

Combined End-Side Separate Channel Ureteroneocystostomy with Boari Flap to Treat Bilateral Long-Segment Ureteral Defects

Bilateral Uzun Segment Üreteral Defektlerde Kombine Uç-Yan Ayrı Kanal Boari Flap Tekniği ile Üreteroneosistostomi

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ABSTRACT 46-year-old female with a history of total hysterectomy for servical cancer and unsuccessful ureteroneocystostomy admitted to our clinic with bilateral nephrostomy tubes. The patient admitted to our clinic 6 months later with bilateral nephrostomy tubes. After admittance to our clinic, bilateral distal long segment ureteral defect was detected with antegrade pyelography and computerized tomography. We performed a combined end-side separate channel ureteroneocystostomy with Boari flap to reconstruct ureteral strictures. The patient recovered uneventfully. Iatrogenic bilateral ureteral defect is a rare complication that requires challenging reconstructive procedures. There is no standard method of surgical management used for bilateral injury. In case of bilateral ureteral injury, unilateral injury management techniques may need to be modified. Herein, a modified technique for the complex situation of bilateral long segment ureteral stricture is presented.

Keywords: Ureteral stricture; pelvic neoplasm; boari flap

ÖZET 46 yaşında, servikal kanseri nedeniyle 6 ay önce total histerektomi ve başarısız üreteroneosistostomi operasyonu geçirmiş olan hasta kliniğimize bilateral nefrostomi tüpleri ile başvurdu. Tıbbi hikayesinden, ameliyattan sonraki birinci gün idrar çıkışı olmadığı için yeniden ameliyat edildiği ve çift taraflı üreteroneosistostomi uygulandığı anlaşıldı. Hastamıza antegrade piyelografi ve bilgisayarlı tomografi çekilerek bilateral uzun segment üreteral darlık tesbit edildi. Biz Boari flep ile kombine uç-yan üreteroneosistostomi uyguladık. Hasta sorunsuz iyileşti. Bilateral iatrojenik üreteral defektler genel rekonstruktif işlemleri zorlaştıran nadir durumlardandır. Bilateral üreteral defektlerin cerrahi tedavisinde standard bir metot yoktur. Bilateral vakalarda tek taraflı defektlerin tedavisinde uygulanan yöntemlerin modifiye edilmesi gerekebilir. Bu çalışmada, bilateral uzun segment üreteral darlıkların tedavisinde modifiye yeni bir teknik sunmayı amaçladık.

Anahtar Kelimeler: Üreteral darlık; pelvik neoplazi; boari flep

Iatrogenic ureteric injury is a well-recognized complication of radical hysterectomy occurring in 5-30% of cases. If such injury is not recognized immediately, it may lead significant morbidity and mortality.^{1,2} Bilateral injuries are rare, and documented in the literature as case reports causing ureteral stenosis in both ureter.^{2,3} Injuries recognized during the initial surgery are usually treated with immediate open repair over a ureteric stent. The localization, length and etiology of stricture affect the surgical modality. Management of bilateral long ureteral defects is a potentially challenging reconstructive problem when the ureteral length is insufficient for direct anastomosis or reimplantation. The standard methods of surgical management used for unilateral injury may need to be modified or used in

combination for cases of bilateral injury. Close observation is needed to minimize further loss of renal function and avoid urosepsis. Considering the rarity of bilateral ureteral injury and lack of literature outlining the management of such cases, we describe a new feasible technique for the complex situation of bilateral long segment ureteral strictures that has not been previously reported according to our knowledge. It is a feasible alternative procedure in the treatment of bilateral long-segment ureteral injuries.

CASE REPORT

46-year-old female with a history of total hysterectomy for servical cancer and unsuccessful ureteroneocystostomy admitted to our clinic with bilateral nephrostomy tubes. In her medical history, she had been reoperated on post operative second day following hysterectomy due to anuria and bilateral ureteroneocystostomy operation had been performed. The patient had an acute abdomen with urinary ascites causing sepsis two days after ureteroneocystostomy. Bilateral nephrostomy had been performed. The patient admitted to our clinic 6 months later with bilateral nephrostomy tubes and under anticholinergic treatment. The patient had detailed history and physical examination performed. The patient has no history of preoperative chemotherapy or radiotherapy. She had colitis ulcerosa and had been under cortisol treatment. Complete blood counts, serum creatinine were done. Bilateral distal long segment ureteral defect was detected with antegrade pyelography and computerised tomography (Figure 1).

The patient was reviewed with a multidisciplinary approach. Considering the defect length of bilateral ureters and previous operations, we planned open surgical treatment of segmental resection for ureteral injuries accompanied with bilateral ureteroneocystostomy and with unilateral psoas hitch. Informed consent of the patient was obtained. Under general anaesthesia and in supine position, routine cleaning and draping was done. Via the lower midline transperitoneal incision, access was gained to the pelvis. After exposing the bi-



FIGURE 1: Bilateral ureteral defects. Antegrade pyelogram showing bilateral long segment ureteral defect.

lateral ureters and bladder, fibrotic changes in the pelvis and bilateral long-segment ureteral defects were seen. We isolated both ureters by dissection. The length of bilateral healthy ureters was not long enough although mobilization of both kidneys. Left ureter was shorter than right ureter and approximately 10 cm in length. After mobilization of the bladder, a psoas hitch onto the left psoas tendon was done. Approximation with the bladder was not possible in this situation. Boari flap was raised from the anterior surface of the bladder. Mobilization of the kidneys were not attempted as approximation of ureters and boari flap was possible without tension. The flap was converted into a tube and the lower end of the left ureter was anastomosed to the end of the Boari flap tube. The right ureter was brought to the left side through retrocolon channel. Uretero-ureterostomy was not possible due to kinking and tension. Right ureter was directly anastomosed the edge of the Boari flap (Figure 2A, B, C). No attempt was made to create a submucosal tunnel antireflux technique. Bilateral 6-Fr DJ stents

were placed and the bladder closed. Total operating time was 180 minutes. No intra- or postoperative complications were noted. After operation, the patient recovered uneventfully and was discharged on postoperative 5 days after post operative computed tomography (CT) control (Figure 3). The patient is under anticholinergic treatment since that time. We removed the double-j catheters two months later. 12 months later, a follow-up sonography showed no hydronephrosis.

DISCUSSION

Radical hysterectomy mandates wide excision of the local disease and removal of the draining lymphatics.⁴ Despite the ureters being identified and protected during dissection, it is possible to compromise severely the blood supply, leaving a devascularised segment causing stenoses and ruptures in the immediate postoperative period. 5-30% of women undergoing radical hysterectomy suffer ureteral injury.⁵ Despite improving surgical technique and awareness, it is likely to be a problem.

The management of ureteral injury is positively influenced by the early recognition and prompt repair. Primary management by stenting can safely be accomplished for most (80%) women with bilateral uretering injury following radical

hysterectomy. This approach has the advantage of stabilising the situation, protecting renal function and drying up the vaginal leakage if present. Close follow-up of patients is required to detect silent ureteral stenosis in long term. In case of ureteral defects as in our case, open ureteral reconstruction is the gold standard with a success rate over 90%.^{6,7} In recent years, laparoscopic and robotic ureteral reconstructive surgery has been reported with good success in the literature. However, in our case, bilateral long segment ureteral defect was present. Additionally, the patient underwent previous abdominal explorations with unsuccessful results. We preferred open ureteral reconstruction due to possibility of fibrosis.

There are various procedures for treating ureteral injuries, depending on the length, complexity and location of the lesion. Boari developed an open bladder flap operation and succeeded in an animal model in 1894.⁸ Boari flap utilizes only normal urinary tract without danger of ipsilateral kidney dysfunction.⁹ In case of bilateral ureteral defect, it is very difficult to perform bilateral bladder reconstruction with psoas hitch or Boari flap. We overcome this problem by rerouting the mobilized right ureter to the left side. Instead of transureteroureterostomy, combined end-side separate channel ureteroneocystostomy to Boari

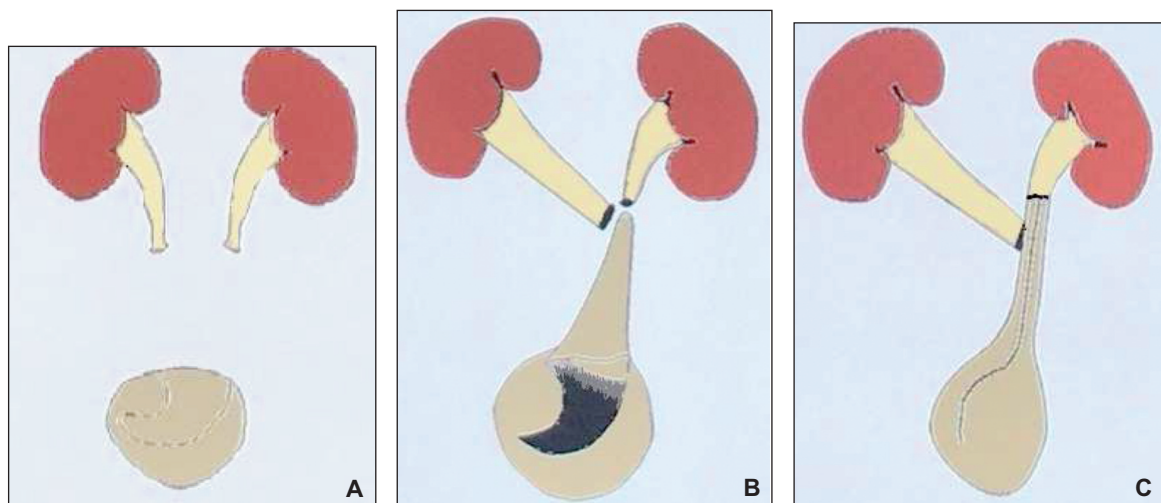


FIGURE 2: **A)** In Boari flap, bladder is mobilized and flap is marked anterolaterally, **B)** The flap is created, ensuring good vascular supply, **C)** Bilateral combined end-side separate channel ureteroneocystostomy with Boari flap is completed, with the longitudinal bladder tube closure.

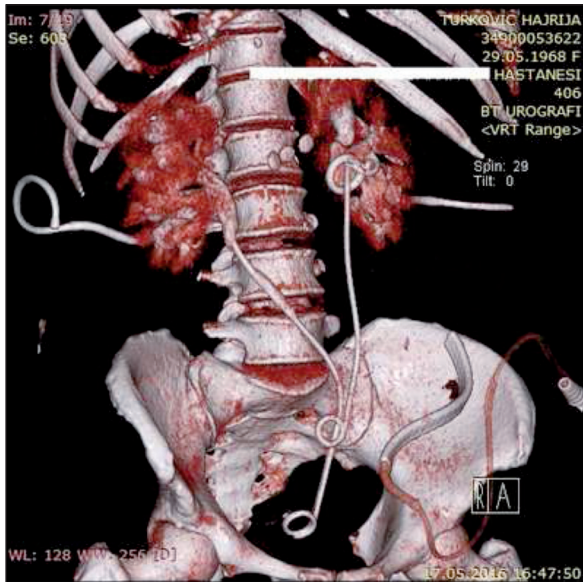


FIGURE 3: Post operative control CT. Combined end-side separate channel ureteroneocystostomy with Boari flap.

flap was performed. This technique made more smoothly urinary drainage from the both kidney without kinking with larger anastomosed-lumen. Similarly, Chen reported a case of bilateral ureteral stenosis treated with combined Y-shaped common channel transureteroureterostomy with Boari flap.¹⁰ Our technique differs in ureteral anastomosis type. We preferred separate anastomosis to Boari flap in order to decrease bilateral post operative stricture.

The management of bilateral ureteral injury is more complex. There is no standard method of surgical management used for bilateral injury. In the

present case, a different technique for the complex situation of bilateral long segment ureteral strictures has been described. It is concluded that combined end-side separate channel ureteroneocystostomy with Boari flap is a feasible alternative procedure to treat bilateral long-segment ureteral strictures.

Informed Consent

Written informed consent was obtained from the patient for publication of the case report.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: Adem Fazhoğlu, Erdinç Ünlüer; **Design:** Fatih Kurtuluş, Oğuzhan Parlakkılıç; **Control/Supervision:** Fatih Kurtuluş, Erdinç Ünlüer; **Data Collection and/or Processing:** Fatih Kurtuluş, Oğuzhan Parlakkılıç; **Analysis and/or Interpretation:** Fatih Kurtuluş, Adem Fazhoğlu; **Literature Review:** Fatih Kurtuluş; **Writing the Article:** Fatih Kurtuluş, Oğuzhan Parlakkılıç; **Critical Review:** Adem Fazhoğlu, Erdinç Ünlüer.

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