

# Laparoscopic-Assisted Vesicocalicostomy for Severe Pelvi-Ureteral Stricture Disease

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## ABSTRACT

A 39-year-old female previously treated with shock wave lithotripsy developed extensive ureteral stricture disease. After 2 unsuccessful attempts at retrograde balloon dilatation, she was evaluated at our center for further management. Successful reconstruction was performed with laparoscopic-assisted vesicocalicostomy.

**Key Words:** Vesicocalicostomy, Laparoscopic, Reconstruction, Ureteral stricture, Hydronephrosis, Ureteral obstruction.

## INTRODUCTION

The management of proximal ureteral stricture disease is complex and can require renal autotransplantation, bowel interposition, or even nephrectomy. Although often successful, these interventions can lead to metabolic derangements and loss of renal function. The following case describes the use of laparoscopic assistance for successful management of a complicated stricture using the orthotopic position of the kidney and the patient's native urothelium.

## CASE REPORT

Evaluation of the patient's right upper tract with retrograde pyelogram demonstrated the presence of a 4-cm proximal ureteral stricture with virtually no remaining renal pelvis (**Figure 1**). Estimated GFR was  $>60\text{mL/min per }1.73\text{m}^2$ , and a radionuclide scan with ureteral stent in place suggested that the right renal unit contributed 33.6% function while the left kidney contributed 66.4%.

The natural right renal position was quite caudal and therefore vesicocalicostomy was planned. With the patient in the flank position, a 4-port laparoscopic access was used to limit the eventual open incision size. The kidney was fully mobilized, and the lower pole calyx was identified and marked using laparoscopic ultrasound. The bladder was also mobilized laparoscopically including division of the contralateral bladder pedicle. A Gibson incision was then created, and the lower pole moiety was amputated without hilar clamping to expose a renal calyx. Nephropexy as caudal as possible was followed by a psoas hitch and Boari flap to approximate the bladder to the renal calyx (**Figure 2**). A stent, Foley catheter, and Jackson-Pratt drain were left in place. A cystogram 10 days postoperatively demonstrated no extravasation, and the Foley catheter was removed (**Figure 3**). The stent was removed 1 month postoperatively. At 2-year follow-up, the patient denies flank symptoms, while renal function and drainage are maintained as documented by diuretic radionuclide scan.

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DOI: 10.4293/108680812X13291597716627

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**Figure 1.** Preoperative Retrograde Pyelogram: ~ 4-cm proximal ureteral stricture with virtually obliterated renal pelvis.



**Figure 2.** Intraoperative photograph after performing laparoscopic-assisted right vesicocalicostomy with psoas hitch and Boari flap. A) right kidney after lower pole heminephrectomy B) Boari flap

## DISCUSSION

Complex proximal ureteral stricture disease is a challenging area in reconstructive urology. Classically, ileal interposition, either using an open or minimally invasive technique, and autotransplantation have been the only approaches besides nephrectomy for treating such patients.<sup>1,2</sup> Certainly the use of urothelium in the reconstruction is optimal to prevent metabolic abnormalities.

Vesicocalicostomy has been previously described in 2 cases of normally positioned kidneys.<sup>3</sup> The authors de-



**Figure 3.** Postoperative cystogram: Right ureteral reflux confirming no extravasation.

scribed successful reconstruction for a solitary kidney as a primary procedure or after failed previous reconstruction. Certainly, kidney position is one of the key aspects regarding the use of vesicocalicostomy in a normally positioned kidney. Furthermore, bladder mobility is an important factor in the success of this particular operation. Bridging lengthy ureteric strictures in patients with low capacity, contracted bladders would most likely be difficult.

This case highlights the use of a laparoscopic-assisted approach to aid in limiting ultimate incision size. The patient is initially placed in a flank position to facilitate complete laparoscopic renal mobilization, because radical caudal displacement of the kidney is essential. The patient can then be easily rotated on the operating table to a supine and steep Trendelenburg position to fully mobilize the bladder. We did not need to re-prepare and drape the patient, as the rotation of the operation table itself was sufficient. Due to the radical mobilization of the bladder and kidney, a far smaller open Gibson incision was eventually required for the remainder of the procedure. The center of the Gibson incision should approximate the site of the vesicocalicostomy anastomosis. If laparoscopic renal and bladder mobilization were not performed, a lengthy midline incision or perhaps 2 open incisions (one flank and one low midline/Gibson) would have been required.

The costs associated with laparoscopy have to be weighed against the benefits of a smaller open incision. Although further study is required, it is likely that the decreased size

of the incision would provide benefits in terms of perioperative analgesia requirements, decreased length of hospitalization, and shortened convalescence.<sup>1</sup>

In terms of preparing the lower pole calyx, intraoperative ultrasound was used to mark the exact position of the renal papilla. We were then able to use monopolar cautery to excise the lower pole parenchyma while maintaining gentle manual pressure to ensure hemostasis without arterial clamping. Two to 3 sutures were used to control specific vessels. After performing nephropexy to the psoas muscle as caudad as possible and psoas hitch of the bladder as well with PDS suture, a Boari flap was created. 3-0 Vicryl interrupted sutures were then used to approximate the flap to the open calyx, and a running 3-0 Vicryl suture was used to reapproximate the bladder defect.

Complex ureteric reconstructive procedures can occasionally risk ipsilateral renal function, contralateral renal func-

tion, or introduce bowel into the urinary tract. Minimizing these various risks is ideal but sometimes not possible. This case demonstrates that laparoscopic-assisted vesicocalicostomy can be a rare but viable option in select patients with severe pelvi-ureteric stricture disease.

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