

## DELAYED RECOGNITION OF BILATERAL URETERAL INJURY AFTER GYNEACOLOGICAL SURGERY

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### SUMMARY

**Background:** Iatrogenic bilateral ureteric injury is a rare complication of pelvic surgery, which if not recognised immediately results in significant morbidity and even mortality

**Objective:** To describe the presentation, aetiology and treatment of iatrogenic bilateral ureteric injuries recognised late following gynaecological surgery.

**Methods:** The case notes of 14 consecutive cases of bilateral ureteric injury managed between October 2000 and January 2007 were studied.

**Results:** Thirteen cases resulted from abdominal hysterectomy and one from vaginal repair of vesicovaginal fistula. Excessive bleeding with difficult haemostasis was the predominant predisposing factor. The indication for referral included oliguria, anuria, and urinary ascites or azotaemia. The time interval between the original surgery and the recognition of the injury ranged between 1 and 92 days. Patients in whom deterioration in renal function was ascribed to obstructive uropathy from bilateral ligation (postrenal renal failure) were referred much earlier than those in whom a diagnosis of prerenal renal failure was made (mean of 2 vs. 10 days). Five patients (36%) required dialyses before repair. All the repairs were done at open surgery. Thirteen survived with no loss of kidney. One patient died of overwhelming sepsis.

**Conclusions:** Late recognition and referral of bilateral ureteric injury was associated with serious complications. Post operative deterioration in a patient's renal function following pelvic surgery should be assumed to be due to ureteric obstruction until proven otherwise. Such patients should be promptly referred to centres with the facility for further investigation and management. Early open repair for these injuries is advocated.

**Keywords:** ureteral injury, renal failure, gynaecological surgery, anuria, hydronephrosis

### INTRODUCTION

Bilateral ureteric injury is a rare and severe complication of pelvic surgery. If such injury is not recognized immediately, it may lead to anuria, fluid overload, renal failure and even death. The injury can either be

caused by a ligation, transection, crushing, tethering or an excision of a portion of the ureter.

For the surgeon who is trying to do his best for the patient, this injury can deal a devastating blow to his or her morale. It is therefore incumbent on all practitioners performing procedures around the ureter to be aware of the spectrum of possible injuries to the ureter, factors that increase the risk of injury and techniques for early recognition. Such knowledge will minimize the risk of inadvertent injury and if they occur allow expeditious recognition and referral to appropriate centres to facilitate their repair.

Mate- Kole et al <sup>1</sup> reported on 7 cases of acute renal failure due to bilateral ureteric ligation over 7 year period (1984-1991) at the Korle Bu Teaching Hospital, Accra. In their series, all the injuries followed total abdominal hysterectomy, all the surgeries were performed by non- specialists, and all the patients received haemodialysis before reconstruction. Five patients survived reconstruction and two died. We analyzed our recent experience with bilateral ureteric injuries in order to highlight possible preventive measures that will help reduce its occurrence, to determine factors responsible for delay in diagnosis and referral and to evolve optimal management strategies for successful repair of these injuries.

### PATIENTS AND METHODS

This study consisted of 14 consecutive cases of bilateral ureteric obstruction following gynaecological surgery managed at the Urology Unit of Korle Bu Teaching Hospital, Accra between October 2000 and January 2007. Patients with unilateral injuries have not been included in this analysis. Our management strategy for these cases is early laparotomy. All patients had detailed history and physical examination performed. Complete blood counts, blood urea and serum creatinine were done in all cases. Ultrasonography of the renal tracts was also performed. The patients were reviewed by a multidisciplinary team which included an urologist, anaesthetist and nephrologist. After which a management plan was formulated.

All data collected were prospectively entered in a database. Parameters collected included indication for the gynaecological surgery, type of procedure, predisposing factors and imaging modalities used for the diagnosis of ureteric injury. To determine the reasons for delayed recognition and referral of these cases, data was collected on initial urological symptoms and signs suggestive of bilateral ureteric injury, time to recognition of these symptoms, diagnosis and time of referral. Telephone conversations with the referring doctors provided some of this information. Imaging modalities

used for diagnosis, location of injury, management, and complications were also examined.

## RESULTS

The patients were aged between 18 and 74 years. Elective total abdominal hysterectomy was the operation most frequently associated with bilateral ureteric injury. In 3 patients the injury occurred during an emergency hysterectomy to control severe bleeding following uterine rupture (Table 1).

**Table 1:** Indications and procedures responsible for bilateral ureteric injury

Indication	Operation	No. patients	(%)
Uterine fibroid	Elective abdominal hysterectomy	9	(64.3)
Ovarian cancer	Elective abdominal hysterectomy and ovarian cystectomy	1	(7.1)
Uterine rupture	Emergency hysterectomy	3	(21.4)
Vesico-vaginal fistula	Vaginal repair	1	(7.1)

Four (29%) of the operation were performed by experienced gynaecologists working in tertiary care facilities (one teaching and three non teaching hospitals). The rest 10 (71%) were by non specialist working in district hospitals. The surgeon's assessment of intra-operative conditions that might have contributed directly to the bilateral ureteric injury were excessive bleeding (6),

distorted anatomy (2), adhesions (2), routine conditions (3) and no available data (1). The patients were referred to us between 1 and 92 days after surgery. Table 2 shows the relation between the diagnosis made by the referring surgeon/gynaecologist, the signs and symptoms of the patient at the time of referral and the time interval that elapsed before referral.

**Table 2:** Relation between referring diagnosis and delay in referral

Diagnosis made by referring surgeon	Number of patients	Signs and symptoms	Time between injury and referral(days) Range (mean)
Pre-renal renal failure	9	Oliguria, azotemia	5 -17 (10)
Bilateral ligation of ureters	4	Anuria	1-3 (2)
Metastatic carcinoma of cervix	1	Oliguria, abdominal distension	92 (92)

Patients in whom the ureteric injury was suspected were referred much earlier than those whose post operative deterioration in renal function was attributed to pre-renal renal failure (2 vs. 10 days). One patient was however referred to the oncologist as a case of metastatic cancer of the cervix. She had total abdominal hysterectomy done 3 months earlier on account of a bleeding uterine fibroid. The histology of the cervix revealed carcinoma of the cervix. She presented with oliguria, ascites and azotaemia. Biochemistry of her peritoneal fluid however revealed very high creatinine content

and ultrasound showed gross bilateral hydronephrosis. At laparotomy she was found to have urinary ascites with bilateral ureteric strictures and necrosis.

Abdominal ultrasound was performed in 13 cases, hydronephrosis was seen in 21(81%) out of the 26 of obstructed ureters. In the remaining five kidneys there was no hydronephrosis despite the presence of complete ureteric ligation. In two patients although the gynaecologist suspected bilateral ureteric ligation, the absence of hydronephrosis influenced the decision to

manage as acute tubular necrosis and after several days the patient was referred to the nephrologist for dialysis. Ureteric obstruction in these cases was confirmed by cystoscopy and failure of retrograde ureteric catheterization. In another case there was no hydronephrosis on one side because the ureter was tied and severed proximally. It was therefore discharging urine freely into the peritoneal cavity. One case did not have ultrasound done because bilateral ureteric exteriorisation had been performed at a regional hospital before referral. Five patients (36%) had haemodialysis on account of hyperkalaemia. All these patients had been anuric for more than 5 days. No patient received more than two dialysis sessions.

All the injuries involved the distal third of the ureter. Surgical procedures carried out for repair of the injuries were direct re-implantation (19), de-ligation (4), re-implantation with psoas hitch (4) and trans-utero ureterostomy (1). Twelve patients (86%) were explored and their injuries repaired within 48 hours of arrival at our facility. Thirteen out of the fourteen patients made a full recovery with no loss of kidney and one died of overwhelming sepsis.

## DISCUSSION

Iatrogenic ureteric injury can be a serious complication of pelvic gynaecological surgery and occurs with a reported frequency of between 0.5% and 1.5%.<sup>2</sup> Bilateral injuries are rare accounting for 5 to 10% of all ureteric injuries.<sup>3</sup> This rate is increased where the procedure is performed for malignancy, conditions causing induration and distortion of pelvic anatomy, for example, huge fibroid or previous pelvic inflammatory disease.<sup>4,5</sup> In our series excessive intraoperative bleeding with difficult haemostasis (blind clamping and placement of sutures) was the predominant risk factor contributing to the injuries. However, in 3 out of the 14 cases the referring gynaecologist described the operation as routine. This is consistent with the literature where half of all ureteric injuries had no identifiable predisposing factors.<sup>6</sup> Prompt recognition and expeditious management can minimize the morbidity associated with this injury. Several studies have shown that intra-operative recognition and repair allow for better results and fewer complications.<sup>7,8</sup> On the other hand injuries that are detected after surgery or delayed tend to be more complex, require more complex repairs, as well as multiple procedures, and have higher rates of nephrectomy and death.<sup>9,10</sup> In our series, all the patients referred within 5 days of surgery were fit enough to undergo reconstruction without prior dialysis. A significant finding was that symptoms suggestive of bilateral injury (oliguria and anuria) were present in the early post operative period. However, because there was excessive intra-operative bleeding, the low urine

output was misdiagnosed as prerenal acute renal failure in some cases. This resulted in a delay of several days as the kidneys were challenged with fluids and furosemide. In contrast patients in whom the post-operative low urine output was attributed to obstruction from bilateral ureteric ligation were referred much earlier. This diagnostic dilemma can be resolved with renal ultrasonography which may show the presences of hydronephrosis or fluid collection in the pelvis or abdomen.

Ultrasound which is now available in most hospitals in Ghana has many attributes which make it an ideal method for detecting urinary obstruction. It is noninvasive, quick, portable, requires neither radiographic contrast media nor ionizing radiation, and is relatively inexpensive. However in our cases 20% of obstructed ureters did not show any hydronephrosis. This is in agreement with the literature where Ultrasonography failed to detect hydronephrosis in 7 of 20 patients (35%) with proven acute obstruction on intravenous urography (IVU)<sup>11</sup>. Thus in some cases ultrasound may not be very efficacious in diagnosing acute ureteric obstruction. An IVU may be more useful but because these patients have renal insufficiency intravenous urography is unlikely to be effective. Therefore if the suspicion of bilateral ligation is high such patients require cystoscopy and retrograde catheterization and should be referred promptly to a urologist.

The management of ureteric injury depends on the patient's condition and the extent and location of the injury. Some investigators have suggested that ureteric obstruction following gynaecological procedures is due to entrapment or ligation of the ureter by a suture, which is eventually absorbed and may be best treated by proximal drainage alone.<sup>12</sup> This strategy which is supported by several studies<sup>13,14,15</sup> assumes that the longitudinal continuity of the ureter is intact and also requires the placement of percutaneous nephrostomy tubes which, in a third world environment is not readily available or affordable. Furthermore the period of proximal drainage may be protracted and may eventually require surgery. Because of the aforementioned reasons a policy of immediate open surgical intervention was adopted. This approach is enhanced by the use of multidisciplinary team of urologist, nephrologist and an anaesthetist. Patients who are poor risk for surgery i.e. hyperkalaemia or fluid overload are dialyzed and surgery performed as soon as they are fit. Thirty six percent of patients in this study received dialysis before reconstruction as compared to 100% of patients in the previous study.<sup>1</sup> In the present study 86% of the patients were operated upon within 48 hours of arrival at our facility. Another important reason for immediate open reconstruction was to identify and drain abdomi-

nal or retroperitoneal collection of urine or abscess. This may result from necrosis of the ureteral wall and extravasation of urine.

The best way to prevent ureteric injury is to take all the necessary precautions, including careful dissection and recognition of potential distortions to normal ureteral anatomy in the presence of pelvic pathology and bleeding that obscures operative visibility.<sup>16</sup> Preoperative excretory urography or insertion of ureteric stents have been shown to be of limited value for preventing ureteral injuries.<sup>17,18</sup> All the injuries in our series occurred at the distal third of the ureter, this is consistent with most large series where over 75% of gynaecological ureteric injuries occurred in this location.<sup>19</sup> Care should be taken during dissection of this region particularly at the level of ligation of the uterine artery, ureterosacral and transverse ligament and at the level of ligation of suspensory ligament of the ovary.

## CONCLUSION

Surgical operations adjacent to the ureters may occasionally result in bilateral ureteric injury, hence due caution must be taken during control of bleeding. The surgeon must be vigilant in the immediate post operative period. Oliguria or anuria following pelvic surgery should be assumed to be as a result of bilateral ureteric injury until proven otherwise. Such patients should be promptly referred for urological evaluation because delay in diagnosis is the most important factor contributing to the morbidity and rarely mortality of bilateral ureteric injury.

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