radiation disease were excluded from this study. The recognition time of injury was arbitrarily divided in to: Intra-operative, early (< 1 Week) and late (> 1 week). Those cases identified intraoperatively were managed per-operatively, while those cases identified post-operatively, underwent various necessary imaging and functional studies before planned intervention, such as physical and clinical examination ultrasonography KUB, intravenous urogram and renal scan when indicated. Urethrocystoscopy and retrograde ureteric catheterization performed almost in all cases. Follow-up ranged from 3 to 6 months, following definitive correction of urological injuries. Follow-up include routine clinical assessment, ultrasonography and intravenous urogram. Success was defined as symptom free with no evidence of obstruction.

### Results

During 2 years 3400 obstetric and gynecological surgeries were done (Table 1). There were 30 patients who sustained urological injuries (Table 4). The frequency of bladder, ureteric and urethral injuries in gynecological surgery was 1.06%, 0.63% and 0.42% respectively (Table 3). Where as in obstetrical surgery frequency of bladder, ureteric and urethral injuries were 0.65%, 0.03% and 0.00% respectively. (Table 2).

The predisposing factors commonly were found, previous caesarean sections, previous pelvic surgery, pelvic adhesions, huge fibroids, distorted anatomy and massive intraoperative hemorrhage.

Out of thirty patients, 24 were urinary bladder injuries. Twenty three urinary bladder injuries were recognized on the operative table and repaired per-operatively (Table 4), while 1 (one) patient presented with urinary leakage through abdominal wound. The leaking stopped with continuous wide bore 18FR catheterization and patient did not require any surgical intervention.

Out of 23 patients of urinary bladder repair, two patients developed leakage of urine on 7<sup>th</sup> postoperative day through vagina and developed vesicovaginal fistula. Later on they submitted for definite repair after 3 months.

There were 04 patient’s sustained ureteric injuries out of 30 patients, Three (03) ureteric injuries occurred in gynecological surgery (Table 3) and one in obstetric surgery (Table 2). One patient of ureteral transaction was recognized per-operatively. Both ends of ureter was identified, mobilized, speculated and end to end anastomosis over the double J stent. Double J stent was removed after two months. One case of bilateral ureteric ligation presented with anuria, bilateral flank pain. Ultrasonography revealed bilateral hydronephrosis with hydroureter and managed with de-ligation with keeping JJ Stent within 48 hours of offending surgery. JJ Stent was removed after 2 months.

**Table 1:** Major Obstetrical and Gynaecological Surgeries. Year 2007 to 2008.

Year	Obstetrical Surgeries			Gynaecological Surgeries			Grand Total
	LCS	Obs: Hysterectomy	Total	Abdominal Hystrectomy	Vaginal Hystrectomy	Total	
2007	1300	30	1330	190	80	270	1600
2008	1565	35	1600	140	60	200	1800
Total			2930			470	3400

**Table 2:** Type of Urological Injuries in Obstetrical Surgeries, N = 2930.

Type of Injury	LCS	Obstetrical Hystrectomy	Total (%)
Urinary Bladder	15	4	19 (0.65%)
Unilateral Ureter Ligation	0	1	01 (0.03%)
Urethra	0	0	0 (0.00%)
Total	15	5	20

**Table 3:** Type of Urological injuries in gynaecological surgeries, N = 407.

Type of Injury	Abdominal Hystrectomy	Vaginal Hystrectomy	Total (%)
Urinary bladder	4	1	5 (1.06%)
Ureteral	3	0	3 (0.063%)
Unilateral Ureteral Transection	1	0	
Bilateral Ligation	1	0	
Unilateral Ligation	1	0	
Urethra	0	2	2 (0.42%)

**Table 4:** Time of Recognition and Number of Urological Injuries.

Type of Injury	Intra operative	Early < 1 Week	Late > 1 week	Total
Urinary Bladder	23	1	0	24
Ureteral Transection	1	0	0	1
Bilateral Ligation	0	1	0	1
Unilateral Ligation	0	0	2	2
Urethral Tear	2	0	0	2
Total	26	2	2	30

Two cases of unilateral ureteral ligation were presented within one month of offending surgery, with loin pain. Ultrasonography revealed severe hydronephroses with hydroureter with intact cortical thickness. Ligation was at lower segment of ureter on left side. Renal scan was done in both cases and revealed greater than 15% renal function. Ureteric catheterization was done and submitted for open surgery. Ligated portion was resected in both cases. End to end anastomosis was done over JJ stent in one case while Boaris flap repair with psoas hitch over JJ stent done in other case. Two cases of urethral injuries were recognized per-operatively and repaired over catheter.

## Discussion

Close anatomic association of genital and urinary organ, predisposes the urinary tract to injury, during pelvic surgery.<sup>1</sup> The most important surgical tool for surgeon is his / her knowledge and understanding of the anatomy in which he operates.<sup>10</sup>

Bladder injury appears to be the most prominent urological complication in our review. It occurs most commonly during the incision in to the utero-vesical space to dissect bladder caudally. It is conceivably so because of the increased scarring that may occur between the bladder base and pubovesical fascia.<sup>9</sup>

The close attachment of the ureter to the peritoneum and uterine vessels makes it particularly vulnerable during abdominopelvic surgery. Certain factors have been recognized as increasing the risk, an enlarged uterus, endometriosis, previous pelvic surgery, pelvic adhesions, distorted pelvic anatomy<sup>11</sup> and massive intraoperative haemorrhage.<sup>12</sup> Our experience is similar regarding the predisposing factors. Intraoperative measures to prevent injury include, an appropriate operative approach, adequate exposure ureteric dissection and direct visualization, mobilize bladder away from operative site. Short diathermy applications, full examination of the disease in the pelvis and seeking early urological assistance where appropriate.<sup>13</sup> Most of intraoperative ureteric injuries are unilateral and involve left lower segment.<sup>11,14,15-17</sup> Also seen in our series.

It is difficult to estimate the true incidence of such injuries: the quoted incidents of ureteral injury, in gynecological operations is 0.43% (0.2 – 0.5%),<sup>18</sup> (0.5-1.5%)<sup>19</sup> and of bladder injury is 0.5%.<sup>20</sup> Incidence of ureter and bladder injury in obstetric operations is 0.25% and 0.3% respectively.<sup>21</sup> The incidence of bladder and ureteric injuries with gynecological surgery was 1.23% and 0.11% respectively. Where as in obstetric surgery incidence of bladder and ureter injury was 0.67% and 0.33% respectively.<sup>1</sup> In our series the bladder, urethral and ureteric injuries in gynecological surgeries were 1.06%, 0.63% and 0.42% respectively where as in obstetric surgeries, bladder, urethra and ureteric injury was 0.65%, 0.03% and 0.00% respectively.

There is general agreement that when inadvertent injury to the bladder or ureter was detected during surgery, immediate on table repair is the optional treatment.<sup>22</sup> Intraoperative correction carries less morbidity and provides better quality of life.<sup>23</sup> This notion was beautifully coined by Higgins who stated: “The venial Sin is injury to the ureter but the mortal sin is the failure of recognition”.<sup>24</sup>

## Conclusion

Iatrogenic urological injuries are still a major cause of harm and concern. These injuries are preventable with meticulous anatomical knowledge and preventable with certain precautions. One should not to over look such incidences. Earliest exploration and appropriate measures are necessary in cases of ureteric injuries.

Proper training and supervision of postgraduate trainees. This will avoid the miserable life of the patient.

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