Ureteral stenosis is the most frequent urologic complication of kidney transplantation. The incidence of stenosis has been reported as 2–10% of all renal transplant recipients [1–6]. Early recognition and treatment are critical for patients with ureteral stenosis because the complication can lead to deterioration in renal function and graft loss [7]. Despite greater perioperative morbidity and a longer period of hospitalization, the common treatment for all these forms of ureteral stricture remains open surgery [8]. Currently, minimally invasive endourologic techniques are being used more frequently, such as Acucise catheter endoureterotomy. Acucise ureteral catheter is a ureteral cutting balloon device that was first clinically reported in 1993 (Applied Medical, Laguna Hills, CA, USA). Favorable worldwide experience with endopyelotomy or endoureterotomy using Acucise has increased since then. The Acucise catheter system has become a very popular choice for endourologic treatment of ureteropelvic junction obstruction and also other ureteral strictures. However, there have only been a few cases treated with Acucise endoureterotomy following renal transplantation [9]. We report a case of ureteral stricture following renal transplantation successfully treated with Acucise endoureterotomy.

**CASE PRESENTATION**

A 50-year-old female patient who was diagnosed with end-stage renal disease received renal transplantation in her right iliac fossa in 2003 in Mainland China. She received regular follow-up at our hospital after surgery. Unfortunately, right hydrenephrosis was noted
A 0.035-inch stiff guide wire through the cystoscope into the renal pelvis under fluoroscopic guidance. Unfortunately, the guide wire failed to enter the neoureter orifice due to severe stenosis of the lower ureter. So, US-guided antegrade percutaneous guide wire insertion was performed (Figure 2A–C). Next, the cystoscope was removed and the Acucise catheter was advanced over the guide wire under fluoroscopic control until the balloon markers straddled the stenotic segment.

Figure 1. Antegrade pyelography shows lower ureteral stricture.

Figure 2. (A) Stenotic region at the ureterovesical junction. (B, C) Ultrasound-guided antegrade percutaneous guide wire insertion was performed. (D) The Acucise catheter is advanced over the guide wire under fluoroscopic control until the balloon markers straddle the stenotic segment.
advanced over the guide wire under fluoroscopic control until the balloon markers straddled the stenotic segment (Figure 2D). The balloon was filled with 0.5 mL of contrast medium under fluoroscopic guidance to confirm correct placement of the balloon (Figure 3A and B). Then, the cutting wire was activated at 75 W pure cut for 5 seconds while the balloon was inflated to a total volume of 2.2 mL (Figure 3C and D). The generator was again placed on the “stand-by” mode and the Acucise balloon was left fully inflated for 10 minutes to tamponade the incised ureter (Figure 4A). We deflated the balloon (Figure 4B) and retrograde ureterography was performed through the Acucise catheter to confirm extravasation at the incision site. After the balloon catheter was removed, we placed a 7F/14F endopyelotomy stent with the 14F end positioned across the incised area. A Foley catheter was placed after the operation and was removed the following morning.

The patient was discharged on the second postoperative day. The stent was removed 4 weeks later and abdominal US revealed no hydronephrosis. Renal function remained in the normal range after 5 months of regular follow-up at our outpatient department.

**DISCUSSION**

Ureteral complications following renal transplant are uncommon [10–12]. The most common complications are ureteral obstruction, urine leakage, hematuria, and necrosis of the distal ureter [13]. Prompt diagnosis and effective therapy are mandatory if the risk of graft loss is to be reduced.

Ureteral stenosis soon after transplantation commonly results from ischemia of the distal transplant ureter caused by restricted vascularization and this leads to fibrosis of the ureteral intima. Other reasons
are kinking of the ureter at the new muscular hiatus in the bladder, external compression for a variety of reasons, and intramural clot or calculus [14].

Standard therapy for stenosis of the transplant ureter is open surgical ureteroneocystostomy or pyeloureterostomy with the patient’s native ureter. These methods are associated with a high incidence of early perioperative complications, including wound infection and urinary tract infection leading to urosepsis.

Recently, an innovative technique of endourologic therapy for stenosis of the ureter—Acucise endoureterotomy—was introduced. It was first introduced into clinical practice by Chandhoke et al [15]. Youssef et al [14] reported the first experience with this technique in three patients who had transplant ureteral obstruction. This minimally invasive procedure offers the following advantages over open surgery: (1) shorter operative time; (2) reduced postoperative analgesia requirements; and (3) faster recovery [16,17].

Bleeding is one of the most feared acute complications and usually results from injury to a crossing vessel and it can present as any combination of hemodynamic instability, flank mass/ecchymosis, hematuria or decreasing hematocrit [18]. Effective methods for managing postoperative bleeding are either a balloon passed over the guide wire and positioned to achieve tamponade or emergent angiography [19].

The treatment of renal transplant ureter stenosis with balloon cautery endoureterotomy has so far been investigated in only a small number of patients. To improve long-term patency of treated ureters, some authors suggest that patient selection is important before operation, i.e. the interval between the appearance of the stricture and the primary operative trauma should be at least 6 months, the length of the stricture should not exceed 1.5 cm, and the function of the obstructed kidney should not be less than 25% of the total renal function [20].

We treated stenosis of the transplant ureter with the Acucise catheter technique and the patient was free of symptoms and re-stenosis during 5 months’ follow-up. Therefore, we believe that Acucise catheter is a significant addition to the available modalities for treating ureteric stenosis and this procedure should be considered an initial approach for distal ureteral stenosis in the transplant kidney because of the speed of the procedure, overall safety and short hospital stay. In conclusion, the Acucise technique is useful for treating ureteral stenosis following renal transplantation.

REFERENCES

以 Acucise 內視鏡輸尿管內切開術治療腎臟移植後之輸尿管狹窄 — 病例報告及文獻回顾

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五十歲末期腎病變女性病患於兩千零三年至中國大陸接受腎臟移植手術，門診追蹤時於超音波底下發現移植腎積水，且順行性腎盂攝影術顯示下段輸尿管狹窄，病患接受三次輸尿管導管置入撐開術，但腎臟積水均於導管拔除後復發且反復發生泌尿道感染。經與病患討論後施行 Acucise 內視鏡輸尿管內切開手術，病患於術後第二天出院且至門診追蹤時恢復良好且無腎積水復發情形。

關鍵詞：Acucise 內視鏡輸尿管內切開術，腎臟積水，移植腎臟，輸尿管狹窄

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