



## Case Report

# Management of a long segment of bilateral ureteric injury: A combination of Boari flap and ureteroneocystostomy with psoas hitch

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Boari flap, bilateral ureteric injuries, ureteral reconstruction

### Abstract

Iatrogenic ureteric injuries are a relatively common complication of pelvic and gynecological surgeries which, if left untreated, could lead to medical and legal issues. Therefore, reconstruction of the ureter is still regarded as requiring a sophisticated approach which demands a specialist urologist. This case involves a post-hysterectomy and bilateral salpingo-oophorectomy 46-year-old woman who presented with a bilateral ureteric injury. A left Boari flap and right Lich-Gregoir ureteroneocystostomy with psoas hitch was performed for the correction of the bilateral long segment defect.

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### Introduction

The majority of iatrogenic ureteral injuries are a result of pelvic surgery (obstetric rather than colorectal procedures). End-to-end anastomosis is frequently performed for repairing short-segmented defects within the ureter. However, for repairing long segmented deformations, advanced surgical procedures are required for the reconstruction of the injured ureter to enable continuity. Different types of surgical processes are utilised, including ureteroneocystostomy with psoas hitch, ureter replacement, renal auto-transplantation, Boari flap, and nephrectomy. None of these surgical techniques has demonstrated substantial superiority. The aim of this study is to investigate the feasibility of using a combina-

tion of Boari flap and ureteroneocystostomy with psoas hitch with in a bilateral iatrogenic ureteric injury.

### Case Report

A 46-year-old female patient was referred to our hospital as a case of post-hysterectomy along with bilateral salpingo-oophorectomy that resulted in distal bilateral ureteric injury. The patient was transferred with a condition of fever and anuria for 2 days after surgery. The Computed Tomography of the pelvis and abdomen with an intravenous contrast indicated a leakage of contrast from the right renal pelvis into the right posterior retroperitoneal space. Bilateral moderate hydrouretero-nephrosis with bilateral

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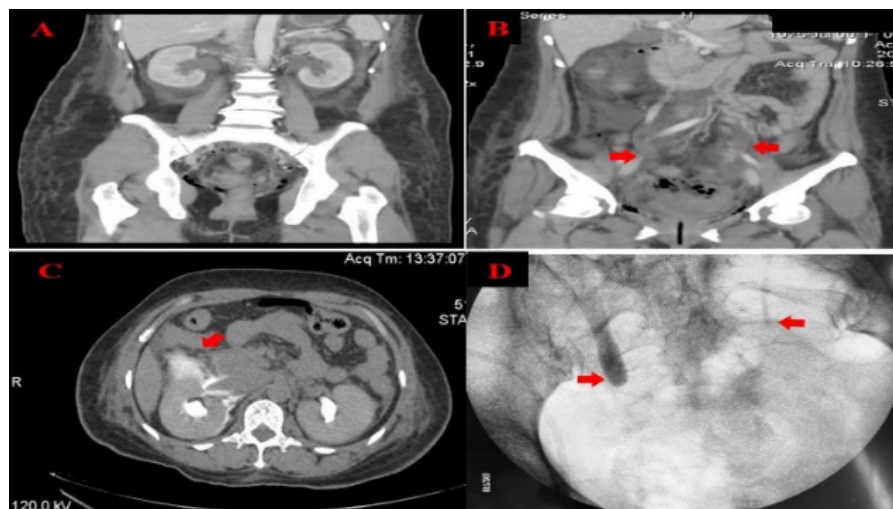
abrupt narrowing of the distal ureters above the ureterovesical junction was present. About 4 cm of each side. Excretion in both kidneys was delayed and there was no contrast passing through the bilateral distal ureters although there was a delay in imaging of 3 hours. The right renal pelvis was perforated due to an increase in intra-pelvic pressure from a complete distal ureteric obstruction. The patient was in a relatively stable condition when referred, with a body temperature of 37.9 °C, BP 120/71 mmHg, PR 90/minute, and RR 20 /minute.

The laboratory tests revealed leukocytosis and an increase in creatinine from 0.66 ng/dl to 2.68 ng/dl. Fluid therapy was started, and the patient was given an antibiotic. Cystoscopy was carried out to rule out bladder injury and an intra-operative bilateral nephrostogram was done after the bilateral percutaneous nephrostomy was performed. She was admitted for 10 days for correction of infection, acute kidney injury, and post obstructive diuresis. After improvement, the patient was discharged with a bilateral nephrostomy and given an appointment for readmission for a definite surgical procedure after ten weeks. The patient was provided with counselling to enable acceptance of the open bilateral ureteral reconstruction. Anatomical fibrosis of both distal part of ureters was revealed through intraoperative findings. Also, significant adhesions and phlegmon holding the bladder with sigmoid colon and right ureter were also evident.

During the process of dissection, to free the bladder from the phlegmon, the intended ureteral

cut was made at the end of the healthy region (at 6 cm from UVJ on the right and 5 cm from UVJ on the left ureter). The mobilization of the bladder was successful. However, due to a limitation of the small size of the bladder, we decided to perform a combination of re-implant ureter and tubular bladder flap. Three stitches of 3/0 Vicryl® suture were inserted into the posterior upper right lateral wall of bladder. The stitches were inserted into the detrusor muscle and went through the tendon of the right psoas muscle whilst avoiding right genitofemoral nerve injury. After the right psoas hitch was checked for a lack of tension the Lich-Gregoir technique for ureteroneocystostomy was used to bridge the defect. The serosal and muscular layers of the detrusor were opened along an oblique course around 2.5 centimeters length. The detrusor was separated from the underlying mucosa to create the anti-refluxing trough. The ureter was placed within the trough and ureterovesical anastomosis was done with 6 stitches of 4/0 catgut suture after a 6-Fr double pigtail ureteric stent across the anastomosis was performed. The detrusor was closed with interrupted 3/0 catgut sutures.

After this, the gap between the proximal end of the left ureter and bladder was widened to 6 cm. The proximal ureteral stump was cut longitudinally for approximately 1-cm for anastomosis. The anterior bladder wall was opened with an oblique shaped incision. The flap was fashioned to be 7 cm, the widths of the apex and base were 3 and 5 cm, respectively. The base of the flap was fixed to the psoas muscle using interrupted 3-0



**Figure 1.** CT abdomen and pelvis with contrast showing: A: Bilateral hydronephrosis after hysterectomy, B: Bilateral distal ureteral stricture, C: Urinary leakage at right renal pelvis, D: Preoperative nephrostography showing bilateral distal stricture.

Vicryl® sutures. Due to the limitation of the flap length, the spatulated ureter was anastomosed to the apex of the flap using the end-to-end technique with 4-0 Vicryl® sutures. A 6-Fr double J ureteral stent was then inserted in the renal pelvis across the anastomosis. Finally, the flap was tubularized by running 4-0 Vicryl® sutures. The bladder was refilled with 200 ml of saline to verify the integrity of closure. The urethral catheter was removed two weeks after surgery, and the double J stents were removed six weeks postoperatively. Finally, 3 months later, the follow up of cystogram revealed a grade III left vesicoureteral reflux; and the bladder capacity was 300-ml with lobulated contour. No post voiding residual urine was detected. The laboratory tests revealed normal kidney function.

## Discussion

Ureteric injuries can lead to severe hydronephrosis of the urinary tract and even renal failure. Upper urinary tract reconstructive surgery aims to restore the continuity of the urinary tract and protect renal function.<sup>1</sup> Open ureteral reconstruction was the gold standard for ureteral defects with a success rate of over 90% and good long-term results.<sup>2</sup> Short-lower-ureteric strictures up to 4-5 cm could usually be managed by ureteroureterostomy or simple ureteroneocystostomy.<sup>3</sup> When a long segment of defect in the distal ureter was discovered, a ureteroneocystostomy with psoas hitch became an ideal method for distal ureteral reconstruction. For long distal and middle ureteric strictures, the Boari flap was an effective treatment option.<sup>4,5</sup> Bilateral ureteric stricture is an uncommon occurrence and should be regarded as a difficult surgical challenge. To date there is a shortage of literature focusing on the procedure for bilateral ureteric injury.

Chen and colleagues<sup>6</sup> reported that a case presenting as bilateral long-segment ureteric stricture was successfully treated by the combined use of Y-shaped common channel transureteroureterostomy with Boari flap technique. The technique described was a smart method to reconnect both ureters to the bladder without using an augmentation or bowel segment. In addition, Sagalovich and his colleagues<sup>7</sup> demonstrated management of the bilateral distal ureteric strictures with a bilateral Boari flap. The Boari flap was performed which resulted in an uneventful recovery of the patient. Another study conducted



**Figure 2.** Postoperatively, three months of cystography follow up after surgery showed left ureteral reflux reaching up to the left collecting system; no contrast leakage and post voiding residual urine was detected.

by Ordorica and the team<sup>8</sup> reported on 16 cases of long segment ureteral strictures all of which had received a ureteral replacement using a segment of ileum, colon or the appendix. Renal function and urinary drainage were preserved in fourteen out of the sixteen patients. However, in our case, the length of ureteral stricture was long and included both ureters. We also found fibrosis of the distal end of the proximal stumps and severe retroperitoneal adhesion as the patient experienced urinary leakage and infection due to prior perforation of the renal pelvis. Therefore, we decided to postpone the reconstructive surgery for 12 weeks after injury and use the combination of right ureteroneocystostomy (Lich-Gregoir technique) with psoas hitch and left Boari flap with end-to-end anastomosis.

There was a post-surgical follow up with the patient after 6 months. This indicated only a grade III vesicoureteral reflux of the left kidney without renal deterioration. The patient was also free from infection and pain. This technique was facilitated by the introduction of a smart method for the reconnection of both the ureters with the bladder without making use of a bowel segment or augmentation in management of iatrogenic bilateral ureteral injury with long segment defect.

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## Conflict of Interest

The author declares no conflict of interest.

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