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Original Article

A 7-Year Review of Urological Injuries arising from Obstetric and Gynaecological Surgeries in Abuja, Nigeria

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Abstract

Background: Collateral injuries to the urinary tract during obstetric and gynaecological (O&G) surgeries are not uncommon. Delay in recognition of such mishaps may lead to significant morbidity and mortality. This study aims to document the incidence, clinical presentations, aetiology, types and management of urologic injuries arising from O&G surgeries.

Methodology: Retrospective review of electronic medical records of all patients with urologic injuries arising from O&G surgeries managed by the urology unit of Federal Medical Centre, Abuja, from January 2019 to December 2025. The extracted data included biodata, clinical presentation, initial O&G diagnoses, types of injuries, timing of injury recognition, and reconstructive surgeries performed, as well as outcomes. These were analysed using SPSS 27.0

Results: There were 19 patients (0.26%) with urologic injuries out of 7,312 O&G surgeries performed within the study period. The mean age of the patients was 39.4 ± 9.6, with ages ranging from 27 to 64 years. Total abdominal hysterectomy was the leading offending surgery (n=10, 52.6%). The commonest initial diagnosis was uterine leiomyoma (n=8, 42.1%). Bladder injury (n=10, 52.6%) was more common than the ureteric injury (n=9,47.4%) in our study. Most of the injuries were recognized intra-operatively (57.9%). We did not record any mortality.

Conclusion: Urologic injuries during obstetric and gynecological surgeries, though rare, can lead to significant morbidity. Our study found that total abdominal hysterectomy is the most common procedure associated with these injuries, primarily bladder injuries, most of which were detected during surgery. This underscores the necessity for increased surgeon awareness to prevent complications. Despite the low incidence and no mortality in our cohort, ongoing monitoring and the use of improved surgical techniques are crucial.

Keywords: Hysterectomy, Cesarean Section, Bladder injury, Ureteric injury, Ureteroneocystostomy, Boari flap.

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Quick Response Code:

Introduction

Urologic injuries arising from obstetric and gynecological (O&G) surgeries represent a critical yet often underestimated aspect of surgical practice globally, more so in resource-limited settings such as Abuja, Nigeria. These collateral injuries to the urinary tract can lead to significant morbidity if not promptly identified and managed [1]. The intricacies of pelvic anatomy and the proximity of the urinary tract to reproductive structures render these surgeries particularly susceptible to unintentional injuries [2-8]. In many cases, the delay in recognizing and addressing such injuries can result in prolonged hospital stays, additional surgical interventions, and diminished quality of life for affected patients [5,6,8,9].

The incidence of urologic injuries during obstetric and gynecological surgeries varies worldwide. It ranges from 0.3% to 1.5% across all procedures [2, 10, 11]. Bladder injuries are generally three times more common than ureteral injuries [10], with rates for bladder injuries estimated between 0.05% and 0.66% in gynecologic procedures [12]. Ureteral injuries are reported in 0.03% to 0.5% of gynecological procedures [6]. While the bladder is particularly susceptible during procedures like hysterectomy, Cesarean sections, and operations for pelvic organ prolapse or endometriosis [6,12], ureteral injuries are frequently associated with hysterectomy, oophorectomy, and procedures involving extensive pelvic dissection, largely due to the ureter's course under the uterine artery ("water under the bridge") and its proximity to the ovarian vessels [6].

The risks associated with urologic injuries during O&G surgeries are multifactorial. These include previous pelvic surgery, cancers, complex or emergency procedures like Cesarean section or ruptured uterus, large uterine fibroids or endometriosis, adhesions from pelvic inflammatory diseases, hemorrhage, surgeon's experience and technique, type of surgery, as well as resource-limited settings [13-16].

Prompt diagnosis is key to minimizing long-term complications of these injuries [1,9]. It is preferable to identify urologic injuries at surgery. Bladder injury can be detected by cystoscopy or by filling the bladder with sterile fluid and observing for leakage. Alternatively, methylene blue dye can be added to visualize perforations. Ureteral injuries are harder to detect intraoperatively; intravenous indigo carmine or methylene blue can sometimes reveal ureteral transection or ligation by discoloration of urine, but this is not always reliable [17]. However, about 80% of these injuries are not recognized intraoperatively [18]. This group with delayed diagnosis often presents with symptoms like prolonged ileus, flank pain, anuria, fever, peritonitis, or urinary leakage [5]. Ureterovaginal fistulas, for instance, can present days to weeks post-surgery with continuous urinary leakage from the vagina [7]. Imaging studies such as CT urogram, intravenous pyelogram (IVP), or retrograde pyelography are essential for confirming the diagnosis and localizing the injury [18].

In Nigeria, there is a paucity of research on urologic injuries during obstetric and gynecologic (O&G) surgeries [2,20-27], and a pressing need exists to better understand their incidence, types, and management strategies in this regional context. This study aims to document the clinical presentations and outcomes of urologic injuries associated with O&G surgeries at Federal Medical Centre, Abuja. Ultimately, this investigation seeks to improve patient safety and outcomes within the scope of obstetric and gynecological care in Abuja, Nigeria.

Patients and Methods:

We retrospectively reviewed the electronic medical records of all patients who sustained urologic injuries during obstetrics and gynecology (O&G) surgeries, managed by the urologic unit at the Federal Medical Centre, Abuja, from January 2019 to December 2025. The inclusion criteria encompassed all patients diagnosed with urologic injuries resulting from obstetric and gynecologic (O&G) surgical procedures, while those with incomplete records or unrelated pathologies were excluded from the study.

The hospital's Health Research and Ethics Committee approved the study protocol **(FMCABJ/HREC/2026/324).**

The extracted data comprised the patients' biodata, clinical presentation, initial diagnoses made by the Obstetricians and Gynaecologists, as well as the specific types of urologic injuries identified. Additional variables included the timing of injury recognition, which was classified into immediate (<24 hours post-surgery), early (24 hours to 7 days), and late (>7 days), as well as details regarding the reconstructive surgeries performed.

The injuries to the urinary tracts are graded according to the American Association for the Surgery of Trauma (AAST). Those identified intra-operatively were repaired primarily. Appropriate evaluations, including full blood count, renal function test and computed tomography (CT) urography, were carried out for injuries that were recognized beyond 24 hours for proper diagnosis and treatment.

All patients were followed up at the outpatient clinics. Outcomes were assessed based on criteria such as resolution of symptoms, the need for additional surgeries and any postoperative complications. Statistical analyses of the extracted data were performed using SPSS version 27.0, with descriptive statistics calculated for demographic and clinical variables.

Results:

During the 7-year study period, there were a total of nineteen patients who sustained urologic injuries. In that same timeframe, 7,312 obstetric and gynecological surgeries were performed, resulting in an incidence of urologic injuries of 0.26%.

The mean age of the patients was 39.4 ± 9.6, with ages ranging from 27 to 64 years.

Figure 1 depicts the types of obstetric and gynaecologic surgeries that were associated with urologic injuries. Total abdominal hysterectomy was the leading offending surgery (n = 8, 42.1%), followed by myomectomy (n = 7, 36.8%).

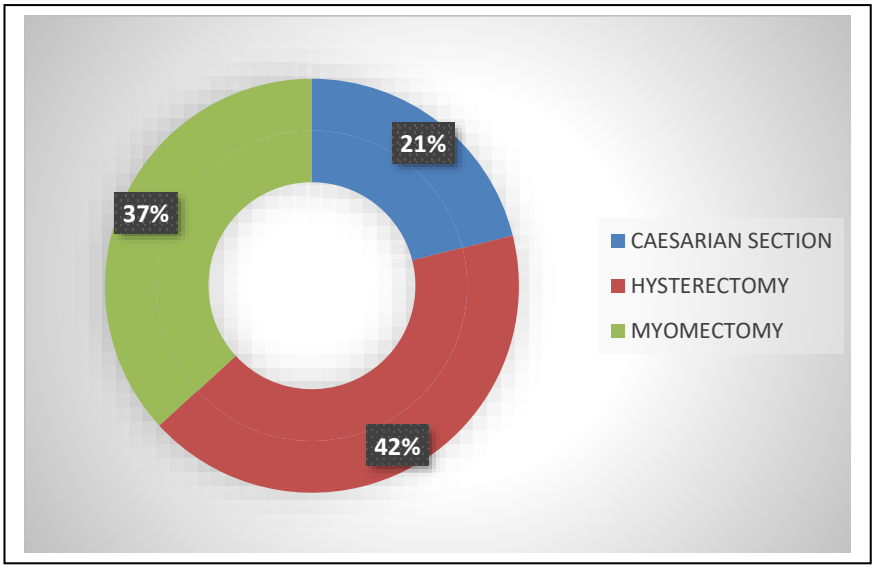

Figure 1: Obstetric and Gynaecologic surgery performed in patients with urologic injuries

The types of injury are detailed in Table 1. Bladder injury (n=10, 52.6%) was more common than the ureteric injury (n=9, 47.4%) in our study. American Association of Surgery for Trauma (AAST) Grade III (n= 6, 31.6%) and Grade IV (n=4, 21%) bladder injury was observed while 6 out of the 9 ureteric injuries were AAST grade V (31.6%).

Types of injury	Frequency	Percentage
Bladder injury		
Grade III	6	31.6
Grade IV	4	21.0
Ureteric Injury		
Grade I	2	10.5
Grade IV	1	5.3
Grade V	6	31.6

Table 1: Types of urinary tract injury

Most of the injuries were recognized intra-operatively (N=11, 57.9%) as shown in Figure 2.

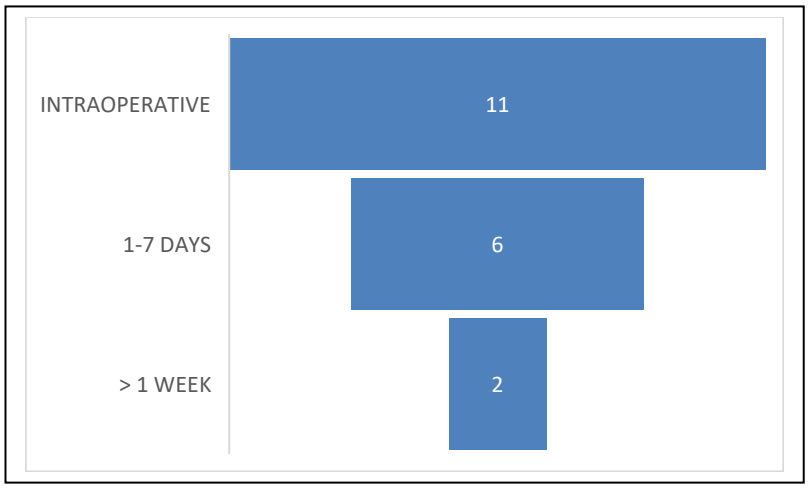

Figure 2: Funnel chart showing the timing of recognition of injury

Figure 3 shows the clinical presentation of patients with urologic injuries. Urinary leakage at the operation site, noticed intraoperatively, was recorded in 11 cases (36.7%), while 2 patients had anuria as a result of bilateral ureteric injuries. One patient presented with urinary incontinence while still retaining the urge to void.

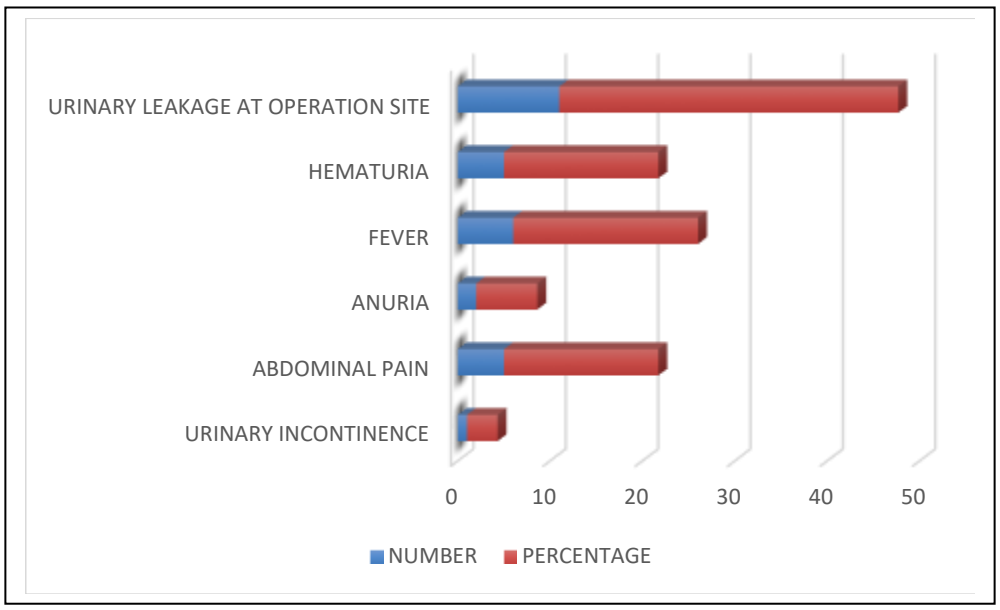

Figure 3: Symptomatology in the patients

The definitive treatments carried out in these patients are presented in Table 2. Bladder repair in two-layer was the leading definitive surgery performed during the study period (n=10,52.6%). This was followed by Ureteroneocystostomy in 5 patients, one of whose ureter was detached from the vagina and re-implanted into the bladder to cure her continuous urinary incontinence from ureterovaginal fistula.

Procedure	Frequency	Percentage
Bladder repair	10	52.6
Endoscopic Ureteric Stenting	2	10.5
Uretero-ureterostomy	1	5.3
Ureteroneocystostomy into the Boari flap	1	5.3
Ureteroneocystostomy with vesico- psoas hitch	5	26.3

Table 2: The definitive Surgeries Performed

The urology team performed all the procedures and followed up on all the cases in the clinics. One woman was referred to the Fistula Centre. We did not record any mortality.

Discussion

The study presents findings on urologic injuries that occurred during obstetrics and gynecology (O&G) surgeries, highlighting a specific focus on their frequency, types, treatment and outcomes. A total of 19 patients (0.26%) out of 7,312 surgeries experienced these complications, indicating that while rare, urologic injuries remain a concern in O&G practice. Our incidence is relatively lower than the global value of 0.5 – 1.5% [28,29] and 0.3% in the Ibadan study [2]. This may be due to under-reporting or good technique by

surgeons, as most surgeries were performed by the consultant obstetricians and gynaecologists before 2023, when senior registrars were allowed to take some selected cases independently.

The mean age of the patients was 39.4 ± 9.6 years, with a range from 27 to 64 years. This age distribution aligns with the demographics typically undergoing procedures such as total abdominal hysterectomy (TAH) or cesarean sections, where the average patient is often middle-aged.

TAH was the most common procedure associated with injury, comprising 52.6% of the cases, which is consistent with literature that cites TAH as a surgical intervention with a potential for significant complications [2,20,30]. This is also corroborated by Tijanni et al in Lagos University Teaching Hospital [26]. At Hysterectomy, ureteric injury may occur during the ligation of uterine vessels, ovarian vessels or dissection of the infundibulo-pelvic ligament [26]. The pelvic portion of the ureter has a close anatomical relationship with these structures at this location.

The report indicates that bladder injuries were more frequent (52.6%) than ureteric injuries (47.4%), a finding supported by existing research. For instance, a systematic review by Saldana et al. (2020) notes that bladder injuries occur in approximately 0.5% to 3% of abdominal surgeries, often depending on the complexity of the procedure and the surgeon's experience [31]. However, urinary bladder injury is lower in some studies [32,33], apparently due to under-reporting since these works were retrospective.

Multiple factors, including adhesions, endometriosis and urinary tract abnormalities, are associated with an increased risk of urologic injury during O&G surgeries [34,35]. Cesarean section for emergency and also from previous surgery accounted for the highest number of bladder injuries (n=6, 31.6%). This is a result of the close proximity of the bladder to the lower uterine segment. In a Caesarean hysterectomy, as documented in 2 of our cases, due to severe postpartum haemorrhage resulted in urologic injuries due to panic efforts to control bleeding.

The most commonly recorded initial diagnosis was uterine leiomyoma (52.6%), which is significant as leiomyomas are a frequent indication for TAH. This supports findings in the literature demonstrating that patients undergoing surgery for symptomatic leiomyomas are at risk for surgical complications, including urologic injuries [36]. The occurrence of emergency cesarean sections also highlights a critical area, as these procedures may involve unique challenges that could predispose patients to injury [37]

In this study, recognizing most injuries intra-operatively (57.9%) emphasizes the importance of surgical technique and awareness during surgery. This finding correlates with recommendations that surgeons should maintain a high index of suspicion for these injuries during pelvic surgeries to facilitate immediate repair [38]. This discovery rate is slightly higher than other reports [3,26,27] where the preponderance of injuries was recognized post-operatively. Our observations may be reflective of the higher number of bladder injuries identified. These AAST grade III and IV bladder lacerations were easily detected by surgeons. However, some bladder perforations may be revealed by intraoperative cystoscopy or by filling the bladder with normal saline and observing for leakage or adding methylene blue dye to be able to visualize the rent [39,40]. The detection of ureteral injury intra-operatively is, nonetheless, often difficult. High indices of suspicion are key, as direct visualization of the injury is crucial. Intravenous indigo carmine or methylene blue has been deployed by some surgeons to demonstrate ureteral transection or ligation by discoloration of urine, but with variable results [41,42].

Clinical presentation of the injury post-operatively varies depending on the type of injury and timing of detection. These include fever, sepsis or unexplained abdominal distension, persistent flank pain or abdominal tenderness, anuria or renal failure (if bilateral injury), urinoma and urine leak per vagina. In this study, the commonest post-operative presentation was fever(n=6,31.6%), while we recorded only one (5.3%) case of ureterovaginal fistula who complained of continuous urine leak per vagina. The latter feature was also reported by Lawal et al at the University College Hospital, Ibadan [7]. For these cases of delayed presentation, diagnosis was clinched with CT urography or retrograde pyelography.

Management of urologic injuries depends on the type, site, and timing of the diagnosis of the injury [6]. All of the 10 patients with Grade III and IV bladder rents identified intraoperatively were primarily repaired in two layers, and the bladder was drained continuously with a Foley catheter for 14 days. This approach was corroborated by several studies [35,39,40,43,44]. However, ureteral injuries require more complex treatment. Intraoperative detection allows for immediate repair, often through ureteroneocystostomy for distal injuries or ureteroureterostomy for more proximal injuries [2,20,23,45]. In case of delayed diagnosis or extensive damage, more advanced techniques such as Boari flap, psoas hitch, or even renal auto-transplantation may be necessary [46,47,48]. Ureteral stents are often placed post-repair to ensure patency and facilitate healing [49]. Two cases of ureteral ligation we detected intra-operatively were de-ligated and DJ stents positioned with the aid of cystoscopy; one patient had ureteroneocystostomy into a Boari flap as 7cm of her distal ureter was inadvertently excised along with a utero-cervical lesion, while 5 patients had ureteroneocystostomy with vesico-psoas hitch. The only woman in our study with a ureterovaginal fistula had the ipsilateral ureteric re-implantation into the bladder.

All our patients were followed up at the urology outpatient clinics. Urethral catheter inserted post-bladder repairs were removed at the second week, while ureteric stents were removed via cystoscopy by the third week. All have resolution of symptoms, but we recorded one case of vesicovaginal fistula following bladder repair. She was referred to the fistula centre for expert management. There was no case of mortality.

Despite our documented findings, several limitations impact this study. The small sample size (n=19) may reduce the statistical power and limit the generalizability of the results. The analysis was purely descriptive, which restricts the use of inferential statistics and a comprehensive risk factor analysis. Additionally, there is a possibility of selection bias due to incomplete data.

Conclusion

The absence of recorded mortality is noteworthy and suggests that, while urologic injuries can be serious, prompt recognition and management may mitigate severe outcomes. As surgical techniques continue to evolve, ongoing training and education in anatomy and surgical approach are vital in reducing the incidence of such complications. Recommendations for future practice include the incorporation of routine cystoscopy in cases of suspected injuries and enhancing preoperative imaging to better assess risk factors.

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