MAK HILL Publications Research Journal of Medical Sciences

Research Article
doi: 10.59218/makrjms.2024.4.338.342

Urosurgical Complications Following Gynecological Surgeries at an Indian Hospital: A Retrospective Analysis

[1]Nishi Mishra, [2]Amita Sharma, [3]Rohit Dubey and [4]Namrata Shrivastava

[1]Department of Obstetrics and Gynaecology, Government Medical College, Satna, Madhya Pradesh, India
[2]Department of Obstetrics and Gynaecology, Government Medical College, Datia, Madhya Pradesh, India
[3]Department of General Surgery, Government Medical College, Satna, Madhya Pradesh, India
[4]Department of Obstetrics and Gynaecology, Index Medical College, Hospital and Research Centre, Indore, Madhya Pradesh, India

OPEN ACCESS

Key Words
Urological injury, gynecological surgery, ureter, strictures

Corresponding Author
Namrata Shrivastava,
Department of Obstetrics and Gynaecology, Index medical College, Hospital and Research Centre, Indore, Madhya Pradesh, India
namratakhare2407@gmail.com

Author Designation
[1]Senior Resident
[3]Assistant Professor
[2,4]Associate Professor

Received: 24 December 2023
Accepted: 18 January 2024
Published: 27 February 2024

Citation: Nishi Mishra, Amita Sharma, Rohit Dubey and Namrata Shrivastava, 2024. Urosurgical Complications Following Gynecological Surgeries at an Indian Hospital: A Retrospective Analysis. Res. J. Med. Sci., 18: 338-342, doi: 10.59218/makrjms.2024.4.338.342

ABSTRACT
Urological trauma following gynecological or obstetrical surgeries presents a significant concern, particularly in settings with limited resources, where its prevalence remains inadequately documented and posing substantial health challenges. This study aims to investigate the clinical, therapeutic and prognostic dimensions of iatrogenic urological injuries. A retrospective, descriptive analysis was conducted at a tertiary health care hospital in India. The study encompassed all gynecological surgical procedures performed within the department, with exclusive focus on Urinary Tract Injuries (UTI) occurring during surgery. UTIs arising outside this context were excluded. Socio-demographic characteristics, clinical manifestations, intraoperative UTI presentations and treatment outcomes were analyzed. Statistical analyses were performed utilizing Epi Info 6 software. A total of 56 cases of UTI (6.02%) were documented, comprising bladder and combined bladder and ureteral injuries. The mean age of patients was 28.75 years. UTIs were suspected intraoperatively based on hematuria or direct visualization and postoperatively from peritonitis symptoms. Prompt repair of UTIs was performed in the majority of cases, primarily through bladder suturing or cystorrhaphy. Postoperative complications included urogenital fistulas, urinary tract infections and acute peritonitis. The average hospitalization duration in the urology department was 39 ± 6 days, with no maternal fatalities reported. While urologic complications arising from gynecologic procedures may be inevitable at times, adherence to standardized surgical protocols can mitigate their occurrence. Tailored treatment strategies should be based on injury location, extent and available surgical interventions.

INTRODUCTION

A significant challenge in obstetrics and gynecologic surgery is the frequent occurrence of bladder injuries. These postoperative complications are unintended but can result directly from the surgical procedure or the surgeon's expertise. Adherence to surgical standards and guidelines can help prevent such incidents, which may lead to legal consequences[1-3].

Urinary tract infections (UTIs) primarily stem from the close anatomical proximity between the pelvic genital organs and the urinary tract. They occur in 0.2-1% of all gynecologic pelvic surgeries, with higher risks observed in cases of severe endometriosis and locally advanced cervical cancers. UTIs predominantly affect the lower ureter (51%), followed by the upper (30%) and middle (19%) portions. Common iatrogenic lesions encompass the pelvic segment of the urethra, posing a consistent risk during pelvic surgery. These injuries can result from ligature ligation or kinking, clamping, division, devascularization, or diathermy-related damage. However, complete or partial ureter transection is the most frequent mechanism[4-6].

The severity of such injuries lies in their potential impact on the upper urinary tract. With the increasing rate of cesarean deliveries, the incidence of urologic complications may rise. During hysterectomies, the uterine arteries intersect the pelvic portion of the ureter, heightening the risk of iatrogenic injury. The frequency of UTIs is challenging to ascertain due to underreporting. The initial mechanism often originates from obstetrical surgery but can also occur incidentally during gynecological procedures[1-3,7]. Adherence to standard surgical procedures can help prevent and mitigate iatrogenic urological complications in gynecological surgery. In managing cervical malignancies, prevention strategies encompass primary prevention (prophylactic treatment), secondary prevention (early detection) and tertiary prevention (treatment)[8-11]. Individualized management of malignant lesions is essential to avoid urinary tract trauma. This study aims to discuss clinical and management data for UTIs during gynecology surgery in a tertiary health care hospital in India.

MATERIALS AND METHODS

This retrospective descriptive study focused on patients with iatrogenic UTI treated during emergency or scheduled surgeries surgery in a tertiary health care hospital in India. Inclusion criteria comprised cases of ureteral injuries with available clinical observations, abdomino-pelvic ultrasound imaging and operative reports. Additionally, all instances of iatrogenic UTIs documented intraoperatively or postoperatively during initial gynecological surgeries were included, while traumatic UTIs occurring outside of surgical procedures were excluded. The study analyzed causative events, intraoperative UTI features (lesion topography and characteristics), methods of lesion repair, repair outcomes, socio-demographic characteristics, time to diagnosis. Urologists performed surgical reconstructions either during the primary operation or reoperation.

Statistical analysis utilized Epi Info 6 software, with qualitative variables expressed as proportions and quantitative variables represented by means with standard deviations (SD), medians and ranges. Student's t-test and Chi-square test were used to compare mean, standard deviation and proportions, with significance set at $p<0.05$.

RESULTS

A total of 930 gynecological procedures were documented. Within this cohort, 56 instances of iatrogenic Urinary Tract Injuries (6.02%) were identified, comprising 71.43% of bladder injuries. The mean age of the patients was 28.75 years, with the majority falling within the age range of 15 to 40 years (25.82%). Further details on socio-demographic characteristics are presented in Table 1.

Hysterectomy emerged as the primary causative procedure for iatrogenic ureteral injury, predominantly performed via open abdominal approach in majority of cases. Intraoperative suspicion of ureteral injury was primarily triggered by hematuria (53%) or visual identification (24%). The nature of ureteral injury included ligations and complete ureteral transection. Although intravenous urography (IVU) or computed tomography (CT) scan was not conducted, seven patients exhibited pelvicalyceal dilatation or ureterohydronephrosis on ultrasound. Postoperatively, presentations included urine leakage into the peritoneum, anuria or oliguria and flank or lumbar pain. Refer to Table 2 and 3 for detailed information.

Immediate repair of Urinary Tract Injuries (UTIs) upon identification was undertaken in 96.16% of cases. Management strategies comprised simple bladder injury suturing, end-to-end suturing of traumatic lesions in the terminal part of the ureter, ureteral reconstruction involving procedures such as ureteroneocystostomy and end-to-end ureteroureterostomy, or removal of ureteral ligations (Table 3).

Follow-up revealed postoperative complications in 16.47% of cases, including urogenital fistulae (51%), urinary tract infections (24.5%) and peritonitis (24.5%). Vesicovaginal fistulae were surgically repaired after three months, with a median hospital stay of 42 days. The average duration of inpatient stay in the urology department was 39±6 days, with no maternal deaths reported.

Table 1: Socio-demographic variables of study population

Variables	n	Percentage
Age group		
15-20 years	6	10.71
21-30 years	18	32.14
>31 years	32	57.14
Parity		
Primipara	19	33.93
Paucipara	7	12.50
Multipara	30	53.57
Abdominal surgery in past		
Yes	35	62.50
No	21	37.50

Table 2: Pre-operative Diagnoses in study population

Variables	n	Percentage
Benign lesions	22	39.29
Uterine leiomyoma	15	26.79
Endometriosis	5	8.93
Ovarian lesion	2	3.57
Malignant lesions	34	60.71
Cervical cancer	28	50.00
Ovarian cancer	4	7.14
Endometrial cancer	2	3.57
Pelvic adhesions	56	100.00
Filmy	22	39.29
Dense	34	60.71

Table 3: Surgical management of UTIs

Variables	n	Percentage
Type of Surgical approach (n = 56)		
Open laparotomy, suprapubic, transverse	40	71.43
Open laparotomy, mid-line, sub-umbilical	9	16.07
Vaginal surgery	4	7.14
Laparoscopic surgery	3	5.36
Surgery during open laparotomy (n = 49)		
Radical hysterectomy	26	53.06
Myomectomy	10	20.41
Simple total hysterectomy	9	18.37
Adnexal surgery	4	8.16
Surgery during laparoscopy (n = 3)		
Adnexal surgery	2	66.67
Total hysterectomy	1	33.33
Adhesiolysis	0	0.00
Vaginal surgery (n = 4)		
Prolapse surgery	3	75.00
Total hysterectomy	1	25.00
UTIs (n = 56)		
Bladder injury	40	71.43
Ureteral injury	10	17.86
Bladder + ureteral injury	6	10.71
Time of diagnosis (n = 56)		
During initial surgery	49	87.50
Postoperative	7	12.50
Repair of UTIs (n = 56)		
Simple bladder suture	45	80.36
Uretero-vesical reimplantation	5	8.93
Simple end-to-end ureteric suture	2	3.57
Ureteric reconstruction	2	3.57
Ureteric strictures removal	2	3.57

DISCUSSION

In our investigation, there were 56 instances of iatrogenic urinary tract injury documented. These complications predominantly arose during gynecological surgeries, although a significant portion emanated from obstetrics and gynecological procedures. This trend is attributed to the close anatomical proximity between the urinary and female genital organs. Urinary tract injuries (UTIs) incurred during pelvic surgery present formidable challenges to surgical teams involved. They pose the risk of legal ramifications involving healthcare practitioners and institutions, as well as substantial morbidity and mortality rates[2,3,12-14].

Traumatic urological injuries during pelvic surgery in women are seldom documented[12]. In our practice, research on this subject is limited due to inadequate registration of such lesions or their management by other medical teams[15-17]. Nonetheless, analyzing postoperative complications is imperative for surgeons to conduct audits, understand causative factors and develop strategies to prevent future occurrences. Recognizing the necessity for meticulous documentation, grading systems for postoperative complications have been devised to ensure uniformity and standardized reporting across different units, facilitating objective comparisons of practices[18,19].

Our study revealed that UTIs are typically identified intraoperatively or sometimes detected late in patients aged 15 to 40 years, consistent with existing literature. Multiparous women comprised the majority of cases, aligning with findings from other studies[15,16,20-22]. The demographic profile reflected the socio-demographic characteristics, where pregnancies are often early, numerous and closely spaced[2,14,15,21].

During radical surgery for malignant pelvic tumors, cleavage of the peritoneum between the bladder and uterus may pose a risk for traumatic bladder injuries[1,7,13]. In our study, iatrogenic traumatic lesions were predominantly detected intraoperatively, contrary to Western literature[1,3-6]. The incidence of intraoperative ureteral iatrogenic injuries was lower compared to other studies[23-27]. Early diagnosis ensures better prognoses by enabling prompt intervention.

Most ureteric injuries occur during gynecological procedures and necessitate intraoperative identification to prevent significant complications[19,20,24,25]. Postoperative diagnosis of UTIs can be challenging due to nonspecific clinical manifestations and the unavailability or high cost of diagnostic tests[15,20,28]. While Computed Tomography Urography (CTU) is considered the gold standard for diagnosis, its utility may be limited in resource-constrained settings[20,29].

Management of ureteral traumatic injuries encompasses various approaches, including end-to-end simple stitching, ureterostomy, or removal of abnormal ligation stitches. Additionally, ureteric reconstruction or stenting are efficacious interventions. Techniques for reconstructing ureteral strictures have evolved, with promising results observed in recent years. However, these advanced procedures require resources often unavailable in low-resource settings[30-32].

Preventive measures, such as skill acquisition, adherence to surgical guidelines and technological

advancements like laparoscopic approaches, can mitigate the incidence of urinary complications in pelvic surgery. The findings underscore the importance of meticulous reporting to enhance understanding and improve the management of urinary complications, particularly in LMICs where therapeutic options may be limited and populations are economically disadvantaged. This study serves as a foundation for better reporting practices and informs strategies to enhance patient outcomes in pelvic surgery.

CONCLUSION

Urological complications linked to gynecologic and obstetric interventions can be averted through the expertise of skilled surgeons operating in suitable environments. Early detection and proper management are imperative. In the event of complications, timely recognition and correction are crucial, with the approach contingent upon the nature and extent of the iatrogenic injury.

REFERENCES

1. Varlas, V.N., Y. Rhazi, R.G. Bors, O. Penes and D. Radavoi, 2021. The urological complications of vaginal birth after cesarean (VBAC) - a literature review. J. Med. Life, 14: 443-447.
2. Ridha, F., M. Latifa, R. Ines, H. Maamar and B. Salem, 2018. Ureteral injuries complicating gynecologic surgery. Pan Afr. Med. J., Vol. 30, No. 145 .10.11604/pamj.2018.30.145.15470.
3. Sokol, D.K. and J. Wilson, 2008. What is a surgical complication?. World J. Surg., 32: 942-944.
4. Selli, C., F.M. Turri, C. Gabellieri, F. Manassero, M.D. Maria and A. Mogorovich, 2014. Delayed-onset ureteral lesions due to thermal energy: An emerging condition. Archivio Ital. Urol. E Androl., 86: 152-156.
5. Lee, J.S., J.H. Choe, H.S. Lee and J.T. Seo, 2012. Urologic complications following obstetric and gynecologic surgery. Korean J. Urol., 53: 795-799.
6. Avritscher, R., D.C. Madoff, P.T. Ramirez, M.J. Wallace and K. Ahrar *et al*., 2004. Fistulas of the lower urinary tract: Percutaneous approaches for the management of a difficult clinical entity. Radiographics, 24: S217-S236.
7. Berkmen, F., A.E. Peker, H. Alagöl, A. Ayyildiz, A.I. Arik and S. Başay, 2000. Treatment of iatrogenic ureteral injuries during various operations for malignant conditions. J. Exp. Clin. Cancer Res., 19: 441-445.
8. D'oria, O., G. Corrado, A.S. Laganà, V. Chiantera, E. Vizza and A. Giannini, 2022. New advances in cervical cancer: From bench to bedside. Internat. J. Environmental Res. Public Health, Vol. 19, No. 7094 .10.3390/ijerph19127094.
9. Poniewierza, P. and G. Panek, 2022. Cervical cancer prophylaxis—state-of-the-art and perspectives. Healthcare, Vol. 10, No. 7. 10.3390/healthcare10071325.
10. Bogani, G., L. Lalli, F. Sopracordevole, A. Ciavattini and A. Ghelardi *et al*., 2022. Development of a nomogram predicting the risk of persistence/recurrence of cervical dysplasia. Vaccines, Vol. 10, No. 579. 10.3390/vaccines10040579
11. Bogani, G., F. Sopracordevole, V.D. Donato, A. Ciavattini, A. Ghelardi and S. Lopez, 2021. High-risk HPV-positive and -negative high-grade cervical dysplasia: Analysis of 5-year outcomes. Gynecologic Oncol., 61: 173-178.
12. Teeluckdharry, B., D. Gilmour and G. Flowerdew, 2015. Urinary tract injury at benign gynecologic surgery and the role of cystoscopy. Obstet. Gynecol., 126: 1161-1169.
13. Popoola, A.A., G.G. Ezeoke and A. Olarinoye, 2013. Urological complications from obstetrics and gynaecological procedures in ilorin, Nigeria - case series. J. West Afr. Coll. Surgeons, 3: 99-109.
14. Eke, N., 2000. Iatrogenic urological trauma: A 10-year experience from port harcourt. West Afr. J. Med., 19: 246-249.
15. Bouya, P.A., A.W.S. Odzébé, F.G. Otiobanda, C. Itoua and K. Mahoungou-Guimbi *et al*., 2011. Urological complications of gynecologic surgery. Progrès En Urol., 21: 875-878.
16. Kpatcha, T.M., K. Tengué, T. Anoukoum, G. Botcho and K.H. Sikpa *et al*., 2014. Complications urologiques de la chirurgie pelvienne au chu aristide le dantec de dakar. Afr. J. Urol., 20: 206-210.
17. Pal, D., V. Wats and B. Ghosh, 2016. Urologic complications following obstetrics and gynecologicai surgery: Our experience in a tertiary care hospital. Urol. Ann., 8: 26-30.
18. Strasberg, S.M., D.C. Linehan and W.G. Hawkins, 2009. The accordion severity grading system of surgical complications. Ann. Surg., 250: 177-186.
19. Dindo, D., N. Demartines and P.A. Clavien, 2004. Classification of surgical complications. Ann. Surg., 240: 205-213.
20. Raassen, T.J.I.P., C.J. Ngongo and M.M. Mahendeka, 2017. Diagnosis and management of 365 ureteric injuries following obstetric and gynecologic surgery in resource-limited settings. Internat. Urogynecol. J., 29: 1303-1309.
21. Sangaré, D., H.J.G. Berthé, M.L. Diakité, A. Samassekou and A.S. Diakité *et al*., 2018. Urological complications of pelvic surgery at point-g hospital, about 23 cases. Mali Med., 33: 9-12.

22. Rao, D., H. Yu, H. Zhu and P. Duan, 2011. The diagnosis and treatment of iatrogenic ureteral and bladder injury caused by traditional gynaecology and obstetrics operation. Arch. Gynecol. Obstet., 285: 763-765.
23. Smith, A.P., A. Bazinet and D. Liberman, 2019. Iatrogenic ureteral injury after gynecological surgery. Can. Urol. Assoc. J., 13: S51-S55.
24. Gild, P., L.A. Kluth, M.W. Vetterlein, O. Engel, F.K.H. Chun and M. Fisch, 2018. Adult iatrogenic ureteral injury and stricture-incidence and treatment strategies. Asian J. Urol., 5: 101-106.
25. Chung, D., J. Briggs, B.W. Turney and C.R. Tapping, 2016. Management of iatrogenic ureteric injury with retrograde ureteric stenting: An analysis of factors affecting technical success and long-term outcome. Acta Radiol., 58: 170-175.
26. Ku, J.H., M.E. Kim, Y.S. Jeon, N.K. Lee and Y.H. Park, 2003. Minimally invasive management of ureteral injuries recognized late after obstetric and gynaecologic surgery. Injury, 34: 480-483.
27. Ostrzenski, A., B. Radolinski and K.M. Ostrzenska, 2003. A review of laparoscopic ureteral injury in pelvic surgery. Obstetrical Gynecol. Surv., 58: 794-799.
28. Trombatore, C., G. Giordano and V.M.S. Lio, 2017. Interventional radiology in iatrogenic ureteral leaks: Case series and literature review. Radiol. Med., 122: 696-704.
29. Lynch, T., L. Martinezpineiro, E. Plas, E. Serafetinides, L. Turkeri, R. Santucci and M. Hohenfellner, 2005. EAU guidelines on urological trauma. Eur. Urol., 47: 1-15.
30. Mian, D.B., V. Angoi, R. Kasse, A. Yao and S. Akinloye *et al*., 2023. Urologic complications following gynecologic surgery in a sub-saharan west African country. Clin. Experimental Obstet. Gynecol., Vol. 50, No. 5 .10.31083/j.ceog5005092.
31. Locke, J.A., S. Neu and S. Herschorn, 2021. Morbidity and predictors of delayed recognition of iatrogenic ureteric injuries. Can. Urol. Assoc. J., 16: E1-E.
32. Ding, G., X. Li, D. Fang, H. Hao, X. Li and L. Zhou, 2021. Etiology and ureteral reconstruction strategy for iatrogenic ureteral injuries: A retrospective single-center experience. Urol. Internat., 105: 470-476.