

Diagnosis and Management of Ureterovaginal Fistula in a Resource-Constrained Setting: Experience at a District Hospital in Northern Nigeria

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Abstract: During 2007 we were invited at different times to review and manage four women with ureterovaginal fistula following caesarean section performed in different rural hospitals. We describe our experience of a simple technique of diagnosis and management of these indigent patients in a resource-constrained hospital. The condition was diagnosed by the three-swab test in all four patients, and abdominopelvic ultrasound was employed to help find the ureter involved. Transvesical ureteral implantation with a stent was carried out. Stent was removed after 2 weeks. All four patients were dry. Amidst the complexity of and sophistication of modern health care, it is important to remind ourselves of the common occurrence of this distressing condition following caesarean section and the use of a well known simple diagnostic technique and subsequent management in resource-poor communities.

Key words: *Ureterovaginal fistula, Caesarean section, Resource constrained*

Introduction

Although gynaecological surgery, especially hysterectomy, accounts for most ureterovaginal fistulas in developed countries, the scenario is completely different in developing countries where obstetric services are still below standard [1,2,3,4,5,6]. Reports from Nigeria indicate that caesarean sections and caesarean hysterectomies were the leading causes of ureteric injury leading to ureterovaginal fistula, being responsible for (38%) and (25%) of the cases, respectively [4]. The occurrence of both vesicovaginal and ureterovaginal fistula at the same time has been described by those physicians well experienced in urogenital fistula repair [3,4,5]. In developing countries, obstetric complications are the most common cause of vesicovaginal and ureterovaginal fistula. Fistulas may develop during difficult or prolonged labor, when the head of the foetus compresses the trigone or the bladder neck against the anterior arch of the pubic symphysis. This may lead to tissue ischemia, necrosis, and eventual fistula formation. Unrecognized bladder injury during a difficult hysterectomy or caesarean delivery may also cause vesicovaginal fistula. The ureter may be injured during dissection around the infundibulopelvic ligament or during ligation of the uterine vessels. Unexpected pelvic hemorrhage may obscure the surgeon's vision and result in ureteral injury that manifests as delayed ureterovaginal fistula. While vesicovaginal fistula (VVF) is usually easily diagnosed by vaginal speculum examination, ureterovaginal fistula is difficult to diagnose in this way. Diagnosis of ureterovaginal fistula requires a combination of cystoscopy, intravenous pyelography and retrograde ureteropyelography [6,7,8,9,10]. While exact preoperative diagnosis and intraoperative evaluation are necessary in order to avoid operative failure, the absence of these required investigative techniques and the low-income status of the patients in most developing countries illustrates the need to employ inexpensive but equally sensitive methods of diagnosis of ureterovaginal fistula. This paper highlights the occurrence of ureterovaginal fistula following caesarean section and demonstrates the efficacy of a simple diagnostic method and subsequent treatment at a district hospital in Nigeria.

Material and methods

We reviewed four patients who had caesarean section in different rural hospitals and presented with continuous leakage of urine despite normal urge and voluntary micturition. They were all referred to a district hospital where Rotary Club International supports repair of VVF. Initial assessment included vaginal speculum examination to assess the anterior and posterior vaginal walls for any fistulous opening. The standard three-swab test was then performed to differentiate between vesicovaginal and ureterovaginal fistula and to rule out stress incontinence. In this test, 100 ml of 1:5 diluted methylene blue solution was instilled into the bladder via a urethral catheter after three dry sterile swabs were placed in the upper, middle and lower third of the vagina. The patient was asked to walk around for ten minutes, after which the swabs were removed and examined. If the lower swab is wet and stained blue, it indicates stress incontinence. If the upper swabs are wet and blue, that indicates VVF, and if the upper swabs are wet but not stained blue, it is an indication of ureterovaginal fistula. Abdominal ultrasound was done preoperatively to evaluate ureters and kidneys for hydroureter and or hydronephrosis. All patients had exploration of the bladder and ureters with division of ureter above the dense adhesion and subsequent ureteric reimplantation over a stent with antireflux mechanism on the affected side. No reconstructive interpositions or psoas hitch was required in any of the patients. Stents were removed after two weeks and urethral catheters were removed a week later.

Results

The result of the review of the four patients managed is as documented in Table 1. Out of the four patients referred only one was a teenager (18 years). The rest were aged 20, 30 and 35 years. The three swab test revealed no staining of the swabs in any of the four patients, but the upper swab was wet with urine, indicating that there was no communication between the bladder and the vagina. The source of urine wetting the upper swab was then judged to be from the ureter. Ultrasound of the kidneys revealed dilated pelvis and upper ureter in two patients, signifying stasis; this was corroborated intraoperatively. Our findings also revealed that both the right and left ureters were involved in equal

proportion (two each) in the four patients managed. The main intraoperative findings were dense adhesion surrounding the distal end of the affected ureter and the closure of the corresponding ureteric opening within the bladder cavity. All four patients were dry following removal of the ureteric stent and urethral catheter, and all of them remained dry and had no complaints during follow-up three months after surgery. Abdominal ultrasound during this follow up revealed normal kidneys, upper ureters and bladder with no evidence of hydronephrosis or hydroureter.

Discussion

Ureterovaginal fistula is a relatively frequent complication of pelvic surgery. Pelvic adhesions due to repeated caesarean section, markedly enlarged uterus at the time of abdominal hysterectomy, and massive hemorrhage that obscures the operative field during surgery were the main causes of ureteral injury [6]. Transection of the ureters is the commonest injury during pelvic surgery. However, fistulas do occur between the affected ureter and the vagina, uterus and skin. Most of the injuries were associated with attempts to achieve hemostasis without proper identification of the ureter [7]. This was likely the cause in our four patients as indicated by the referral note of patient number two and by the common finding of the distal end of the affected ureters surrounded by dense fibrous tissue involving adjacent structures.

Many reports indicate that the history can be misleading, and so diagnosis of ureterovaginal fistula should include an extensive cystoscopy, vaginoscopy, intravenous pyelogram and retrograde ureterography [1,2,5,6,7,8,9,10]. In this report on four patients, we did not use any of these techniques. The existence and the site of the fistulas was clearly demonstrated using basic but important preoperative detailed assessment and two intraoperative findings.

The preoperative referral note that indicated the site of technical difficulty during the previous operation assisted in identifying the affected ureter. Evidence of urinary stasis, where present and as revealed by preoperative abdominopelvic ultrasonography, indicated which ureter was likely involved. A detailed speculum pelvic examination may reveal a pinpoint opening at the vaginal apex and leakage of clear fluid at the site of the fistula, thereby assisting in locating the likely ureter involved. The three-swab test was the final and definitive test used in this study to determine the presence of ureterovaginal fistula. However, it does not identify which ureter is involved. The effectiveness of the three-swab test in differentiating between vesicovaginal and ureterovaginal fistula and in ruling out stress incontinence has been well described [2,11,12,13].

Intraoperative details that point to which ureter is involved include finding that the distal portion of the ureter is surrounded by extensive fibrous adhesions extending into retrovesicular and paravesicular spaces, and that the ureteric opening in the bladder is closed; the opening is represented by a dimple through which no urine spurts, and can not be canulised.

These assessments combined helped us to determine the location of the ureterovaginal fistula in relation to the trigone and ureteral orifices in all the four patients we managed.

All four patients described in this study had delayed repair because they all reported late. The earliest time of presentation was three months and the longest was nine months. The preferred operative technique employed for all the patients for definitive correction was ureteroneocystostomy.

Table 1 Findings and Outcome of surgery

Patient	Age & parity	Duration of leakage	Preoperative Ultrasound	Main intraoperative findings	Ureter involved	State of ureteric opening on affected side	Outcome of surgery
1	30 years Para 8+0	4 months	Dilated left upper ureter and pelvis	Distal end of distended left ureter was surrounded by dense adhesions.	Left ureter	closed	Leakage had stopped.
2	20 years Para 1+0	3 months	Normal kidneys and ureter	Distal end of right ureter was surrounded by dense adhesions.	Right ureter	closed	Leakage had stopped
3	35 years Para 7+0	9 months	Dilated left upper ureter and pelvis	Distal end of distended left ureter was surrounded by dense adhesions.	Left ureter	closed	Leakage had stopped
4	18 years Para 1+0	5 months	Normal kidneys and ureter	Distal end of right ureter was surrounded by dense adhesions.	Right ureter	closed	Leakage had stopped

None of the patients had psoas hitch procedure. Direct localization of the injured ureteral site by difficult dissection was avoided as this was found to be unnecessary with ureteroneocystostomy because this procedure bypasses the site of the injury to the ureter [6]. Complications associated with ureterovaginal fistula repair, which include urinary extravasation and ureteral stricture formation, did not occur in any of the patients.

Though two of the patients had difficult labour before the caesarean section, none of the four patients had VVF, but all of them had evidence of ureteric injury as evident by the fibrous tissue surrounding the terminal ureter involved. This indicates technical difficulties during surgery, which might have been due to a defect in surgical technique. Strategies to prevent these injuries should therefore include adequate surgical training and meticulous surgical techniques.

This report illustrates that simple, inexpensive diagnostic methods, such as the three-swab test and abdominal and pelvic ultrasound, in addition to detailed clinical assessment, are effective in the diagnosis of ureterovaginal fistula and the complication it may give rise to, such as hydronephrosis [8,11,12,13].

Conclusion

When resources are inadequate, simple, inexpensive diagnostic techniques, such as the three-swab test and abdominal and pelvic ultrasound are effective and reduce the need for referral in the management of such patients.

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