

Trauma and reconstruction

Management of iatrogenic ureteral injury: Ureteral reimplantation with a bilateral Boari flap

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ABSTRACT

Reconstruction of the ureter is still regarded as a sophisticated approach demanding absolute dedication of the urologists. Similarly, iatrogenic ureteral injuries, as well as strictures, are quite common complexities of the pelvic and gynecological surgeries which if left untreated could lead to short as well as long-term issues. Presently, a case of a post-caesarian section along with hysterectomy of 40 years old woman has been presented that has resulted in distal left ureteral injury. A bilateral Boari flap was performed for the mobilization of the bladder.

Introduction

There are different etiologies associated with ureteral injuries, however, many of these injuries are a result of iatrogenic reasons (obstetric instead of colorectal procedures).¹ End-to-end anastomosis is usually performed by 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 for enabling continuity. Repairing long segmented defects have been a persistent issue for the urologists. Different types of surgical processes are implied which include psoas bladder hitch, ureter replacement, renal auto-transplantation, Boari flap, and nephrectomy. Nevertheless, none of the aforementioned surgical techniques has demonstrated substantial superiority.²

We aimed to report the bilateral feasibility of the Boari flap within a bilateral iatrogenic ureteral injury.

Case report

40 years old female patient was referred to our institute as a case of post-caesarian section along with hysterectomy that resulted in distal left ureteral injury. The patient was transferred with bilateral JJ stents, bilateral nephrostomies, as well as abdominal drain for further management and investigations. She had a rather stable condition when referred.

The laboratory tests revealed normal results, while the nephrostography demonstrated a distal left ureteral leak with an intact right ureter (Fig. 1 A). CT of the pelvis and abdomen with an IV contrast indicated a left pelvic collection along with left distal ureteral leak with an in situ stent (Fig. 1 B). There was minimal abdominal drain which was removed. After improvement, the patient was discharged with a left nephrostomy and later readmitted for a definite surgical procedure. The patient was provided counselling for the robotic left ureteral reimplantation. Anatomically distorted bladder was revealed through intraoperative findings. Also, significant adhesions and phlegmon holding the bladder with sigmoid and left ureter was also evident. During the process of dissection, right ureter had reached the left side.

To free the bladder from the phlegmon, intentional cut was made at the right ureter. Since the dissection was difficult, hence surgical process was shifted to open surgery. The attempt for the mobilization of the bladder was unsuccessful so bilateral Boari flap was used (Fig. 2).

Discussion

There is a dearth of literature focusing on the bilateral Boari flap procedure for ureteral injury.

An article was penned down in China by Lujia Zou in the October of 2016 focusing on the unilateral long-segmented ureteral reconstruction utilizing the bilateral Boari flap bridge as an experimental model conducted on dogs. The experiment comprised of eight beagle dogs who

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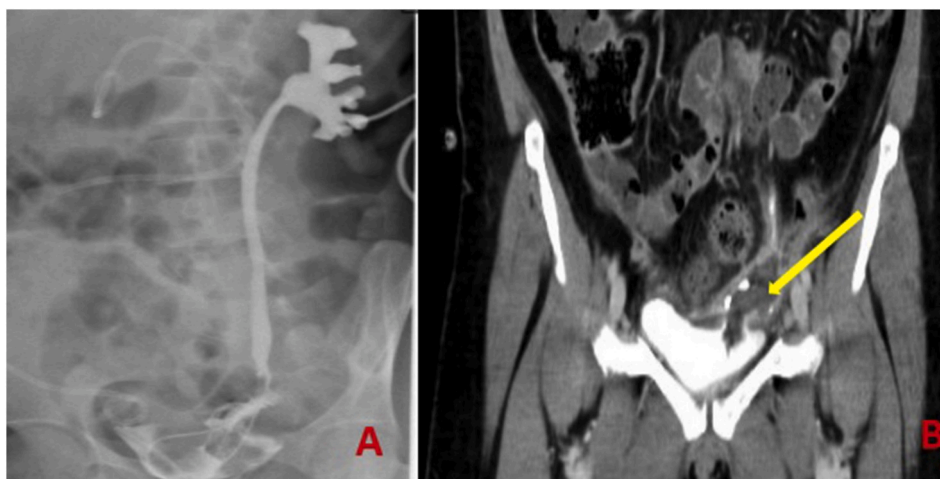


Fig. 1. A: Preoperative nephrostography showed distal left ureteral leak with distal stricture, right ureter was intact. B: Preoperative CT abdomen & pelvis with contrast showed left pelvic collection with left distal ureteral leak and stent in situ.

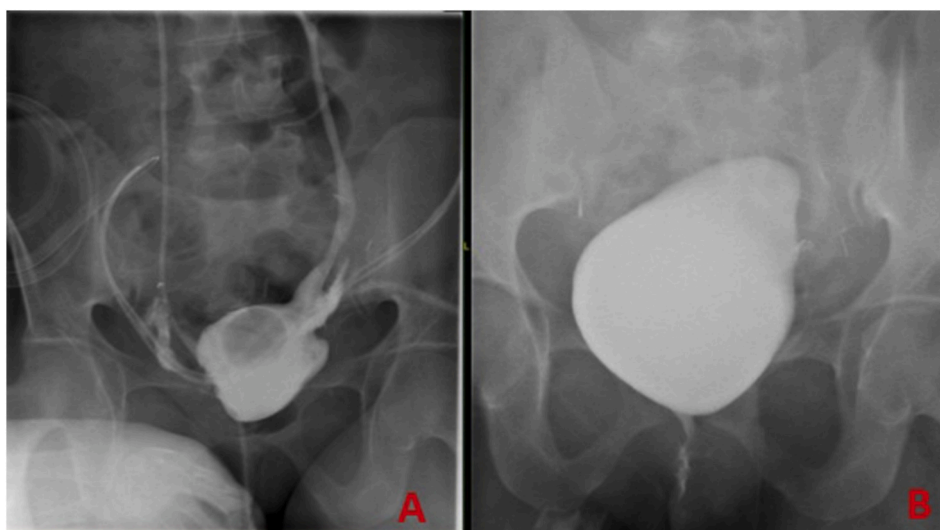


Fig. 2. A: Postoperatively, cystography was done, without evidence of extravasation, bilateral JJ stents removed 6 weeks after surgery. B: 1 year cystography follow up after surgery showed left ureteral reflux reaching up to the left collecting system, no contrast leak and small amount of residual contrast noted post voiding.

were healthy and aged 1 year old. No obvious complications were recorded by any of the animals throughout the procedure and the survival rate was also 100% until the dogs were laid down at the 8th post-op week. Cystostomy was performed where the consistency in the output of urine was recorded from the neoureter orifices. Patent urinary excretion was recommended via urography with a normal calibre of the ureter without any obvious stenosis or fistulas.³

Another study by Sagalovich and his colleagues demonstrated management through minimal invasion of the distal structures of the ureter with a bilateral Boari flap in October of 2018.⁴ The experiment was focused on an 82 years old female patient with a bilateral mid ureteral stenting as well as bilateral nephrostomy tubes. Robotic bilateral Boari flap was performed which resulted in an uneventful recovery of the patient. This demonstrated that the robotic bilateral Boari flap is only feasible in patients who have bilateral distal ureteral strictures. Further research is needed to analyse the long term prospects.

Chen et al. analyzed a case study focusing on the bilateral reconstruction of the ureter with long-segmented strictures making use of a combined y-shaped common channel transureteroureterostomy in addition to a Boari flap.⁵ 18 months post-surgical follow-up of the patient was conducted which indicated only a slight dilation of the right

kidney. This technique facilitated in 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. Specifically, the psoas hitch along with Boari flap is used most often for the reconstruction of single side.

Conclusion

To the best of our knowledge, this is the first reported case of ureteral reimplantation using bilateral Boari flap in the management of iatrogenic ureteral injury. Reconstruction of the ureteral has become a grave challenge in the domain of reconstructive urology. In comparison with the urethra, the size, vulnerability, and delicacy of the ureter are much small. Hence, procedures for the reconstruction of the urinary tract are not as simple as opposed to the reconstruction of the upper urinary tract.

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