Antegrade percutaneous dilation of ureteral strictures after kidney transplantation

Gosse O. N. Oosterhof¹, Andries J. Hoitsma², and Frans M. J. Debruyne¹

¹ Department of Urology and
² Department of Nephrology, Sint Radboud University Hospital, P. O. Box 9101, 6500 HB Nijmegen, The Netherlands

Abstract. Ureteral obstruction after renal transplantation is due mostly to retroperitoneal fibrosis in the area of surgical dissection, and pyeloureterostomy is the treatment of choice for such an obstruction. For confined strictures, especially at the site of the ureteroneocystostomy, endoscopic dilation may be a good alternative. Antegrade percutaneous dilation was used to treat six patients with ureteral stricture after kidney transplantation. Four patients had stricture at the ureterovesical junction, one a confined midureteral stricture, and one a secondary stricture at the site of pyeloureterostomy. Percutaneous antegrade dilation of the stricture to 14 Fr with semirigid fascial dilators and external ureteral stenting with a 12-Fr silicon splint for 6 weeks was successful in the four patients with ureterovesical junction obstruction, but not in the two other patients. Results were judged on the basis of serum creatinine concentration, renal ultrasonography, and intravenous urography (IVU). The follow-up period was 12–20 months (mean 15 months). None of the six patients died and perioperative morbidity was minimal.

Key words: Endoscopic dilation - Percutaneous antegrade dilation - Renal transplantation - Ureteral stricture - Ureterovesical junction obstruction.

Ureteral obstruction after kidney transplantation occurs in 1.0%–10.7% of cases [10, 11, 13, 14, 18]. The most common causes of obstruction are retroperitoneal fibrosis and stricture of the ureteroneocystostomy. The standard therapy for ureteral obstruction after kidney transplantation is open operative reconstruction. The specific treatment of choice is pyeloureterostomy, which consists of an anastomosis between the pelvis of the transplanted kidney and the native ureter [4, 18].

Since the development of percutaneous techniques, transluminal dilation of ureteral strictures has become an accepted mode of treatment for obviating a potentially complicated operation [8, 9, 15, 16]. Patients with short strictures of the ureter are known to be the best candidates for endoscopic dilation [2], but experience with this technique in transplanted kidneys is rather limited [7–9, 13, 15, 16].

Patients and methods

Between January 1973 and April 1988, 880 kidney transplantsations were performed, including 24 into patients with urinary diversion [12]. In every patient with a normal bladder (n = 856), a transvesical ureteroneocystostomy without an antireflux mechanism was established and the ureter implanted in the fixed (dorsal) part of the bladder. Ureteral obstruction was observed in 29 patients (3.4%) [4]. Of these 29 patients, 5 had ureterovesical anastomotic stricture. The other 24 patients had a more generalized retroperitoneal fibrosis in the area of surgical dissection that led to obstruction of the proximal ureter in 5 patients, of the midureter in 6, of the distal ureter in 9, and of the whole ureter in 4. Obstruction occurred 2–44 months after transplantation (mean 13 months).

Since January 1985 antegrade percutaneous dilation has been used to treat six patients with ureteral stricture. Four of these patients had ureterovesical junction obstruction, one a confined midureteral stenosis, and one a stenosis at the site of a previous pyeloureterostomy. Obstruction was suspected mostly because of an increase in serum creatinine concentration or a dilation of the pelvicalyceal system on ultrasonographic examination. Percutaneous nephrostomy drainage was done in all six patients. The diagnosis of obstruction was later confirmed by a decrease in serum creatinine concentration (except in patient C), antegrade pyelography, a Whitaker perfusion test, and sometimes renal scanning. Results of the dilation procedure were judged on the
Fig. 1. Antegrade pyelography and Whitaker (perfusion) test to establish the site and length of the stricture and the degree of obstruction

Fig. 2. Dilation of the nephrostomy tract and placement of a guide wire through the strictured area. The guide wire is picked up endoscopically from the bladder

Fig. 3. After dilation of the stricture, a percutaneous transureteric, multihole, silicon stent (12 Fr) is positioned, to be kept in place for 6 weeks

Fig. 4. The external transureteric stent is replaced with a nephrostomy tube to judge the results of the procedure to correct obstruction (with antegrade pyelography and, if needed, a Whitaker test)

basis of serum creatinine concentration, renal ultrasonography, and intravenous urography (IVU).

The dilation procedure was as follows: a percutaneous nephrostomy was performed under local anesthesia. When kidney function was restored, a Whitaker perfusion test and antegrade pyelography through the nephrostomy tube were done (Fig. 1). Once the decision was made to dilate the ureteral stricture endoscopically, the nephrostomy tract was dilated under general anesthesia and both the renal pelvis and the ureter, which was often proximally dilated, were inspected using a flexible nephroscope. A guide wire was passed through the strictured area with the aid of the nephroscope or under fluoroscopic control (Fig. 2). The tip of the guide wire was then picked up endoscopically from the bladder. The stricture was dilated progressively with semirigid fascial dilators (to 14 Fr) over the guide wire, which was fixed on both ends, and the dilated ureter was intubated with a 12-Fr multihole, silicon stent to keep the dilated area open while draining the ureter and providing optional nephrostomy drainage (Fig. 3). The percutaneous transureteric stent was occluded 24 h later to provide internal drainage only. After 6 weeks the external silicon stent was replaced with a nephrostomy tube that remained clamped for 24–48 h (Fig. 4). When there was no longer any sign of obstruction, the nephrostomy tube was removed.

Results

Ureteral dilation was defined as successful when anatomical and functional resolution or improvement of the obstruction was such that later intervention was not required. The results of the procedure (Table 1) were good in the four patients with obstruction at the ureterovesical junction. The other two patients, however, did not benefit from the technique. One of them (patient A) had a recurrent stricture at the same site after 5 months; a pyeloureterostomy was done and the patient now has a well-functioning transplanted kidney. In the other