

Appendiceal Substitution Following Iatrogenic Ureter Injury: Case Report

Üreterin İatrojenik Yaralanmasında Appendiksin Kullanılması

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ABSTRACT Ureteral injuries are not common, but with more frequent use of ureteroscopy, the incidence of such injuries are increasing rapidly. We report the case of lumbar ureteral replacement with the vermiform appendix, in an iatrogenic ureter injury. We believe that appendix is still a simple and useful conduit for patients with right-sided ureteral defects not amenable to primary end-to-end anastomosis.

Key Words: Appendix; ureteral obstruction; ureteroscopy; transplantation, autologous

ÖZET Üreter yaralanmaları sık değildir, ama üreteroskopinin daha sık kullanımıyla bu tür yaralanmaların sayısı hızla artmaktadır. Bu olguda, apendiks ototransplantasyonu ile tedavi edilen iatrojenik üreter hasarı rapor edilmiştir. Özellikle primer olarak uç uca anastomoza uygun olmayan sağ üreter defektlerinde apendiksin hala kolay ve uygun bir konduit olduğuna dikkat çekmek istiyoruz.

Anahtar Kelimeler: Apendiks; üreter tıkanıklığı; üreteroskopi; transplantasyon, otolog

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Long defects of the ureter may result from iatrogenic injuries during open or endourological surgery.¹ There are numerous techniques for the repair of these injuries. Primary end-to-end anastomosis, psoas hitch ureteral reimplantation, and Boari flap may not be feasible in selected cases due to the length and location of the injury. Ileal interposition and auto-transplantation of the kidney have been successfully used, but they are technically challenging and associated with unique morbidities. We present here our experience of a case of ureteric substitution with vermiform appendix.

CASE REPORT

A 57 year-old male presented with abdominal pain, having been previously operated endoscopically for ureteric stone in two different centers. His physical examination and routine laboratory investigations were normal. An ultrasound and a CT scan revealed a 6 mm mid ureteral calculus and

grade 2 hydronephrosis. An intravenous urogram (IVU) showed delayed renal function with no passage to distal ureter and bladder.

After antegrade and retrograde evaluation, diagnosis of a ureteric stricture with a relatively long defect was made. The patient was taken up for exploration and was found to have 5 cm long stricture distal to 6 mm calculus in mid ureter. Owing to the length of the diseased segment, direct end-to-end anastomosis was not possible. Availability of a large appendix with a long pedicle encouraged the consideration of appendix interposition. We separated the base of the appendix from the cecum and excised its tip. After irrigation of the lumen and spatulating both ends, we anastomosed the base of the appendix to the proximal ureter and tip of the appendix to the distal ureter on a previously inserted double J stent (Figure 1).

Histopathological study of the excised ureteric segment demonstrated only nonspecific inflammation and fibrosis. The patient was discharged from hospital on postoperative day 7. The patient was followed up three months later without recurrence of pain and ultrasound of kidney showed no hydronephrosis. Double J stent was removed after 3 months. 4 months postoperatively a CT urography was performed that showed a patent appendiceal graft with no evidence of stricture or hydronephrosis (Figure 2).

DISCUSSION

In 1912 Melnikoff was the first to report substitution of the ureter with the vermiform appendix¹ but it did not become a popular method at that time. However, there are new reports of using the appendix as a ureteral substitute.² The results of using the appendix as a ureteral substitution (although almost all reported cases involve the right side) are encouraging.³⁻⁵ However, there is also a report of a proximal left ureteral repair by Zargar et al. in 2004.⁶ There are many advantages in using the appendix as a ureteral substitute; good contractility, the ability to be mobilized with its blood supply to reach any part of both ureters, no need for bowel anastomosis, negligible urine absorption, the possibility of creating a submucosal tunnel to prevent re-



FIGURE 1: Intraoperative view after anastomosis.
(See for colored form <http://uroloji.turkiyeklinikleri.com/>)



FIGURE 2: Postoperative 4rd month 3D Urinary CT image showing a patent graft with no evidence of stricture.
(See for colored form <http://uroloji.turkiyeklinikleri.com/>)

flux in lower ureteral cases, and comparability of appendiceal caliber to that of the ureteral lumen.^{7,8}

Two important technical points in using the appendix are: base to tip direction of peristalsis in the appendix, so the base should be anastomosed to the proximal and the tip to the distal part of the ureter, and the necessity of adequate mobilization to achieve a tension-free anastomosis to the right or left ureter.^{7,9}

In conclusion, We believe that appendix is still a simple and useful conduit for patients with right-sided ureteral defects not amenable to primary end-to-end anastomosis.

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