

Surgical Management of Multi-Segment Ureteral Strictures

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INTRODUCTION

Ureteral stricture commonly is associated with hydronephrosis and impaired renal function. In recent years, iatrogenic injury such as endoscopic management, pelvic surgery and radiotherapy of malignant tumors, contributes to the increasing incidence of ureteral strictures. Endoscopic dilation or end to end ureteroureterostomy are widely used in short ureteral stenosis. But, the management of multi-segment ureteral strictures is a more difficult task. Dual transections of the ureter at multiple points would lead to devascularization of the ureteric segment which should be avoided at all costs. Then the traditional operations for multi-segment ureteral strictures are Ileal Replacement of the Ureter surgery (IRU) and Autologous Kidney Transplantation (AKT). Both IRU and AKT are unsatisfactory solutions because of the complex surgical procedure, large trauma and serious postoperative complications, including ileus, metabolic acidosis, anastomotic leakage, vascular stenosis and thrombosis. Therefore, it is urgent to explore innovative minimally invasive surgery for multi-segment ureteral strictures.

Dual transection of the ureter impairs the ureteral blood supply, which could lead to ureteral ischemia and an increased incidence of recurrent stenosis. Slawin, et al. described a technique that does not transect the ureter for implantation: The side to side ureteroneocystostomy by anastomosing the bladder mucosa onto a medial side slit along the distal ureter [1]. There are 16 patients who have undergone this approach. With 12.5 months of follow-up, the rate of clinical symptom improvement and radiographic improvement were 93.8% and 100% respectively. Side to side ureteroneocystostomy minimizes the disruption of distal ureteral vascularization, and would allow a surgeon to perform transection and reconstruction at the proximal ureteral stricture. Therefore, it is reasonable to believe that multiple ureteral stenoses could be repaired by laparoscopic non-transecting side-to-side ureteroneocystostomy combined with pyeloureteroplasty or ureteroureterostomy.

DESCRIPTION

Ureteroplasty with Oral Mucosal Graft (OMG) was inspired by the usage of only technique in the reconstruction of urethral stricture. Although strictured ureters inadequate for urine drainage, the blood vessels of ureteral plate could assist in revascularization of the grafts. The efficacy and safety of OMG ureteroplasty have been demonstrated over the past decades in multiple medical centers [2-4].

Since OMG technique could repair ureteral stricture without transecting ureter, it become a potential solution for treating multiple strictures in one ureter. Lee, et al. published a case of male patient with unilateral multifocal ureteral strictures, who underwent robotic assisted ureteral reconstruction using double buccal mucosal grafts [5]. There were no intraoperative complications and patient was discharged within 24 hours after operation. This case indicated a promising direction to the management of extensive ureteral strictures, which is the "double graft technique". The candidates of "graft" including lingual mucosa, buccal mucosa, lip mucosa and appendiceal flap. Appendiceal flap is a good onlay graft for the treatment of complex stricture of right ureter [6]. However, we need more studies about the utilization of "double graft technique" in management of multi-segment ureteral stricture.

With the development of onlay graft technique, we proposed a novel surgical strategy that OMG ureteroplasty combined with ureteroneocystostomy for multi-segment ureteral stricture. The first-line surgical therapy for distal ureteral stenosis is ureteroneocystostomy, which has higher success rate and few complications. In our previous case report, a male with three segmental strictures in unilateral ureter was treated by Lingual Mucosal Graft Ureteroplasty (LMGU) combined with ureterovesical reimplantation [7]. Two segment distal ureteral strictures (17.2 and 24.2 mm respectively) were addressed simultaneously by ureterovesical reimplantation, and the proximal stricture (12 mm) was managed by LMGU. Recently, OMG was demonstrated as a reliable and popular substitute for use in ureteroplasty, which obviated most of serious complications compared with IRU or AKT [3]. However, OMG harvest was associated with some oral discomfort, like numbness, tightness of the mouth and motor deficits. OMG

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technique combined with ureteroneocystostomy reduced the need of oral mucosa, and decreased the discomfort related to mucosa harvest as well.

CONCLUSION

To date, Increasing numbers of new minimally invasive surgeries have been used in selected patients with extensive ureteral stricture. OMG ureteroplasty, side-to-side ureteroneocystostomy or OMG combined with ureteroneocystostomy is alternative to IRU/AKT. Treatment options should be carefully considered for each patient in according with patient age, etiologic factors, previous stricture treatment, location of stricture and length. Further studies are needed to optimize ureteral stricture treatment guideline.

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