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UROLOGY - LETTER TO THE EDITOR

Robot-assisted laparoscopic surgery for the management of post-renal transplant ureteric strictures

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Editor,

I am writing this letter to describe our experience of robotic-assisted laparoscopic surgery as an alternative to the open surgical methods described previously in allograft ureteric strictures. Ureteric stricture is one of the most common reasons for allograft dysfunction, occurring in 2–10% of all patients undergoing renal transplant surgery. Various open and endourologic techniques have been employed in the management of ureteric strictures. Endourologic procedures are performed in majority of patients as an initial intervention aimed at restoring the renal function [1, 2]. Open techniques include ureteric reimplantation, ureterocalicostomy or pelviureterostomy to native ureter, pyelovesicostomy and ureterovesicostomy to Boari flap [3].

Five patients who had transplant ureteric stricture operated in different centers from a period of 25 months from September 2016 to September 2018. All the patients had progressive worsening of renal function with allograft hydronephrosis. Preoperative ultrasound and MRI were performed to identify the location and nature of obstruction. One patient had an allograft renal pelvic calculus and hence underwent non-contrast computerized tomographic scan. Ureteric involvement ranged from stricture at ureterovesical anastomotic site to long segment of involvement of ureter in preoperative MRI. Patients were placed in general anesthesia and lithotomy position. A da Vinci Si system (Intuitive Surgicals, Sunnyvale, CA) was used. The port placements are similar to that of robotic radical prostatectomy. Initially, a Doppler ultrasound is performed using a Hitachi drop-down probe (Hitachi Healthcare, Tokyo). The dilated pelvis, renal hilum and the position of the kidney are mapped (Fig. 1). Then the bladder is filled with saline and a cystotomy is made in proximity to the transplant ureteric anastomosis. The allograft ureteric orifice is identified and then dissected around. The strictured portion of the ureter is identified and excised until a healthy margin is visualized. If feasible, our first option is to perform a ureteroneocystostomy at a different location in the bladder and closure of the initial cystotomy. In instances of inadequate length of the ureter due to long-segment stricture, a pyelovesicostomy was performed in large dilated pelvis. In long-segment stricture of ureter, the native ureter is utilized to bypass the stricture with excessive dissection of the allograft ureter. If the native ureter and then transplant pelvis are near by, a side to side anastomosis is performed. If the ureters are far apart, then the ipsilateral native ureter is mobilized and divided and an end to side anastomosis to allograft renal pelvis is performed. This is followed by ipsilateral native nephrectomy. The ureterovesical anastomosis is performed using 4.0V loc (Covidien LLC, CT) or 4. 0 Vicryl (Ethicon Inc, OH) in Lisch gregoir fashion. The ureteropelvic anastomosis is performed using 5.0 polydioxanone suture (Ethicon Inc, OH). A 15-cm 6-Fr Dj stent was placed across the anastomosis. In the patient who had a stone in the upper ureter, an antegrade puncture and a percutaneous nephrolithotomy were performed prior to the procedure.

Results

All the patients were managed using robotic-assisted laparoscopic surgery. Three patients underwent ureteric reimplantation and two patients were managed with pelviureterostomy to native ureter. All patients had indwelling catheter at the end of procedure which was removed at post-operative day 5 and were discharged on post-operative day 3. The Double-J stent removal was performed after 2 weeks from the day of surgery. One patient with distal ureteral stricture was diagnosed to have BK virus infection. Serum creatinine

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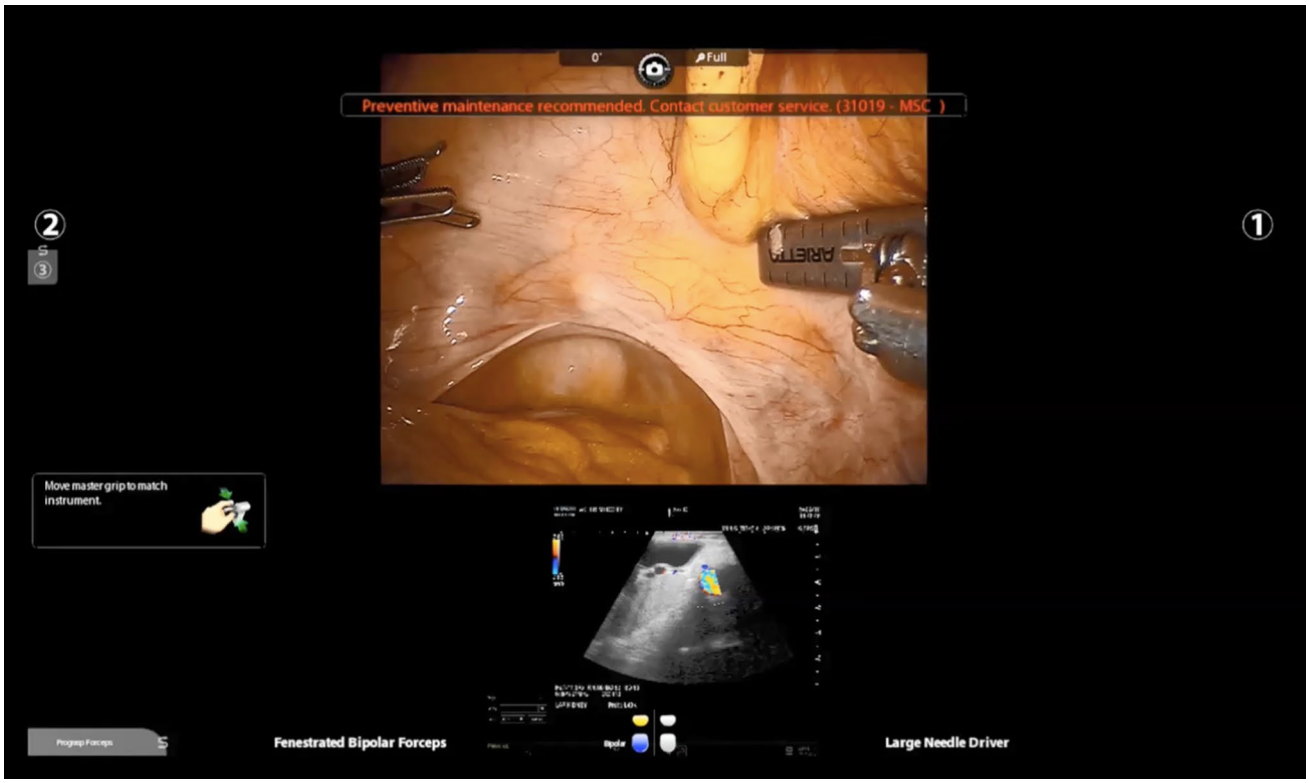

Fig. 1 Intra-operative ultrasound using drop-down probe to locate dilated ureter, pelvis, bladder and blood vessels

Table 1 Patient characteristics and comparison of pre-operative GFR versus Post-operative GFR at three months

	Age (years)/sex	Duration after transplant in months	Procedure performed	Pre-op GFR ml/min	Post-op GFR ml/min 3 months
Case I	31/female	48	Pyeloureterostomy	43	59
Case II	58/male	86	Ureteroneocystostomy	29	45
Case III	45/male	24	Pyelovesicostomy	37	51
Case IV	33/male	3	Pyeloureterostomy	29	41
Case V	45/male	6	Ureteroneocystostomy	37	36

values have improved in all patients except for the one with BK virus infection (Table 1).

Conclusion

We believe that robotic surgery is versatile in these cases and offers all the advantages of minimal access surgery while allowing the operating surgeon to reproduce all the techniques described in open reconstruction.

Laparoscopic surgery gives superior exposure to native ureter, which allows adequate mobilization.

Transperitoneal approach helps to avoid the transplant surgery-related adhesions and helps us to reach the ureterovesical anastomosis quickly and safely.

Robotic drop-down ultrasound can help delineate dilated ureter, pelvis and vascular structures.

Robotic-assisted laparoscopic procedure is an easier, safer and less morbid option for definitive management of transplant ureteric stricture.

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