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Original Research Article

Uretero-uterine fistula, a rare morbidity following lower segment caesarean section

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Abstract

Ureter due to its proximity to the female genital tract and involvement in local pathologies is susceptible to inadvertent iatrogenic injury during pelvic surgeries. The risk of ureteral injury is highest during gynaecological surgeries and lowest during cesarean sections. Uretero-Uterine fistula (UUF) consequent to such inadvertent obstetrical injuries is a rarity. We report three cases of uretero-uterine fistulas and review the available literature.

Keywords: Ureter; Lower segment caesarean section (LSCS); Uretero-Uterine Fistula (UUF); Uretereoneocystostomy

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1. Introduction

Uretero-uterine fistula (UUF) is a rare but unfortunate consequence of an inadvertent obstetrical injury and constitutes 1.7 to 5.1 % of all urogenital fistulas [1]. It has also been reported following planned medical termination of pregnancy (MTP) [3] and as a complication of lower ureteric calculi [4]. Management of uretero-uterine fistula is straightforward, but there is no consensus in the literature with regard to the timing of corrective surgery, especially when the fistula presents early. We report three cases of delayed uretero-uterine fistula (UUF) managed by open ureteric reimplantation with successful outcome, review the available English literature.

2. Materials & methods

Hospital records of patients, who had received treatment for Uretero-Uterine fistula during a period of 2008 to 2018, were searched with an aim to study the causes, period to presentation after Caesarean section and to form an algorithm to manage these unfortunate patients.

Between 2008 and 2018, three patients had been managed for Uretero-uterine fistula. The operative notes of the patients were studied in detail to know any per-operative events which might have had bearing on the development of post-operative fistulas. The vaginal leak of urine in all three patients followed a brief period of fever and left flank pain.

3. Results

The hospital records of three patients who had undergone treatment for uretero-uterine fistulas between periods of 2008 to 2018 were studied for clinical details, operative mishaps, duration to presentation, method of diagnosis and the management of the fistula.

The age of the patients varied between 22 to 34 years. All three patients had history of previous caesarean sections. The operative details in two patients mentioned unusual bleeding during the procedure and in the third patient had an unremarkable procedure.

Two patients presented with vaginal urinary leak, three weeks after LSCS and the other during the second week. Two patients with delayed presentation had a history of having flank pain and fever followed by development of vaginal urinary leak.

After noticing urinary leak during pelvic examination, all patients had a preliminary ultrasonography followed by Intravenous Urogram (IVU) in one and Contrast enhanced CT (CECT) in two patients. In all three

patients the urine was seen to be leaking from the external-OS and further radiologic studies were done to lateralise the fistula. All three patients had varying degrees of hydronephroureterosis often extending in to pelvis. Two patients had left sided hydronephrosis and one on the right side. CECT was diagnostic of the condition often clearly demonstrating the contrast leak into uterine cavity. [Figure 1 & 2]

The patients were managed first by an attempt at stenting and after failure to stent, by Ureteric reimplantation. The ureteric dilation was seen extending in to the pelvis to a level, 5 cm from the ureterovesical junction. The ureters were re-implanted by extravesical method.

All three patients had an uneventful recovery and were dry. All three had subsequent pregnancies with uneventful delivery by Caesarean sections.

Figure 1: Intravenous Urogram showing blind ending left ureter [downward facing solid arrow] with inadvertent hysterogram [Left facing solid arrow]

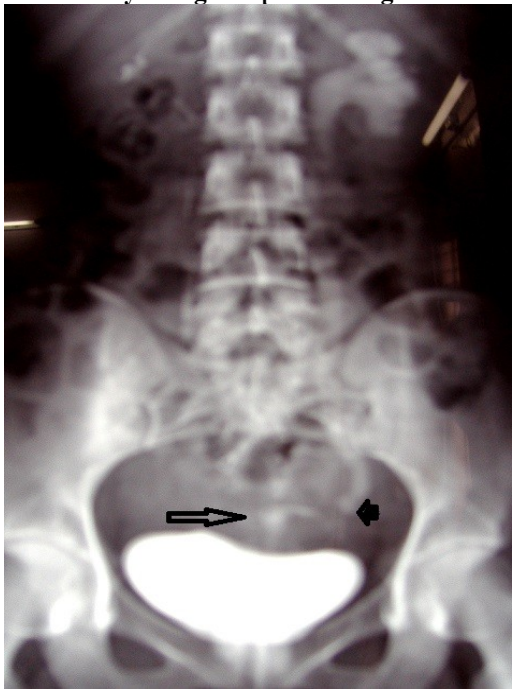

Figure 2: CECT Showing contrast leak into uterus

Figure 2: Retrograde ureterogram showing the leak in to fistula (solid arrow) and non visualisation of proximal ureter

Table 1: Post LSCS Ureterouterine fistula in literature

Authors	No	Diagnosis	Management
Suhler & Saout*[13]	1	_____	_____
El-Mahgoob [14]	1	_____	_____
Moussu *et al* [15]	1	CE, IVU	UNC
Alonso Gorrea[16]	1	IVU, RGP	Spontaneous healing
Docquier J* [17]	1	_____	Uretero-ureterostomy
Pernin F *et al**[18]	1	_____	_____
Saltutti *et al*[19]	1	IVU, CT	PCN,UNC
Lazarevski *et al* [20]	1	IVU	PCN >UNC
Kajbafzadeh AM [9]	1	IVU, RGP	URS Stenting
Nabi *et al*[1]	1	CS, TST, IVU	UNC
Iqbal Singh *et al*[11]	1	CS, TST, IVU	URS Stenting
Koziak A *et al** [21]	1	IVU, CE	UNC with dura
Lanary K A *et al* [8]	1	IVU, CT, Nephrostogram	PCN > UNC
Kumar S *et al* [12]	1	IVU	Lap UNC
Levy L *et al* [22]	1	CE, CT Urogram	PCN, Lap UNC
Present case	1	IVU, RGP	UNC

**Available in non English literature*
CE=Clinical examination;
IVU=Intravenous Urography;
RGP =Retrograde pyelogram;
UNC= Ureteroneocystostoy;
PCN=Percutaneous Nephrostomy;
URS= Ureterorenoscopy;
CS=Cystoscopy

4. Discussion & review of literature

The risk of iatrogenic ureteral injury during caesarean section is quite low at 0.09% [1]. Uretero-Uterine fistula is a consequence of such injuries and constitutes 1.7 to 5.1 % of all urogenital fistulas. The fistula is reported to occur following lower segment caesarean section, Medical Termination of Pregnancy and as a complication of lower ureteric calculi [2]. Table 1 depicts the post cesarean section ureterouterine fistula reported in the literature till date.

The left ureter is commonly injured as the dextroversion of foetus, brings the lower ureter closer to the incisional line [5]. One patient in our series had a right sided fistula. Prolonged obstructed labour in cases of cephalopelvic disproportion, leads to continued compression of lower ureter and thinned out lower segment against the pelvic brim resulting in pressure necrosis. Inadvertent lateral extension of the lower segment incision, leads to bleeding and the misguided attempts at haemostasis will further jeopardize an already susceptible ureter [6]. Inclusion of ureter in the ligatures can also lead to devascularisation of ureter. At a later date, the devascularised ureter gives way and the resultant urinary leak infects the surrounding haematoma, leading to abscess formation. Consequent break down of the abscess into lower segment or vagina leads to uretero-uterine or ureterovaginal fistula respectively.

Depending upon the nature of injury if it's a direct or a devascularisation injury the presentation can be early or delayed. After a brief period of fever and flank pain the fistula presents with a profuse vaginal leak. Patient though incontinent, continues to have normal voiding cycles (Paradoxical incontinence). Paradoxical incontinence is pathognomonic of ureteral involvement in fistula and virtually rules out the commoner vesico-vaginal fistula. Early uretero-uterine fistula is often associated with features of local sepsis as the urinary leak in to the surrounding tissues results in local inflammatory reaction with abscess formation. The patient in this instance presents with ipsilateral loin pain and fever, which resolves as the urine opens into uterine cavity or vagina and ureteric obstruction is relieved.

Sheen *et al* reported a modification of swab test to differentiate the uretero-uterine fistula from utero-vesical fistula, by administering phenazopyridine for 24 hrs to stain the urine orange [7]. The fluid leaking out from external OS is blue in uterovesical fistula as the instilled methylene blue in bladder leaks in to uterine cavity. On the contrary in uretero-uterine fistula it is orange as the urine flowing out from ureter does not get mixed with methylene blue stained urine from bladder. Sonography has limited role in diagnosing uretero-uterine fistula in that it cannot detect the actual fistula but can only lateralize the fistula as the ipsilateral ureteral dilatation. The dilatation may be minimal or nonexistent in large fistulas. Intravenous urogram shows the ipsilateral ureteral dilatation and sometimes demonstrates an inadvertent hysterogram as in our case. It hints at the level of injury and also feasibility of endourological management, as a blind ending proximal ureter is unlikely to be resolved with endourological management. A contrast enhanced CT in addition can show evidence of local sepsis and also demonstrate the fistulous communication with the uterine cavity.

The aim of surgical correction is preservation of renal function and establishment of ureteral continuity. There is no consensus in the available literature about the timing of a repair. Unlike vesico-vaginal fistula, which needs suturing of vaginal & bladder tissues after their separation and hence to a great extent depends upon the health of the local tissue, the management of an ureterovaginal or ureterouterine fistula consists of establishing ureteral continuity by reimplantation either by open surgical method or by laparoscopy. We recommend early repair of fistula soon after the resolution of local sepsis. Some authors have suggested use of percutaneous nephrostomy to divert the urine and delaying the definitive surgery to 3 months [8]. Putting percutaneus nephrostomy and waiting imposes an additional psychological burden of carrying a tube and its maintenance; hence we recommend nephrostomy insertion only in those with systemic sepsis. As the ureteral drainage continues through the fistula, the risk of renal functional loss is negligible. Another reason for preferring delayed repair is still uninvoluted gravid uterus hindering the repair. As the ureter is approached extraperitoneally and is dissected only as far down for adequate ureteral length but not up to the uterus, it should not be the limiting factor.

Endourological management of fistula is advised in those who present early and without sepsis. If the distal ureter is blind ending on RGP [Figure 3], successful stenting is impossible. Kajbafzadeh [9], AC Wang [10] and I Singh [11] reported successful management of a post LSCS, uretero-uterine fistula by dilatation of stenosed ureter at the fistula site and double J stent insertion.

Ureteral continuity is established either by Ureteroneocystostomy. Uretereoneocystostomy accomplished either by open surgical method or by laparoscopic method is the definitive treatment of this rare entity. An extra peritoneal approach to ureter, and extravesical ureteric reimplantation techniques like modified Gregoir-Lich method are recommended. The ureter is dissected as far down as the local condition permit and re-implanted without tension over a double J stent. The diseased distal ureter being involved in dense fibrous tissue is left as it is. If the ureteric length is insufficient, one can utilise Boari flap or Psoas hitch. Kumar S and others have reported laparoscopic management of this rare morbidity [12].

5. Conclusion

Uretero-uterine fistula is a rare morbidity consequent to the unrecognised iatrogenic ureteric injury during obstetrical surgeries, which can be managed successfully with ureteric reimplantation. Unless contraindicated, we strongly recommend an earlier correction to minimize the psychological trauma

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