

Assessment of Urological Complications Following Obstetric and Gynaecological Surgery- A Five Years Review

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ABSTRACT

Aim: To assess the features of urological complications following obstetric and gynaecological surgery, their management, outcome and identification of risk factors for such injuries.

Method: The study was conducted in Jinnah Hospital Lahore from June-2012 to June-2017. The study was prospective interventional. We included 220 patients who had urological injuries following obstetric and gynaecological surgery. The nature of urological injury, timing of diagnosis, and methods of repair were taken into account. Risk factors for such injuries were also identified. Mean age was 36.2 years (range 26-62 years). Bladder injuries were repaired in two layers with 2/0 vicryl and bladder was drained by Foleys catheter which was retained 4 to 6 weeks. In ureteric injuries, DJ stenting alone, end to end ureteral anastomosis over a DJ stent and re-implantation of ureter into the bladder were the procedures applied.

Results: Out of 220 patients, 161 (73.1%) had urinary bladder injury. Most common site of injury was dome and posterior wall of the urinary bladder. The rent was repaired in two layer with 2/0 vicryl. Out of 161 cases with urinary bladder injury 145 (90%) were detected during the surgery and underwent primary repair with successful outcome. In 8 (3.6%) cases of urinary bladder injury, the rent was missed during the surgery. 5 cases out of these 8 were managed conservatively with bladder drainage with wide bore catheter. Re-exploration needed in remaining 3 cases. The rent identified, margin freshed and 2 layer closure done with 2/0 vicryl. Outcome was uneventful. 48 patients (21%) had Ureteric injuries. Out of 48 patients 18 (37.5%) were detected during the surgery. In 30 patients injury was detected in 3 to 33 days post operatively. 8 (16.6%) cases were managed by DJ Stenting only.

Conclusion: Urinary bladder injury was most common urological injury during obstetric and gynecologic surgery followed by ureteral injury. Presence of adhesions, previous pelvic surgery and nature of disease were significant risk factors for urological injuries. Precise knowledge of normal and morbid pelvic anatomy, early diagnosis and early urological intervention are key to success

Keywords: Obstetric gynecologic surgery, bladder injury, Ureteral injuries, ureteroureterostomies

INTRODUCTION

Anatomically urinary tract and female genital tract are closely related, so potential for injury to urinary tract must always be considered while operating on genital system¹. Injury to urinary system is known complications following obstetric and gynecologic procedures². Urological complications are defined as lacerations, rent in urinary bladder, ligation, transection of ureter and leakage of urine or contrast media from urinary tract after surgery. Urinary tract complication rate is 0.2 to 1% of all gynecological and pelvic procedures³. However true incidence is difficult to ascertain from literature as most of studies or review cases take only those patients who become symptomatic. Urinary tract injuries following obstetric and gynecologic surgery can normally be divided into acute complications such as bladder laceration/ rent or ureter laceration, transection or ligation that can be recognized immediately during surgery and chronic complications such as VVF, UVF and ureteral

stricture which can occur later on. Incidence of bladder injury increases with previous cesarean deliveries⁴. Laparoscopic hysterectomy in many centers has resulted in an increased incidence of urological injuries especially Ureteric injury⁵. Urinary bladder injuries are easy to diagnose and manage as compared to Ureteric injuries which are diagnosed late. This diagnostic delay and management failure may end up in increased morbidity and mortality. To avoid injury to urinary tract, the gynecologist must have precise knowledge of normal and morbid pelvic anatomy, meticulous surgical techniques, adequate exposure and to have a constant high level of vigilance. Ureteric injuries need early detection and early intervention to prevent deterioration of renal function and bring satisfactory outcome.

MATERIAL AND METHODS

The study was conducted in Jinnah Hospital Lahore from June 2012 to June 2017, a five years review. This was a prospective interventional study. We included 220 patients who had urological complications following obstetric and gynecologic

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surgery. The patients were operated by senior surgeons. Mean age was 36.2 years (range 26-62 years). The nature of urological injury, timing of diagnosis, methods of repair and outcome was taken into account. Risk factors for such injuries were also identified. In case of bladder injury repair was done with 2/0 vicryl in two layers and bladder drained for 3 to 6 weeks. In Ureteric injury, DJ Stenting alone, ureteroureterostomies and re-implantation of the ureter into the urinary bladder were the procedures applied. We utilized modified leich technique for ureter re-implantation. The anastomosis were carried with 4/0 vicryl over a 6 Fr DJ Stent. The DJ Stent was removed after 6 to 8 weeks. Patients with primary repair were followed on daily basis till the time they got discharged. Apart from routine examination leakage of urine/ contrast from vagina, from wound, flank distention, unexplained fever, prolonged ileus and signs of sepsis were noted during the follow up of cases with primary repair. After discharge, the patients were followed on weekly basis in OPD if they were from Lahore. Patients outside Lahore were followed on monthly basis depending upon their convenience. Telephonic liaison maintained with the patients who were from far flung areas. The study was in accordance with the ethical regulations of our Hospital ethical committee.

RESULTS

Two hundred and twenty two patients who sustained urinary tract injury following obstetric and gynecologic surgery were included in the study. Out of 220 patients, 161(73.1%) had urinary bladder injury. Common sites of injury were dome and posterior wall of the urinary bladder. Out of 161 cases with urinary bladder injury 145(90%) were detected during the surgery and underwent primary repair with successful outcome. In 8(3.6%) cases of urinary bladder injury the rent was missed during the surgery, 5 cases out of these 8 were managed conservatively with bladder drainage with wide bore catheter. Re-exploration needed in remaining 3 cases. 3(1.8%) cases of bladder injury were diagnosed in week 1-4 post operatively. 5(3.1%) cases were diagnosed late after 4 weeks of operation.

Table 1: Time of Diagnosis of Urinary Bladder Injury

Time	Frequency	% age
Intra-operative	145	90
1-7 days	08	3.6
1-4 weeks	03	1.8
> 4 weeks	05	3.1

Time of Diagnosis of Urinary Bladder Injury is shown above table 1. In 145(90%) patients, bladder injury was diagnosed intra-operatively. In 8(3.6%)

patients injury was diagnosed within 7 days of operation. In 3(1.8%) patients the injury was diagnosed within 4 weeks of operation. In 5(3.1%) patients injury was diagnosed after 4 weeks of operation.

Out of 220 patients, 48(21%) had ureteric injuries. 8(16.6%) cases were managed by insertion of DJ Stent only. 18(37.5%) cases were managed by end to end ureteral anastomosis. 22(45.8%) cases required re-implantation of ureter into the urinary bladder. Out of 48 patients, 5(10.4%) had bilateral ureteric injury. 19 (39.5%) cases had right ureteric injury and 24(50%) cases had left ureteric injury. Time of diagnosis of ureteric injuries is shown in table 2 below,

Table 2: Time of diagnosis of ureteric Injury

Time	Frequency	% age
Intra-operative	16	33.3
1-7 days	11	22.9
1-4 weeks	14	29.1
> 4 weeks	07	14.5

Table 3: Type of Obstetric & Gynecological Surgery resulting in Urinary Tract Injury

Surgery	Frequency	% age
Total Abdominal Hysterectomy	104	47.2
Sub-total Hysterectomy	20	09
Caesarian Section	60	27.2
Caesarian Hysterectomy	28	12.7
Vaginal Hysterectomy	8	3.6

Out of 48 cases with ureteric injury, 16(33.3%) were diagnosed intra-operatively. 11 cases (22.9%) were diagnosed within a week after operation. 14(29.1%) cases were diagnosed within week 1-4 after operation. 7(14.5%) cases were diagnosed late after 4th week of operation. So ureteric injuries were difficult to diagnose early as compared to bladder injuries which were easy to diagnose earlier. Now we take into account the type of obstetric and gynecological surgery resulting in urinary tract injury as shown in table 3.

Table 4: Initial Diagnosis Leading to Obstetric & Gynecologic Surgery

Diagnosis	Frequency	% age
Fibroid Uterus	81	36.8
Prolonged Labour	80	36
Endometrial Ca/ Ca Cervix	18	8
DUB- Dysfunctional Uterine Bleeding	14	6.3
Rupture Uterus	12	5.4
Placenta Percreta	11	5
VVF/ UVF	04	1.8

The most common obstetric and gynecologic surgery was total abdominal hysterectomy 104(47.2 %) followed by caesarian section 60(27.2%). Caesarian Hysterectomy 28(12.7%) and Sub-total

Hysterectomy 20(09%) also contribute significantly. Common urological procedures performed are primary bladder closure, end to end ureteral anastomosis and ureteric re-implantation into the urinary bladder. Minimal invasive intervention was DJ Stenting only.

In our study Fibroid Uterus 81 (36.8 %) was most common initial diagnosis followed by prolonged labour 80(36%), Endometrial Ca/Ca Cervix 18(8%), DUB- Dysfunctional Uterine Bleeding 14(6.3%) and Rupture Uterus 12(5.4%). There were 11(5%) cases of Placenta Percreta and 4 cases (1.8%) of VVF/ UVF-3/1. Out of 220 cases, 4 patients were expired. 2 with bilateral ureteric ligation and 2 with placenta percreta.

DISCUSSION

Close anatomical relations of female genital and urinary system increases the chances of potential injury to urinary system during surgical procedure⁶. Injury to urinary tract is a common complication of obstetric and gynecologic surgery⁷. Injury to urinary tract in medical practice was first described on 1030 AD in the Opus called "Al-Kanoun". The world wide incidence is 0.5 to 1.5 %⁸. Nigerian study reported incidence 0.4%⁹. Montz and associates reported bladder injury between 0.5 to 1%¹⁰. Bladder injuries were most common urological injuries in our study. Out of 220 patients, 161(73.1%) had bladder injury. They occur mostly during the separation of bladder from lower segment of uterus. Previous caesarian makes this dissection difficult due to scarring and more prone to bladder injury. In such circumstances upward traction on vesico-cervical fascia will make the dissection between bladder and uterus safe. Bladder injury can be suspected by urine leakage from vagina or wound, haematuria, large cystostomy is easily detected while smaller tears can be detected by filling the bladder with methylene blue mix with saline¹¹. It is beyond doubt that primary repair of bladder during operation has excellent results. In our study majority of bladder injuries were easily detected by the operating surgeon. Large fibroids, pelvic malignancies distort the pelvic anatomy so increasing the chances of urinary tract injury¹². Placenta Percreta which can affect any pelvis organ is a life threatening condition in which bladder is involved by the placenta. A multi-disciplinary approach is needed with the services of gynecologic surgeon, physician, urologist and radiologist. Efforts should be made to achieve an antenatal diagnosis to minimize blood loss. Management of placenta Percreta may be achieved with resection of part of bladder wall, ligation or embolization of internal iliac artery, immediate hysterectomy or therapy with methotrexate and preservation of bladder tissue

whenever possible¹³. In our study 11(5%) were diagnosed as placenta Percreta. 4 were managed by resecting the bladder wall and primary closure. In 2 cases bladder wall closure alone was done. In 5 cases we had to ligate the internal iliac artery with closure of bladder rent. Out of 11 cases 2 patients went into acute renal failure because of hemorrhage. In spite of haemodialysis and other measure we could not save these 2 patients. Bladder injuries are more common than ureteric injuries with ratio of 5 to 1. Urinary tract injuries occur 0.28% of all cesarian deliveries with 3 fold increase risk with repeat delivery. In our study out of 161 cases with bladder injury, 145(90%) were diagnosed intra-operatively and underwent primary repair with successful outcome. The most common indication of pelvic surgery was fibroid uterus, and most common surgery was transabdominal hysterectomy. So we concluded from our study that bladder injuries are most common urinary tract injuries, but easy to diagnose and give successful outcome with primary repair.

Ureteral injury is one of the most serious complications following obstetric and gynecologic surgery. Ureteral injuries are for more serious and often associated with high morbidity, ureterovaginal fistula formation and potential loss of renal function especially when not recognized until first operation¹⁴. Ureteric injuries are difficult to diagnose intra-operatively but can be suspected by observing the leakage of urine in the operation field. But this is difficult in case of scarring, Ca cervix, large pelvic masses and hemorrhage. Ureteric injuries can be confirmed by careful exploration of ureter along its pelvic course, with injection of diuretics and looking for urinary leakage, ureteric dilatation and peristalsis¹⁵. In difficult cases pre-operative bilateral ureteric stenting help in better ureteric exploration. Unfortunately about 2/3 of ureteric injury cases are detected post operatively with variable clinical features such as oliguria, anuria, persistent urine leakage, flank pain, fever, haematuria and signs of sepsis¹⁶. In our study out of 220 cases, 48(21%) had ureteric injuries. 16(33.3%) cases were diagnosed intra-operatively and managed by re-implantation of ureter into the bladder and end to end ureteral anastomosis with 4/0 vicryl over a DJ stent. The general principles of repair of ureteric injury are ureteric dissection preserving adventitial sheath with its blood supply, tension free anastomosis, use of omentum or peritoneum to cover the anastomosis, ureteric stenting and drainage by a passive drain to prevent urine accumulation. Intra-operative identification of ureteric injury enables easy repair and associated with decreased morbidity and negligible legal risks¹⁷. In our study the most common procedures used in ureteric injury were re-

implantation of ureter into the bladder followed by end to end ureteral anastomosis over a DJ stent. None of our cases required omental or peritoneal covering. We removed DJ Stent after 6 to 8 weeks.

The most common part of ureter to be injured is distal one third and it is liable to be injured 1. in broad ligament as ureter passes under uterine artery. 2. at infundibulopelvic ligament and ovarian fossa and 3. where ureter lies on anterior vaginal wall before its entry into the bladder¹⁸. In our study, out of 48 cases with ureteric injury 11(22.9%) were diagnosed post-operatively within 7 days and managed by early intervention. In 14(29.1%) cases late intervention done. 5(10.4%) cases had bilateral ureteric ligation. Two of these 5 cases went into obstructive uropathy which did not resolve even after our intervention. These two patients died because of chronic renal failure. Vaginal hysterectomy is reported to have lower incidence of ureteric injury when compared to abdominal hysterectomy 9 Vs 1.7%¹⁹. Patients with ureteric injury should be investigated and intervene at the earliest. Those patients who present early within 2 weeks have high chance of success with endourological procedures, obviating the need of open surgery²⁰. We managed 8(16.6%) cases with DJ stent only. When preventing measures fail, prompt recognition and early intervention can avoid long term complications such as fistula formation and loss of renal function²¹. Intra-operative recognition should be the primary aim when injury occurs, however it is not always possible. Post operative injury recognition requires a high index of suspicion and vigilance.

CONCLUSION

Urological injuries following obstetric and gynecologic surgery though uncommon, yet they have significant contribution to morbidity and litigation. Distorted pelvic anatomy from benign (large fibroid) and malignant conditions obstetric emergencies like ruptured uterus, placenta percreta and previous cesarean section were major risk factors. Patients with risk factors must have DJ stenting before proceeding to obstetric and gynecologic procedure. When urological complication develops, early diagnosis and early urological intervention are key to success to prevent occurrence of delayed urological complications. Good antenatal care, precise knowledge of normal and morbid pelvic anatomy, meticulous surgical technique by the surgeon as well as periop collaboration of consultants should reduce the rate of such complications.

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