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Original Research Article

A retrospective study of urological injuries during obstetrics and gynecological procedures

Sunil Kumar Samal, Setu Rathod*, Kalaivani Thangavel

Department of Obstetrics and Gynecology, Mahatma Gandhi Medical College and Research Institute, Pondicherry, India

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***Correspondence:**

Dr. Setu Rathod,

E-mail: seturathod@gmail.com

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ABSTRACT

Background: Urological injury in obstetrics and gynaecology are not uncommon because there is a close anatomical association between reproductive and urological system. The objective of this study was to find out the incidence and types of urological injuries in obstetric and gynaecological procedures, clinical presentation and various management option in a tertiary care hospital.

Methods: The study was a retrospective analysis of all obstetric and gynecological surgeries over a period of 6 years from January 2014 to December 2019. Cases with the documented urological injuries during these procedures were analyzed further.

Results: Total 8595 patients had undergone different obstetrics and gynecology procedures, out of which 5429 were obstetrics and 3166 were gynecology surgeries. Out of 3166 of gynecology procedures, there were 16 cases (0.5%) of bladder injuries and one case (0.03%) of ureteric injury. Out of 5429 cases of obstetric procedures there were 11 (0.2%) cases of bladder injury and one case (0.01%) of ureteric injury.

Conclusions: The incidence urological injuries during obstetrics and gynecological procedures are rare but the morbidity associated these are significant. Therefor surgeons should be more cautious and high degree of suspicion can help in early diagnosis and avoid the sequel.

Keywords: Complications, Obstetrics and gynecological procedures, Urologic injury

INTRODUCTION

Urological injury in obstetrics and gynecology are not uncommon because there is a close anatomical association between reproductive and Urological system. This is evidenced by the fact that 75% of iatrogenic urinary tract injuries are due to gynecologic procedures.¹ The incidence of urological injuries in gynecologic procedures is 0.2 to 1% of all gynecologic procedures and pelvic operations.² Although the incidence of urological injuries during obstetrics and gynecology procedures are small in number but the associated morbidity is significant in the form of haemorrhage followed by blood transfusion, longer operative time, more febrile morbidity, longer hospital stay and sometimes may need

second surgery. The etiology of urological injury in obstetrics and gynecology procedures depend upon type of surgery, presence of adhesion due to previous surgery, altered pelvic anatomy due to endometriosis and severe pelvic inflammatory disease, previous radiation therapy, location and size of cervical or broad ligament fibroids and complication like severe intraoperative bleeding.³

A regular review of these iatrogenic urological injuries will give information about their recent incidence, changing trends, the time of diagnosis, the overall morbidity observed and available management options. With this aim, this retrospective study of all the urologic injuries observed during various obstetric and gynecological procedures was carried out.

METHODS

The study was a retrospective observational study done in Mahatma Gandhi Medical College and Research Institute, Pondicherry from January 2014 to December 2019 (6 years).

Inclusion criteria

- The cases who had undergone various obstetrics and gynecological procedures during this period.
- The different gynecological procedures were total abdominal hysterectomy (TAH), total laparoscopic hysterectomy (TLH) or laparoscopic assisted vaginal hysterectomy (LAVH), non-descent vaginal hysterectomy (NDVH), vaginal hysterectomy with or without pelvic floor repair (VH), radical hysterectomy (RH), laparotomy (for ovarian cystectomy, salpingectomy, staging laparotomy), diagnostic hysteroscopy (DHL), myomectomy, Fothergill's surgery, interval sterilization and vault Prolapse surgery. The different obstetrics procedures were lower segment caesarean section (LSCS), Peripartum hysterectomy, hysterotomy and puerperal sterilization.

Exclusion criteria

- The minor obstetric and gynecological procedures where the possibility of urologic injury is almost negligible like medical termination of pregnancy, cervical encircalage and gynecological procedures like dilatation and curettage, conization and laparoscopic tubal ligation.

The data were collected from the records kept in labour ward, operation theatre and medical record section.

Statistical analysis

The data were analyzed critically. Prior clearance was taken before commencement of this study.

RESULTS

Table 1 and 2 showed that total 8595 patients had undergone different obstetrics and gynaecology procedures, out of which 5429 were obstetrics and 3166 were gynaecology surgeries. Table 1 revealed that out of 3166 of gynaecology procedures, there were 16 cases (0.5%) of bladder injuries and one case (0.03%) of ureteric injury. Most no of bladder injury cases (6, 0.62%) and the single ureteric injury case happened during total abdominal hysterectomy. Table 2 showed that out of 5429 cases of obstetric procedures there were 11(0.2%) cases of bladder injury and one case (0.01%) of ureteric injury. Most number of bladder injury cases (9.0.18%) and the single ureteric injury cases happened during LSCS. Table 3 revealed different risk factors of urological injuries including previous caesarean section,

second stage LSCS, altered anatomy due to bleeding, adherent placenta praevia, dense adhesion due to endometriosis and PID, procidentia and cervical fibroid. Most common risk factor for urologic injury in obstetrics and gynaecology procedure was previous caesarean section (41%). No identifiable cause was found in 35.9% of cases.

Table 1: Incidence of urological injuries in gynecological procedures.

Procedures	Total number of cases	Bladder injury (%)	Ureteric injury (%)
Total abdominal hysterectomy (TAH)	960	6 (0.62%)	1 (0.1%)
TLH/LAVH	124	2 (1.6%)	0
Non-decent vaginal hysterectomy	512	2 (0.39%)	0
Vaginal hysterectomy	480	3 (0.62%)	0
Radical hysterectomy	74	2 (2.7%)	0
Laparotomy	300	1 (0.33%)	0
Myomectomy	120	0	0
Diagnostic hysteroscopy	480	0	0
Fothergill-manchester operation	44	0	0
Vault prolapse	12	0	0
Interval sterilisation	60	0	0
Total gynecological procedures	3166	16 (0.5%)	1 (0.03%)

Table 2: Incidence of urological injuries in obstetrics procedures.

Procedures	Total number of cases	Bladder injury (%)	Ureteric injury (%)
LSCS	4812	9 (0.18%)	1 (0.02%)
Peripartum hysterectomy	5	2 (40%)	0
Hysterectomy	12	0	0
Puerperal sterilization	600	0	0
Total Obstetrics Procedures	5429	11 (0.2%)	1 (0.01%)

In Table 4, all gynecologic case with urological injury were analysed in detail. Out of the 6 bladder injury cases during total abdominal hysterectomy, 5 cases diagnosed intraoperatively and primary repair done with 2-0 vicryl suture. One case of bladder injury presented postoperatively as continuous urine leak and diagnosed as

vescicovaginal fistula (VVF) and repair done. Indwelling foleys catheter were kept for 10-14 days in primary repair and 14-21 days in VVF repair cases. Out of two cases of bladder injury during total laparoscopic hysterectomy (TLH) or laparoscopic assisted vaginal hysterectomy (LAVH) one case diagnosed intra-operatively and laparotomy followed by primary repair done. Another case was presented with VVF on 8th day post-op followed by secondary VVF repair was done. Out of the two cases of bladder injury during non-descent vaginal hysterectomy (NDVH), all two were diagnosed intraoperatively and primary repair was done. Out of three cases of bladder injury during vaginal hysterectomy and pelvic floor repair, two case diagnosed intra op followed by primary repair done. One case presented with urine leak on 10th post-op day followed by secondary VVF repair done. Two cases of VVF were found during radical hysterectomy and secondary VVF repair was done after 3 months. One case of ureteric

injury was diagnosed intra-operatively at the time of TAH in a case of severe endometriosis followed by ureteric reimplantation done.

Table 3: Risk factors for urological injuries.

Risk factors	Number	Percentage
Previous caesarean section	16	41%
Second stage LSCS	2	5.2%
Altered anatomy due to bleeding	2	5.2%
Adherent placenta praevia	1	2.5%
Dense adhesion due to endometriosis and PID	2	5.2%
Procidentia	1	2.5%
Cervical fibroid	1	2.5%
No identifiable cause	14	35.9%
Total	39	100%

Table 4: Analysis of gynecological cases with urological injury.

Surgical procedures	Stage of identification	Treatment modality	Duration of hospital stay
Bladder injury			
TAH (6)	5: Intra-op	5: Primary repair	14-21 days
	1: Post-op	1: VVF repair	
TLH/LAVH (2)	1: Intra-op	1: Laparotomy and primary repair	14-21 days
	1: Post-op	1: VVF repair	
NDVH (2)	2: Intra-op	All primary repair	10-14 days
VH (3)	2: Intra-op	2: Primary repair	14-21 days
	1: Post-op	1: VVF repair	
Radical hysterectomy (2)	2: Post-op	2: VVF repair	14-21 days
Laparotomy (1)	1: Intra-op	1: Primary repair	10-14 days
Ureteric injury			
TAH (1)	1: Intra-op	1: Ureteric reimplantation	14 days

Table 5: Analysis of obstetrics cases with urological injury.

Surgical procedures	Stage of identification	Treatment modality	Duration of hospital stay
Bladder injury			
LSCS (9)	9: Intra-op	9: primary repair	10-14 days
Peripartum hysterectomy (2)	2: Intra-op	2: primary repair	14-21 days
Ureteric injury			
LSCS (1)	1: Post-op	1: laparotomy and ureteric reimplantation	14-21 days

In Table 5, all obstetric cases with urological injury were analysed in detail. Out of the 12 cases of bladder injury happened during LSCS, all cases were diagnosed intraoperatively followed by primary repair was done with 2-0 vicryl. Indwelling foleys catheter was kept for 10 to 14 days. Two cases of bladder injury observed during emergency peripartum hysterectomy intraoperatively followed by primary repair was done. One case of ureteric injury (Kinking of ureter) was

detected in one post LSCS case on 7th post-op day followed by laparotomy and ureteric reimplantation was done.

DISCUSSION

The incidence of bladder and ureteric injury during gynecology procedures in this study were 0.5% and 0.03% respectively. The incidence of bladder and ureteric

injuries in obstetric procedures were 0.2% and 0.01% respectively. The overall incidence of urological injuries as reported in previous studies varies from 0.5-1.5%.^{4,5} Ozdemir et al showed that incidence of bladder and ureteric injuries in gynecologic surgeries as 1.23% and 0.11% respectively, whereas in obstetric procedures incidence of bladder injury was reported as 0.67% and ureteric injury as 0.33%.⁶ In this study, authors observed two cases of bladder injury out of five peripartum hysterectomies, which was the maximum incidence across all surgeries. In literature, other studies also reported about high incidence bladder and ureteric injuries of 6.1% and 1.5% respectively for obstetric hysterectomies.⁷⁻⁹ The possible explanation proposed in these cases are difficulty in identifying anatomy due to presence of blood in the surgical field and atonic uterus.⁹ In gynecological procedures, radical hysterectomy for gynecologic malignancy was associated with maximum incidence of 2.7%, which is similar to incidences reported in literature.^{10,11} The possible explanation of urological injury during these procedures was due to extensive dissection performed during these surgeries and pelvic adhesion caused by gynecologic cancer.¹¹ In benign gynecology procedures, the highest incidence of bladder injury observed in laparoscopic procedures like TLH/LAVH followed by simple TAH (0.62%) and VH (0.62%) cases. The possible explanation was attributed to steep learning curve for laparoscopic procedures. In literature, other studies also suggest laparoscopic surgeries have increased the incidence of urologic injuries and with achievement of the learning curve, though the frequency of bladder injury has declined but that of ureteric injury is still high.^{11,12} In this study, authors observed that there were 27 cases of bladder injuries compared to two cases of ureteric injuries in overall all obstetrics and gynecology procedures. Among the cases of bladder injury, 22 cases diagnosed intraoperatively and the remaining five were presented as VVF during post-operative period. The prognosis and outcome of primary repair is good without much late sequels. Hence it is important to identify bladder injuries intra-operatively and perform primary repair to minimize morbidity to the patient. In this study, authors observed two cases of ureteric injury, one during TAH for grade four endometriosis case and another during LSCS for one second stage arrest. The ureteric injury for gynecology procedure was identified intraoperatively and managed by ureteric reimplantation. The other ureteric injury happened during LSCS for second stage arrest was diagnosed postoperatively on 7th POD and managed by laparotomy with ureteric reimplantation. This concurs with other reported cases of ureteric injuries in literature, which also states ureteric injuries are rarely diagnosed intraoperatively.^{12,13} Intra-operatively diagnosed cases of ureteric injuries are usually more easily repaired at the time without the need for a second surgical intervention.^{8,11} Any delay in the diagnosis leads to increase in morbidity, prolonged hospital stay and repeat surgery. Usually ureteric injuries are not always easy to diagnose and suspicion should be raised in patients with

unexplained hematuria, fever, abdominal or flank pain and poor urine output.^{9,12} Regardless of the cause of urological injury and damage, quick radiological investigation in the form of intravenous urography or contrast-enhanced computed tomography is ultimately required for diagnosis to prevent delay in treatment.¹³ In this study, five cases of VVF observed in gynecology procedures. All cases needed secondary repair, with the help of urology surgeons. The possible etiology for these urological injuries is presence of adhesion between bladder and previous LSCS uterine scar with obliteration of safe surgical plane.^{7,12} Gynecological malignancy, carcinomas, large cervical fibroid, procidentia, LSCS in second stage arrest were other risk factors observed in this study. In literature, previous studies have shown higher incidence of urologic injuries in surgery for prolapse and procidentia.^{11,13} It also has been observed that most of the cases of ureteric injuries happened in lower third of ureter and most likely were caused by thermal injury during laparoscopy.^{10,12} The most common sites of ureteric injury happened during hysterectomy was along the pelvic wall lateral to the uterine artery, the area of uretero-vesical junction, and the base of infundibulopelvic ligament.⁹⁻¹² Following measures like a thorough knowledge of pelvic anatomy, being close to the uterus when coagulating, intraoperative cystoscopy and dissecting ureter throughout its course in difficult cases are recommended as measures to avoid ureteric injuries.

CONCLUSION

The incidence urological injuries during obstetrics and gynecological procedures are rare but the morbidity associated these are significant. Bladder injuries are more common, easy to diagnose and easy to manage if diagnosed early. In other hand, ureteric injuries during obstetrics and gynaecology procedures are difficult to diagnose and hence cause more morbidity than bladder injuries. Therefor surgeons should be more cautious and high degree of suspicion can help in early diagnosis and avoid the sequel.

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