

# Iatrogenic urological injuries complicating obstetric and gynaecological procedures

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## ABSTRACT

**Introduction:** Urinary tract injuries are known complications of pelvic surgeries. Although a few instances have been noted, they remain a source of great concern to surgeons due to their associated morbidity and occasional mortality. We report our experience with the management of iatrogenic urological injuries that complicated obstetric and gynaecological surgeries over a five-year period.

**Methods:** We reviewed all cases of urological injuries managed in our unit that were deemed to be of obstetric and gynaecological origins within the study period.

**Results:** A total of 16 patients were identified as having iatrogenic urological injuries following obstetric and gynaecological surgeries. Only four patients presented early. Five patients had injuries to the bladder, while 12 had ureteric injuries; one of the 16 patients had both types of injuries. Seven cases of ureteric injuries affected only the left ureter, while three were bilateral and two affected the right ureter. One patient with a vesicovaginal fistula (VVF) was successfully managed by urethral catheter drainage alone. Three patients had transabdominal repair of the VVF, while ten had ureteroureterostomy and one had diversion procedure. Simple nephrectomy was performed for one patient with a non-functioning kidney.

**Conclusion:** Iatrogenic urological injuries are still common in our environment. In order to reduce the risk of injury, adequate preoperative preparation is recommended and meticulous surgical technique based on proper understanding of the anatomy of the urogenital system should be practised by the surgeon.

**Keywords:** gynaecological surgical procedure, intraoperative complications, obstetric surgical procedure, urinary tract injuries, urology

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## INTRODUCTION

The urinary tract is at risk of injury during pelvic surgical operations due to its proximity to the female genital system.<sup>(1)</sup> These complications, although rare, can result in morbidity and even mortality for the patients, which can create anxiety and psychosocial concerns for the patients and their spouses.<sup>(2)</sup> In different series, hysterectomy and Caesarean section were noted to be responsible for the majority of ureteric injuries.<sup>(3,4)</sup> The increasing repertoire of obstetric and gynaecological surgeries emphasises the importance of understanding the anatomy of the pelvis in order to prevent and manage lower urinary tract misadventures.<sup>(5)</sup> Measures should be taken to prevent these complications in our environment, where there is a strong aversion to surgery. In this study, we analysed the pattern of occurrence and the circumstances surrounding all urological injuries that occurred during obstetric and gynaecological operations over a five-year period. Our purpose was to highlight these injuries and emphasise the measures required to prevent them.

## METHODS

This study was conducted in the Urology unit of University of Benin Teaching Hospital, Benin City, Nigeria from August 2002 to July 2007. All patients who were referred to the unit with a suspected diagnosis of urinary tract injury were identified and included in the study. Information obtained included the patients' age, parity, level of education, occupation, presenting symptoms and the nature of the antecedent surgery. The results of relevant clinical and radiological investigations were noted. Investigations were repeated whenever necessary. Patients with unequivocal urinary tract injuries resulting from obstetric and gynaecological surgeries were identified.

In this study, the timing of presentation was noted as 'early' if the patient presented within seven days of the operation, and 'late' thereafter. The primary disease referred to the disease condition that necessitated the obstetric or gynaecological surgery (primary procedure). The outcome was deemed to be 'good' if there was no residual leakage of urine and 'fair' if there was residual leakage of urine or if a diversion procedure was performed, either of which resulted in an improvement in the patient's quality of life.

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**Table I. Modes of presentation of the patients.**

Clinical presentation	No. of patients
Leakage of urine per vaginam	12
Loin pain	3
Anuria	2
Fever	1
Peritonitis	1
Bleeding per vaginam	1

**Table II. Treatment administered to patients with iatrogenic urologic injuries.**

Treatment	No. of patients (%)
Conservative management of VVF	1 (6.25)
Repair of VVF	3 (18.75)
Ureteroneocystostomy	10 (62.5)
Ureteroureterostomy	1 (6.25)
Bilateral cutaneous ureterostomy	1 (6.25)
Nephrectomy	1 (6.25)

Note: One patient underwent both repair of VVF and ureteroneocystostomy

VVF: vesicovaginal fistula

## RESULTS

A total of 16 patients with urological injuries that were traceable to obstetric and gynaecological surgeries were seen during this period. The patients were 16–50 years of age (median 41.5 years) and were of parity 0–7 (median parity 4). Five (31%) of these patients were referred from the Obstetrics and Gynaecology Department following surgeries in our hospital, while 11 (69%) were referred from other hospitals. Five of the 16 patients had tertiary education, while four (19%) had secondary education, five had primary education and two had no formal education. The most common presenting symptom was leaking of urine per vaginam (Table I). Of the 16 patients, five (31%) had previous Caesarean sections before the primary procedures. 12 (75%) patients had undergone abdominal hysterectomies either for huge uterine fibroids, morbidly adherent placenta praevia, ruptured gravid uterus or early carcinoma of the cervix uteri. Other causes of injury were Caesarean section (n = 2), excision of a large pelvic tumour (n = 1) and radiotherapy (n = 1).

Delays in presentation ranged from five days to nine years (median seven weeks). Four patients presented early, while 12 presented late. The injuries sustained during the primary procedure were transection of the ureter (n = 6), ligation of the ureter (n = 6), laceration of the bladder (n = 3) and devitalisation of the bladder tissue (n = 1). Three patients had bilateral ureteric injuries. Two patients had multiple injuries, one of whom had both rectovaginal and vesicovaginal fistulae (VVF).

**Table III. Outcome of treatment of injuries.**

Presentation/diagnosis	Definitive treatment	Outcome
Vesicovaginal fistula	Conservative	Good
Ureterovaginal fistula	Ureteroneocystostomy	Good
Vesicovaginal fistula	Transabdominal repair	Good
Obstructed ureter	Ureteroneocystostomy	Good
Vesicovaginal fistula	Transabdominal repair	Fair
Vesicourethrovaginal fistula	Bilateral cutaneous ureterostomy	Fair
Ureterovaginal fistula	Ureteroneocystostomy	Good
Ureterovaginal fistula	Ureteroneocystostomy	Good
Ureterovaginal fistula	Ureteroureterostomy	Good
Ureterovaginal fistula	Ureteroneocystostomy	Good
Non-functioning kidney	Simple nephrectomy	Good
Ureterovaginal fistula	Ureteroneocystostomy	Good
Ureterovaginal fistula	Ureteroneocystostomy	Good
Ureterovaginal fistula	Ureteroneocystostomy	Good
Ureterovaginal fistula/ vesicovaginal fistula	Ureteroneocystostomy/ transabdominal repair	Good
Ureterovaginal fistula	Ureteroneocystostomy	Good

Note: 'Good' outcome denotes no residual leakage of urine. 'Fair' outcome denotes residual leakage of urine or if a diversion procedure was performed.

These injuries had followed prolonged obstructed labour. One of these patients had sustained left ureteric ligation during transvaginal repair of the VVF before she was referred to us. The other had bladder laceration as well as a left ureteric ligation. Four (25.0%) of the 16 patients had VVF, seven (44.0%) had ureterovaginal fistulae, six (37.5%) had ligation of the ureter and one (6.25%) had a vesicourethrovaginal fistula. Ureteric injuries affected the left ureter in seven (44.0%) patients, the right ureter in two (12.5%) patients and both the ureters in three (18.75%) patients.

## DISCUSSION

Iatrogenic urological injuries are a major cause of anxiety to the surgeons, the patients and their spouses. They are known to be a source of prolonged morbidity to the patient. These morbidities include persistent leakage of urine per vaginam, recurrent urinary tract infections, vulval dermatitis, hydronephrosis, and in some instances, renal loss. In some countries, there are medico-legal implications associated with these injuries.<sup>(6)</sup> In order to avoid medico-legal action, which is often embarrassing to the surgeon, it is important to approach and counsel the patient adequately. In the event of such an injury, expeditious action, care and attention should be given to the patient so as to avert her wrath, incurred due to the frustration of an extended period of suffering.

Many factors predispose to these injuries, including the timing of the surgery, the indication for the surgery and the competence of the surgeon. We noted in our series that 40% of the primary procedures were emergencies (Caesarean hysterectomy and Caesarean sections for prolonged obstructed labour). Poor health knowledge of patients often results in late presentation to the hospital, in many cases, necessitating emergency surgeries. In these situations, the surgeon typically has inadequate time to prepare the patient; moreover, at odd hours of the day, competent hands may not always be available.

Patients at high risk of injuries include those with altered anatomy, fibrosis or direct extension of disease process, as in cases of chronic pelvic inflammatory disease, endometriosis, large fibroids (especially in the broad ligament), previous pelvic surgery, malignancy, previous irradiation and congenital abnormalities of the urogenital system.<sup>(7)</sup> In our series, most of the injuries were incurred following hysterectomy, as corroborated by the results of other studies.<sup>(5)</sup> In order to minimise iatrogenic injuries in these patients, preliminary intravenous urography and/or ureteric catheterisation have been advocated. These, however, have been a source of controversy. The best defences against ureteric injury are meticulous surgical technique as well as identification of the course of the ureter and the associated anatomic locations where injury is most likely to occur.<sup>(8)</sup> Nevertheless, when in doubt or when the operative field is complicated by extensive local pre-existing morbidity or when the anatomical navigation during dissection is difficult, the judicious use of preoperative or intraoperative ureteric stenting should be considered. This may well avert a potential disaster, although the timing and availability of expertise and resources during these operations may not often be optimal.

Transection and ligation injuries of the ureter were common in our series (75%). This was usually due to the surgeon operating in a poorly defined field caused by uncontrolled haemorrhage and extensive pelvic adhesions. In the process, the surgeon may clamp or even transect a vessel along with the ureter. Only four patients presented early in this series. One of these patients had injuries to the bladder and the vagina following total abdominal hysterectomy for a huge fibroid. She was managed successfully with catheter drainage alone (Table II). Conservative management using in-dwelling catheter can lead to closure of a small-size vesical fistula if the patient presents within a few days of surgery.<sup>(9)</sup> Zimmern et al recommended a conservative approach to a small vesical fistula if the patient's complaints of urinary incontinence were resolved with the insertion of a urethral catheter.<sup>(10)</sup>

Ureteric injuries have been found to be more common on the left side.<sup>(11,12)</sup> This was also observed in our series, where ten of the ureteric injuries were on the left side. The left ureter has a greater proximity to the cervix compared to the right ureter, and is thus more liable to injury.<sup>(12)</sup> The majority of our patients presented late. This may be attributed to the obstetric and gynaecological origins of the injuries; these patients were referred to the urologist by the primary surgeon only when the injury was refractory to their management. The late presentation may also be due to the fact that 60% of the primary procedures were carried out in other referral centres, where the majority of the patients were indigent and had low levels of education.

The outcome of our management was generally good, with an 87.5% success rate (Table III). This may be related to the fact that the procedures were performed by experienced specialists. The aim of treatment for one patient who had fair outcome (advanced carcinoma of the cervix) and whose bladder was fibrotic and shrunken was palliative; repair of the bladder was not possible in this case, and a urinary diversion procedure was done to improve her quality of life.

In conclusion, this study shows that iatrogenic urological injuries are still common in our environment and constitute a source of major morbidity to affected patients. It further reaffirms the fact that ureteric injuries occur more frequently on the left side. In order to reduce the risk of injury, adequate preoperative preparation is recommended and meticulous surgical technique based on proper understanding of the anatomy of the urogenital system should be practised by the surgeon. The presence of a urologist is advised in the event that a difficult pelvic surgery is envisaged. The first repair of injury should be done by an experienced specialist in order to obtain the best result.

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