

## Urological injuries following Obstetrical and Gynecological Surgeries.

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**Background:** Gynaecological operations have been reported to be associated with injuries to the ureter. This study was aimed at reviewing the urological complications resulting from obstetric and gynaecological surgeries in respect to frequency, clinical presentations, and time of diagnosis. The study was undertaken at Departments of Obstetrics, Gynecology and Urology at Kilimanjaro Christian Medical Centre Tanzania from January 2009 to December 2014.

**Methods:** In this 6-year retrospective study, 11219 obstetrical and gynecological surgeries were performed. All patients who sustained urological injuries were reviewed and entered into a data sheet before analyzing their frequency, clinical presentation and the time of presentation.

**Results:** Of the 9221 obstetrical and 1998 gynecological surgeries performed, 105 (0.94%) were sustained urological injuries. A total of 82 patients had VVF (78%), 18 (17.2%) had ureteral injury, 4 (3.8%) patients had bladder injury only, and 1 patient (1%) had both VVF and Ureteral Injury. With respect to injury rate by specific procedure, caesarean section in obstetric surgeries contributed to 36 patients (34.3%) with urological injuries, whereas TAH was the leading gynecological procedure which contributed to 18 patients (17.1%) with urological injuries. All patients with VVF had history prolonged labor and presented with persistent urine leakage per vagina (urine incontinence). The time of diagnosis to most of the patients was more than 48 hours especially to patients with VVF. There were no patients with urethral injury.

**Conclusion:** Obstetric surgeries have shown to contribute to a higher number of urological injuries as compared to gynecological surgeries. Both VVF and ureteric injuries being the most common in obstetrics and gynecologic surgeries respectively have great economic and social impacts not only to the patients, but also the surrounding community and the country as a whole. Late presentation and diagnosis increases the risks of further complications. Early presentation, diagnosis and urologic intervention is important for the better outcomes.

### Introduction

Injury to the urinary tract in medical practice was first described on 1030 AD in the opus called "Al-Kanoun". The close embryologic development and anatomic proximity of the urinary and genital organs, predisposes the urinary tract to injury during surgical procedures in the female pelvis<sup>1</sup>. Gynaecological surgeries have been reported to be responsible for 75% of the injuries to the ureter. At the same time, it has been noted that bladder injuries are 2 to 3 times more frequent than ureteral injuries<sup>2</sup>.

The development of urogenital fistula and urinary leakage from the vagina after surgery is a source of misery for the patient, anxiety and a sense of failure for the surgeon. Similarly, development of anuria immediately after surgery is a situation which demands emergency attention to the patient. Early diagnosis and the timely proper management of these injuries greatly affect the outcome and fate of the patient. Failed primary repair of such injuries represents a burden for the surgeon and for the patient, who suffers from the distress and social limitation imposed by urine leakage<sup>3</sup>.

### **Patients and Methods**

This was a retrospective study that took place at the departments of obstetrics, gynecology and urology of the Kilimanjaro Christian Medical Centre (KCMC). The study includes the patients attended at this hospital who developed urological complications after obstetrical and gynecological surgeries. The data were obtained from the medical records department where a total of 11219 obstetrical and gynecological surgeries were documented. Files of one hundred and five patients who sustained urological injuries were reviewed in terms of their clinical presentations and the time of presentation which helped to determine the prevalence of the injuries. All patients' files which were found to miss information like pre-operative diagnosis, the type of an obstetrical or gynecological surgery done and the type of urological complication developed were excluded from the study.

### **Results**

During a 6 years period, a total of 11219 obstetrical and gynecological surgeries were performed. Obstetric surgeries were 9221 (82.2%), whereas gynecological surgeries were 1998 (17.8%). A total number of 105 patients (0.94%) sustained urological injuries. Of the patients who sustained urological injuries, 84 (80%) of patients were due to obstetrical surgeries and 21 patients (20%) were due to gynecological surgeries. The urological injuries that were sustained included VVF in 82 patients (78.1%), bladder injury only in 4 patients (3.8%), iatrogenic ureteric injuries in 18 patients (17.2%), and 1 patient (1%) had both VVF and unilateral ureteric injury (Table 2). On the other hand, 30 patients (28.6%) presented in less than 24 hours, 35 patients (33.3%) presented between 24 hours to 48 hours and 40 patients (38.1%) presented after more than 48 hours (Table 3).

The average ages of patients managed at the hospital during the study period was 39.6 years (with 14.7 SD). There were 7 (6.7%) single women, 86 married women (81.9%), divorced women 9 (8.6%), and 3 (2.9%) widowed women (Table 1).

The pre-operative diagnosis of the 84 patients who sustained urological injuries after obstetric surgeries were obstructed labor in 76 patients (90.5%) and 8 patients (9.5%) had uterine rupture (Table 4). Of the 84 patients, 32 patients (38.1%) were as a result of normal spontaneous vaginal delivery with ought any intervention, 36 patients (42.8%) due to delivery by caesarean section, 6 patients (7.1%) due to vacuum assisted delivery, 1 patient (1%) due to forceps assisted delivery, 6 patients (7.1%) were as a

result of subtotal hysterectomy, 2 patients (2.4%) were as a result of both caesarean section followed by TAH, and 1 patient (1%) had undergone Laparotomy (Table 5).

**Table 1.** Characteristics of the study population (n = 105)

Information	Frequency	%
<b>Age (years)</b>		
14 - 40	58	55.3
41 - 66	41	39
67 - 92	6	5.7
<b>Marital status</b>		
Single	7	6.7
Married	86	81.9
Widowed	3	2.9
Divorced	9	8.6

**Table 2.** Type of urological injuries that occurred in the 105 Patients.

Urological injury	Frequency	%
VVF only	82	78.1
Bladder Injury only	4	3.8
Iatrogenic Ureteric Injuries		
Right ureter injury	7	6.7
Left ureter injury	5	4.8
Bilateral ureteric injury	6	5.7
Both VVF and unilateral Ureter Injury	1	1.0

**Table 3.** Time Interval of Presentation of Patients After Sustaining Urological Injuries.

Time (hours)	Frequency	%
< 24	30	28.6
24 to 48	35	33.3
> 48	40	38.1

The pre-operative diagnosis of the 21 patients with urological injuries after gynecological surgeries were, 14 patients (66.7%) had uterine fibroids, 2 patients (9.5%) had ovarian cysts, and 2 patients (9.5%) had both uterine fibroids and ovarian cysts, and one patient (4.77% each) in each of the cervical cancer, and bladder mass. There was one patient (4.77%) who volunteered for vasectomy and sustained a urological injury during the procedure (Table 4). Of the 21 patients, 18 patients (85.7%) were due to TAH, 2 patients (9.5%) were due to Laparotomy, whereas only 1 patient (4.8%) was due to BTL (Table 4).

the obstetric patients, normal spontaneous vaginal delivery led into VVF in 32 patients (38.1%), caesarean section which resulted into VVF in 34 patients (40.5%) and ureteric injury in 2 patients (2.4%). Vacuum assisted delivery resulted into VVF in 6 patients (7.1%). Subtotal hysterectomy on the other hand, resulted into ureteric injury in 3 patients (3.6%), VVF in 2 patients (2.4%), and 1 patient (1.2%) of bladder injury. From

the gynecological patients, TAH resulted into ureteric injuries in 11 patients (52.4%), VVF in 5 patients (23.7%), bladder injury 1 patient (4.8%), VVF together with ureter injury in 1 patient (4.8%). Laparotomy on the other hand resulted into 1 patient (4.8%) in each of ureteric and bladder injuries. BTL however resulted in 1 patient (4.8%) of bladder injuries as shown in (Table 6)

**Table 4.** Pre-operative diagnoses Made to Patients Who Had Urological Complications after Obstetrical and Gynecological Procedures (n = 105).

Pre-operative diagnoses	Frequency	%
<b>Obstetrics</b>		
Obstructed labour	76	90.5
Uterine Rapture	8	9.5
<b>Gynecology</b>		
Uterine fibroids	14	66.7%
Ovarian Cysts	2	9.5%
Both uterine fibroids and Ovarian cysts	2	9.5%
Cervical cancer	1	4.77
Bladder mass	1	4.77
Volunteered patients for BTL	1	4.77

**Table 5.** Surgeries complicating Urological injuries (n = 105)

Offending Surgery	Frequency	%
<b>Obstetrics (84 complications)</b>		
Normal spontaneous vaginal delivery without any intervention.	32	30.5
Cesarean section only	36	34.3
Vacuum assisted delivery	6	5.7
Forceps assisted delivery	1	1
Cesarean section followed by TAH	2	1.9
Subtotal Hysterectomy	6	5.7
Laparotomy	1	1
<b>Gynecology (21 complications)</b>		
TAH	18	17.1
Laparotomy	2	1.9
BTL	1	1

A total of 72 patients (68.6%) presented with urine incontinence only, 5 patients (4.8%) had abdominal tenderness only, , 3 patients (2.9%) had urine incontinence and vulval itching, 4 patients (3.8%) had both abdominal distention and abdominal tenderness, 3 patients (2.9%) had anuria, abdominal distention and abdominal tenderness, 5 patients (4.8%) had both urine incontinence and abdominal tenderness, 3 patients (2.9%) had both unilateral hydronephrosis and abdominal tenderness and 2 patients (1.9%) had both urine incontinence and decreased serum creatinine (Table 7).

**Table 6.** Obstetric and gynecological surgeries with their resulting number of urological complications (n = 105)

<p><b>*Normal SVD</b> VVF = 32</p> <p><b>Cesarean Section</b> VVF = 34 Ureter Injury = 2</p> <p><b>Vacuum delivery</b> VVF = 6</p> <p><b>Forceps delivery</b> VVF = 1</p> <p><b>Subtotal Hysterectomy</b> VVF = 2 Ureter Injury = 3 Bladder Injury = 1</p> <p><b>TAH</b> VVF = 2</p> <p><b>Laparotomy</b> VVF = 1</p>	<p><b>TAH</b> Ureteric injury = 11 Bladder injury = 1 VVF = 5 Both VVF and Ureter injury = 1</p> <p><b>Laparotomy</b> Ureteric injury = 1 Bladder injury = 1</p> <p><b>BTL</b> Bladder injury = 1</p>
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### Discussion

The study has shown the urological injuries secondary to obstetrical and gynecological procedures to be common among women of reproductive age. However, obstructed labor which was delayed to be intervened complicated into vesico-vaginal fistula. Many of the gynecological cases who developed urological complications were as a result of undergoing TAH secondary to uterine fibroids.

This study showed the prevalence of urological injuries due to both obstetrics and gynecological surgeries was 0.94%. This is quite different when compared with a 5 years period studies by Vandana et al<sup>4</sup> in 2013, Lee et al<sup>5</sup> in 2012, and Venkitaraman et al<sup>6</sup> in 2008 who found the prevalence to be 0.29%, 0.2%, 0.1% respectively. Most developing countries have less number of obstetrician and gynaecologist, of which those health workers who operates lack the knowledge of the anatomic relationship between the urinary and the genital tracts leading to an increased in number of patients referred to hospitals for treatment of complications <sup>2</sup>.

In our study, caesarean sections accounts for 0.4% of the urological injuries secondary to Obstetric surgeries in this setting. This result is higher when compared to a study by Asifa et al<sup>7</sup> in 2008 who found caesarean section to contributed to 0.47%. Matani et al<sup>8</sup> also showed that caesarean section counted for 0.2% of the cases, whereas Parnitvitidkun<sup>9</sup> 2006 showed 0.12% of the cases to be due to caesarean section. My study also has shown TAH to be the most gynecological surgery complicating urological injuries by 0.9%.

**Table 7.** Clinical presentations of the Cases with Urological Complications (n = 105)

Clinical presentation	Frequency	%
Abdominal distention	1	1.0
Abdominal tenderness	5	4.8
Urine incontinence only	72	68.6
Anuria	1	1.0
Urine incontinence and Vulval itching.	3	2.9
Urine incontinence, pelvic pain, and abdominal distention.	1	1.0
Anuria, abdominal distention, and abdominal tenderness.	3	2.9
Urine incontinence, fever, and headache.	1	1.0
Abdominal distention and tenderness.	4	3.8
Urine incontinence and abdominal tenderness.	5	4.8
Unilateral Hydronephrosis and abdominal tenderness.	3	2.9
Urine incontinence, colic pain and abdominal tenderness.	1	1.0
Urine incontinence and decreased serum creatinine.	2	1.9
Urine incontinence and bilateral lower limb edema.	1	1.0
Urine incontinence, Bilateral Hydronephrosis, and abdominal tenderness	1	1.0
Cutaneous urine leakage, and abdominal tenderness	1	1.0

This is likely similar to the study by Parnitvitidkun<sup>9</sup> 2006 who showed TAH to account 1% of the urological injuries. Many of the patients in this setting presented late with obstructed labor and had to undergo caesarean section as the only management which predisposed them to the complications, and this could explain the above differences.

As per this study, VVF has shown to be most prevalent by 74.3% as compared to 61.9% of the iatrogenic ureteric injuries. Parnitvitidkun<sup>9</sup> 2006 showed that VVF occurred in 28.6% of the cases, while 25% were shown by Obarisiagbon et al<sup>10</sup> in 2011. Lack of knowledge and poor believes among the cases is the contributing factor to the delayed intervention<sup>11</sup>.

In this study also, the right ureter was commonly injured in 38.9% of the cases, left 27.7% cases and bilateral ureteric injury occurred in 33.3% cases. These results are different as compared to a study by Matani et al<sup>8</sup> in 2003 that showed that 47.4% of the patients who sustained ureteric injuries occurred on the left ureter, while 31.6% occurred on the right ureter, whereas 21% occurred bilaterally. Parnitvitidkun<sup>9</sup> in 2006 also showed that 63.6% of the cases had ureteric injury, in which 71.4% cases sustained

left ureteric injury. Studies have shown that the left ureter is more liable to injury as it is much closer to the cervix than the right ureter<sup>12</sup>.

Bladder injury as per my study occurred mostly in gynecological surgeries by 0.15%. However, a small difference can be seen when compared to studies by Vandana et al, 2013 and Venkitaraman et al<sup>6</sup>, 2008 who show bladder injuries to occur in 0.11% and 0.13% of the gynecological operations respectively. Therefore, these close differences in the percentage of cases who sustain bladder injuries in gynecological surgery show that bladder injuries from gynaecological surgeries are rare but are liable to occur due to the inherent anatomic and pathological factors in the pelvis<sup>13</sup>.

The study also shows that, 68.6% of the total cases presented with urine incontinence, abdominal tenderness (4.8%), and 2.9% presented with symptoms of anuria, abdominal distention and abdominal tenderness. A study by Obarisiagbon et al<sup>10</sup>, in 2011 showed that, 75% patients presented with urine incontinence, 18.8% had loin pain, 12.5% had anuria and fever, peritonitis and vaginal bleeding had 0.6% each.

Clinical presentations of patients with urological injuries may vary depending on the site of injury. Early interventions with endourological techniques as a primary option has to be emphasized as a primary option<sup>8</sup>.

Late presentation and diagnosis in most of the patients was also noted in this study. Only 28.6 % of the cases with urologic complication presented with clinical signs and symptoms in less than 24 hours and were managed. 33.3% presented between 24 hours to 48 hours. The rest 38.1% presented after more than 48 hours. A study by Mteta et al<sup>13</sup>, 2006 shows that, delay in diagnosis ranges from 65 days to 10 years. Most of these patients are those who sustained VVF after a prolonged labor who find themselves in a state of fear of stigmatization, lack of support to take the women to the treatment center and low status of women in a community force women to live with the problem. Moreover, cultural medicines may be the first priority rather than seeking modern treatments<sup>11</sup>.

## **Conclusion**

The prevalence of urological injuries secondary to obstetric and gynecological surgeries has been shown to be higher in the current study as compared to previous studies. Cesarean section has been shown to be the leading obstetric surgery to cause urological injuries as compared to gynecologic surgeries in the current study. However, most of the patients who underwent cesarean section, presented late with obstructed labor and therefore most of the complications noted may have been contributed by obstructing labor. Early surgical interventions by skilled medical professionals and provision of reproductive health education among women when provided may help to serve the life of the new born and the mother as well.

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