

Medical Case Report

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# Uretero-vesical anastomotic stricture: a case report and review of management

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## Abstract

Uretero-vesical anastomosis is the connection of the ureter to the urinary bladder at a new site to achieve unimpeded flow of urine from the ureters into the urinary bladder. A rare complication of this procedure is the development of stricture at the anastomotic site. This report is on a 62-yr. old female with one year history of left flank pain and a prior left uretero-vesical anastomosis done 14 years earlier. She had been managed for recurrent urinary tract infections, but the left flank pain was persistent. Abdominal and pelvic CT scan with intravenous urogram helped establish the diagnosis of uretero-vesical anastomotic stricture. This was successfully managed with endoscopic dilatation after retrograde placement of guide wire under fluoroscopy followed by serial dilation. In a patient presenting with flank pains after a previous uretero-vesical anastomosis, stricture at the anastomotic site is an important differential diagnosis. Endoscopic management is the preferred initial management which produces successful outcomes.

**Keywords:** Uretero-vesical anastomosis, ureteroneocystostomy, stricture, endoscopic treatment

## INTRODUCTION

Uretero-vesical anastomosis or ureteroneocystostomy is the joining of the ureter to the urinary bladder at a new site so as to achieve unimpeded flow of urine from the ureters into the urinary bladder. This is performed when there is stricture or trauma involving the distal ureter as occurs in iatrogenic injury during pelvic surgeries from laceration, devascularization, ligation, thermal injury, or resection [1]. It is also performed for the treatment of primary ureteric reflux and in renal transplantation [2,3]. The long-term complications after this procedure include recurrent urinary tract infections [4] and stenosis or stricture at the site of the uretero-vesical anastomosis which has been noted to be rare [1,3,5]. Although transient hydronephrosis after uretero-vesical anastomosis has been noted, it tends to resolve by 2 yr. [5]. However late occurrence of hydroureteronephrosis can lead to obstructive damage to the kidneys if not relieved early. This complication may lead to flank pain, recurrent urinary tract infection, haematuria, pyelonephritis, formation of ureteric or renal calculus and secondary hypertension. The

treatment of the condition includes endoscopic procedures such as balloon dilatation of the stricture [1] and reoperation with re-establishment of a new uretero-vesical anastomosis (secondary ureteroneocystostomy) with or without tapering of a grossly dilated ureter [1,5]. This report is on a case of a uretero-vesical anastomotic stricture and reviews the current management.

## CASE

A 62-yr. old woman presented with a complaint of left flank pains of one year duration with a pain score on the visual analogue scale of 6/10. She had had a total abdominal hysterectomy in 2006 (14 yr. earlier) during which there was laceration of the left distal ureter which required a left uretero-vesical anastomosis using a direct extravesical technique. The pain had been treated several times as recurrent urinary tract infection with no significant relief. There were no lower urinary tract symptoms at the time of presentation. On examination, she was afebrile but had a mild left renal angle tenderness. The left kidney was not ballotable. There was no pedal oedema and no weight loss. She has been hypertensive for the past 15 yr. and was on amlodipine 10 mg daily. The blood pressure at presentation was 139/79 mm/Hg. An initial urine analysis showed pus cells and red blood cells of 5/1 and 3/1 per high power field

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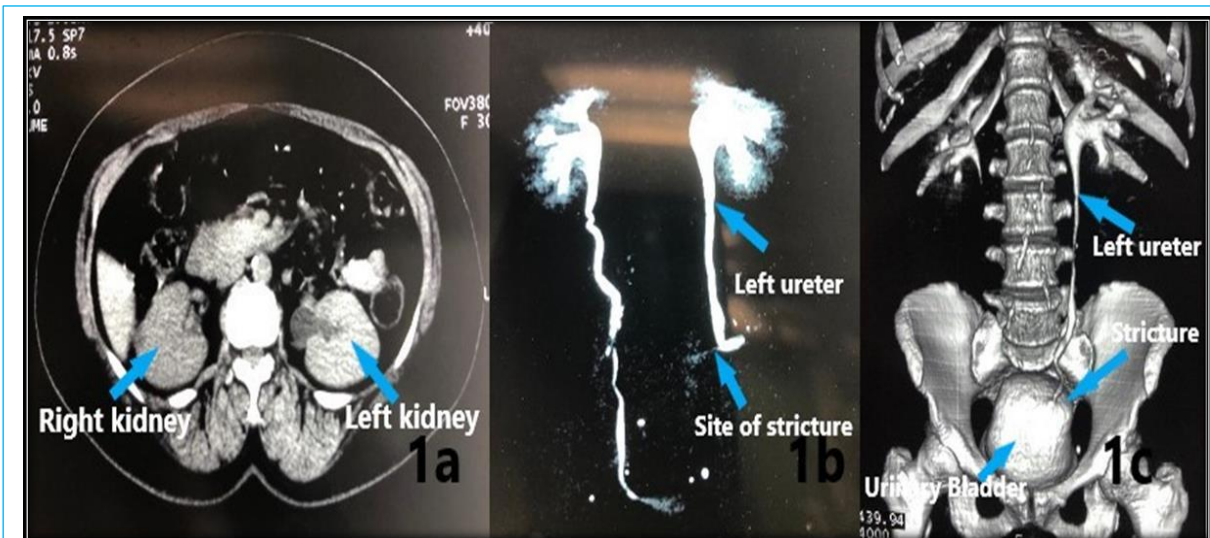


Plate 1: CT Scan images. (1a) CT scan showing the left hydronephrosis; (1b) CT – IVU showing partial obstruction at the left uretero-vesical anastomotic site with hydroureteronephrosis; (1c) 3D reconstruction showing stenosis at the anastomotic site.

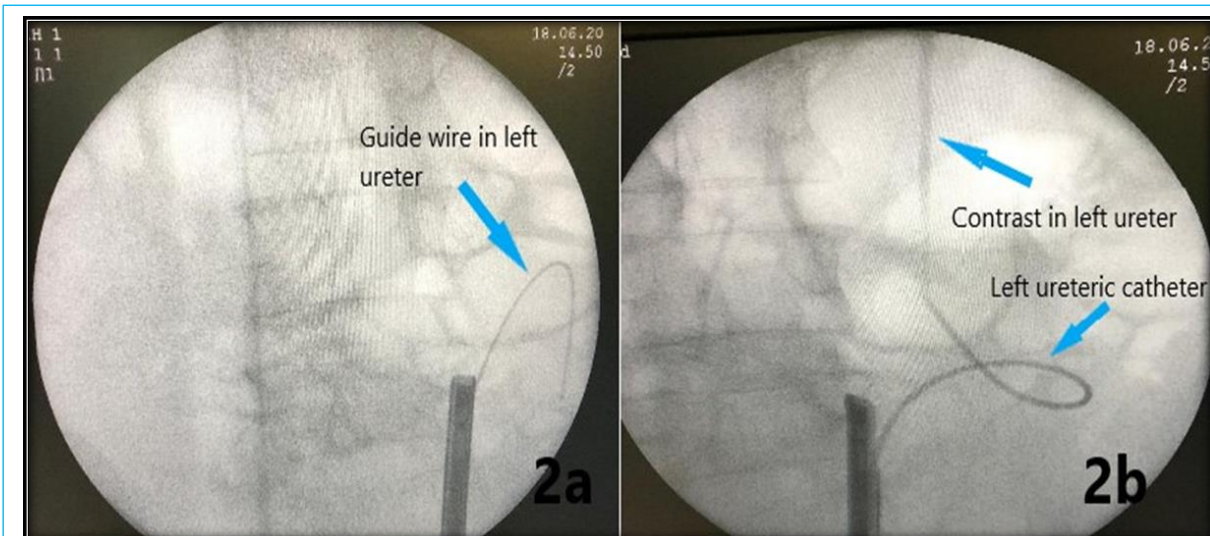


Plate 2: Fluoroscopic images. (2a) showing the placed guide wire under fluoroscopy; (2b) retrograde ureteropyelogram demonstrating correct placement of the guide wire and the tortuous course of the left re-implanted ureter.

however a urine culture was negative for organisms. Her blood electrolytes, urea and creatinine were normal (Na, 139.4 mmol/L; K, 3.98 mmol/l; Urea, 4.4 mmol/l; Cr, 55.53  $\mu$ mol/L). An abdominal and pelvic ultrasonography showed a mildly hydronephrotic left kidney. A follow-up abdominal and pelvic Computed Tomography (CT) scan with CT intravenous urogram (CT-IVU) revealed a left hydroureteronephrosis with stenosis at the left uretero-vesical anastomotic site (Plate 1). After discussion, we used an endoscopic approach with dilation of the left uretero-vesical anastomotic stricture as the patient had had

three previous pelvic surgeries. Under general anaesthesia and in the lithotomy position, cystoscopy was done with finding of a dimple corresponding to the site of the uretero-vesical anastomotic site. This was probed with a guide wire under fluoroscopy that successfully cannulated and traversed the site of the stenosis. The correct positioning was confirmed after passing a ureteric catheter over the guide wire and retrograde ureteropyelogram was performed (Plate 2). Serial graded dilatation of the ureter was done. The patient was found to be free of pain a week after the procedure having completed a 3-day course of analgesia.

An abdominal and pelvic ultrasonography at 2-mos follow-up revealed presence of mild hydronephrosis – an improvement over the initial finding (Plate 3). She had no left flank pain and was satisfied with the intervention at 3 mos.

## DISCUSSION

Uretero-vesical anastomosis, ureteroneocystostomy or ureteric re-implantation is performed to re-establish urine flow from the kidneys to the urinary bladder in cases of distal ureteric stricture, ureteric injuries during pelvic surgeries, and in treating vesico-ureteric anomalies such as vesico-ureteric reflux and obstructive mega-ureter [2,6,7]. It is also performed in renal transplantation as the donor ureter is re-implanted to the recipient's urinary bladder [3,8]. In this case presented, the uretero-vesical anastomosis was performed because of ureteric injury sustained during total abdominal hysterectomy. Intraoperative ureteric injury and subsequent ureteric re-implantation was the most common indication for ureteric re-implantation in a report by El Imam Mohammed et al. [8]. Stricture at the uretero-vesical anastomotic site is a rare complication of ureteric re-implantation [5].

Factors that predispose to stricture at the neoureterocystostomy site include poor anastomotic technique such as anastomosing under tension, poor vascular supply as occurs due to skeletonization of the ureters by stripping the ureter of its adventitia or devascularization from prior pelvic surgeries. Inadequate spatulation of the ureter and failure to achieve mucosa to mucosa approximation at time of the anastomoses of the ureter to the bladder is also a predisposition. The method of anti-reflux procedure used during uretero-vesical anastomosis has not been shown to increase the incidence of strictures. In a long-term follow-up of 204 children (mean 10.6 yr.) after bilateral Cohen reimplantation under a common submucosal tunnel, only one vesico-ureteric stenosis was noted. This was managed successfully with re-operation [7]. The anastomosis in this case presented was direct to the bladder without a psoas hitch or Boari flap. The patient presented with a year's history of left flank pains and had received multiple treatment for suspected urinary tract infections without relief. Recurrent febrile urinary tract infections have been observed in association with hydronephrosis in a ureteric obstruction after repair of bladder extrophy [5].

Abdominal and pelvic ultrasonography detects the hydronephrosis which is confirmed with CT scan with CT-IVU [5]. These imaging modalities helped confirm the diagnosis in this case. Magnetic resonance imaging with urography is preferred in the setting of renal impairment [5]. In the presence of associated urinary tract infection, urine analysis, bacteria culture, and antibiotic sensitivity test will help direct the appropriate antibiotics to use. In this case, the urine culture did not grow any organisms and the blood urea and creatinine were normal. Cystoscopy

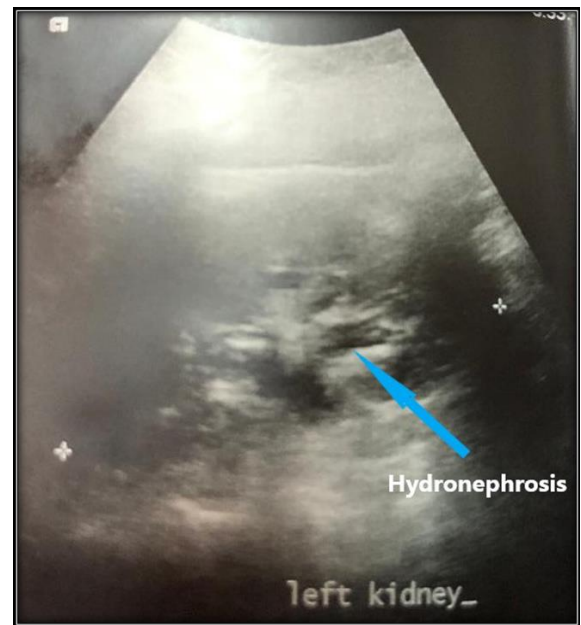


Plate 3: An ultrasound scan of the left kidney at 2 mos post-intervention showing mild hydronephrosis

revealed a uretero-vesical anastomotic stenosis presenting as a dimple at the site of the neo-cystostomy. This site was probed using the guide wire and successful cannulation confirmed under fluoroscopy. The use of fluoroscopy prevents perforating the ureter which assumes a new and tortuous course because of the re-implantation. An on-table retrograde ureteropyelogram confirmed the correct positioning of the guide wire over which rigid dilatation was performed. In situations where it is difficult to identify the site of ureteric re-implantation or the distal ureteric segment, the use of intravenous methylene blue [1] and intra ureteral injection of indocyanine green visualization under near-infrared (NIR) light may help identify the site of the ureteric stricture especially in robotic surgery [1,9]. Endoscopic management of ureteric strictures have been noted to be the initial preferred option as it is less invasive, requires less operative time, minimal postoperative pain and rapid recovery [1,10].

The endoscopic management of uretero-vesical anastomotic stricture may involve the use of serial dilatation, balloon dilatation, balloon cautery endoureterotomy and laser endoureterotomy with temporal stenting [1]. Balloon dilatation is appropriate for short, benign ureteric strictures with an intact vascular supply [1,11]. A report on the use of high-pressure balloon dilatation for ureterovesical anastomosis stricture led to symptomatic and functional improvement after a mean follow-up of 12 mos in two children [12]. Ureteral patency and graft-function rates at 100% after a median follow-up of 24 mos has also been reported when applied to uretero-vesical anastomotic stricture after renal transplantation [3].

Balloon dilatation can be done antegrade with failures related to the severity of the stenosis [1,13]. The use of Acucise balloon incision was reported to lead to success in 83% of uretero-vesical strictures [14]. Kachrilas et al. [1] reported a success rate of 62 to 83% with the use of endoureterotomy under ureteroscopic control with success dependent on the length (< 2 cm) and absence of ischaemia. In difficult cases, a combined retrograde and antegrade procedure is required (*rendezvous* procedure) [15]. The treatment of this case with near obliteration of the uretero-vesical anastomosis was by first advancing a guide wire under fluoroscopy and performing serial graded dilatation. Similar procedure had been used by Watson et al. [15] who probe from both retrograde and antegrade through existing percutaneous nephrostomies and had reported effectiveness of this technique. The placement of stent after dilatation is recommended to ensure a lasting patency [1]. Double J stent was not placed in this case. Surgical exploration with excision of the stricture, tapering when needed and secondary re-implantation by open method [5,7] or with robot assistance [16] give more lasting results and can be used when endoscopic procedures fail or as a first option depending on the stricture characteristics. The patient indicates satisfaction with no left flank pain at 3 mos of follow-up. There is the need for long term follow-up as endoscopic procedure using dilation was offered in this case.

### Conclusions

In a patient presenting with flank pain after a previous uretero-vesical anastomosis, stricture at the anastomotic site is an important differential diagnosis. The use of abdominal and pelvic CT scan with CT-IVU helped to establish diagnosis. Retrograde ureteropyelogram under fluoroscopy following placement of guide wire confirms proper positioning and allows for the safe performance of dilatation. Endoscopic management is the preferred initial management with good success.

### DECLARATIONS

#### Ethical considerations

Informed consent was obtained from the patient for this report. This report does not contain information that could lead to traceability of the patient.

#### Consent to publish

All authors agreed to the content of the final paper.

#### Funding

None

#### Competing Interests

No potential conflict of interest was reported by the authors.

#### Author contributions

KMY performed the surgery and conceived the report, acquired the data, drafted the manuscript, reviewed, and approved the final manuscript for submission. GR, KGO,

MJE, and TB were involved in the conception, acquisition of data, drafting of manuscript, reviewing, and approving the final manuscript for submission.

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### Availability of data

All relevant information is provided in the manuscript. The published information is available from the corresponding author upon a reasonable request.

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