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The Role of Ureteroscopy in the Treatment of Renal Transplantation Complications

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ABSTRACT

Purpose: To determine the feasibility, safety, and efficacy of diagnostic and therapeutic ureteroscopy in renal allograft ureters.

Materials and methods: We reviewed 1560 consecutive renal allografts have been preformed between June 1989 and February 2002. Twenty-eight patients (1.8%) had indication for endoscopic procedure on allograft ureter. Six patients had obstructive ureteral calculi with a history of failed ESWL, 3 had suspected ureteral stricture, 9 had upward migrated ureteral stents and 10 had ureteral stricture at ureteroneocystostomy site. Ureters were anastomosed to bladder using Leadbetter- Politano and Lich-GreGoire methods in 6 and 22 cases, respectively. Ureteroscopies were performed with semi rigid 9.8F wolf ureteroscope.

Results: Identifying and introducing the ureteral orifice was successful in 19(68%) cases. If we exclude 10 patients with ureteral stricture, ureteroscopy was successful in 13 out of 18 (72%). Four ureteral calculi (67%) were removed with ureteroscope. Seven out of nine migrated stents (78%) were retrieved. Four patients with ureteral stricture at ureteroneocystostomy site (40%) had successful ureteral dilatation and double J ureteral catheters were also inserted. Diagnostic ureteroscopy was successful in all cases. Two complications including one urinary leakage and one symptomatic urinary tract infection occurred that were managed conservatively.

Conclusion: Ureteral endoscopy was safe and effective method for management of urological complications after RT (renal transplantation). This procedure can be considered as the first choice compared with percutaneous and antegrade modalities.

KEY WORDS: ureteroscopy, urological complications, renal transplantation

INTRODUCTION

Advancements in endourology, laparoscopic urology, and interventional radiology continue to influence the management of urological complications in RT subjects.⁽¹⁾ Percutaneous access and antegrade intervention has been introduced as acceptable method for the management of renal and ureteral complications in the RT patients. Since this modality carry significant morbidity, one may consider ureteroscopy as an

alternative to percutaneous and antegrade modalities.⁽²⁾ Previous experiences showed ureteroscopy has been used successfully in treatment of kidney graft urinary lithiasis.⁽³⁾ This technique can be the first choice in management of some urological complications occurring after RT.

In this study we report our results regarding diagnostic as well as therapeutic allograft ureteroscopy in kidney transplant patients.

MATERIALS AND METHODS

Between June 1989 and February 2002, 1560 RTs have been performed at our institution. Twenty-eight cases (1.8%) needed endourological procedures. The median follow-up was 39 months (3 to 80 months).

Ureterovesical anastomoses were performed using Leadbetter-Politano in 6 and Lich-GreGoire in 22 cases. Indications for ureteroscopy were upward migration of ureteral stent in 9, failed ESWL for ureteral calculi in 6, ureteral stricture in 10, and diagnostic ureteroscopy in 3 patients.

In this study, we collected information regarding routine demographic data, indication for ureteroscopy, size and location of calculi, and complications. For all patients with ureteral calculi and ureteral stricture, intervention was indicated owing to obstruction and deteriorating kidney function.

We performed ureteroscopy in lithotomy position and under general anesthesia using a Wolf semi rigid 9.8 F ureteroscope. At first; cystoscopy was performed using a 30o lens. Previous surgical reports were also used for finding the ureteral orifice. Ureteral orifice was usually visible as an irregular region with stippled epithelium. A guide wire was regularly inserted into visible ureteral orifice of transplanted kidney. Access to the ureter was usually accomplished with dilatation of the orifice over the guide wire. Then ureteroscopy was introduced into the ureter over the guide wire.

In patients with upward migrated ureteral stent, the catheter was removed with 3F forceps. Ureteral stones less than 5mm in diameter were removed with basket. Only in one case the stone passed after fragmentation using Swiss Lithoclast ballistic lithotripter. After stone removal, a 5F ureteral catheter was regularly left in place for 48 hours. In patients with ureterovesical junction strictures, a guide wire was gently placed up to the renal pelvis, and dilatation of the stricture was done with a 16 F balloon dilatator under direct vision. Dilatation was done while balloon was inflated for four minutes at place using 15 atmosphere pressures. A permanent ureteral catheter was introduced and left in place for 4-6 weeks. Patients underwent ultrasonography and DTPA renal isotope scan two months after stent extraction.

RESULTS

Ureteral access was successful in 19(68%) cases and if we exclude 10 patients with ureteral stricture, success rate will rise to 72% (13 out of 18 remaining subjects). Access was successful in 59% and 100% of patients underwent Lich-GreGoire and Leadbetter-Politano methods, respectively.

Ureteroscopic attempts for stone removal were successful in 4(67%) cases. Open stone extraction and percutaneous antegrade stone removal were performed for two remaining cases. Ureteroscopy was successful in seven (78%) patients with upward migrated ureteral stents. Percutaneous antegrade extraction of the stent and open surgery were done for two remaining patients. Complete stent removal in cases with upward migrated ureteral stents was possible by standard endourological techniques in 89%. ureteroscopy for ureteral stricture dilatation was successful in four (40%) patients with ureteral stricture. All of these 4 cases had incomplete obstruction so that we were able to pass a guide wire at first, and the length of stenosis was 5 to 8 mm. Diagnostic ureteroscopy was successful in all cases.

Complications in this series occurred in two cases including urinary leakage in a patient with ureteral stone and urinary tract infection in another one with ureteral stricture and stone. These patients were managed using antibiotics and bladder free drainage for one week.

DISCUSSION

Today, the incidence of urological complications following renal transplantation is ranged between 2% and 10 percent. Most of these complications occur within the 1st year and affect the distal ureter.⁽²¹⁾ Urological complications seem to be associated with significant morbidity in the immunosuppressed cases. These complications may ultimately cause long-term allograft dysfunction and loss.

Endourological procedures are performed safely and established as standards in managing a wide spectrum of renal and ureteral diseases.⁽⁴⁾ Complications of these procedures in transplant kidneys have decreased dramatically over the past two decades. This advancement may be due

to increasing technical experience and effectiveness of immunosuppressive drugs in less toxic doses.⁽⁵⁾ Previous reports indicate that advances in minimally invasive procedures practiced in general urology can be applied to ureter of transplanted kidneys.^(6,7) Due to increasing experience, endourological procedures sound to become more effective in treatment of urological complications in kidney transplant recipients.

Traditionally, all cases with post transplant obstruction were managed with open surgery.⁽¹³⁾ Shoskes et al described 71 primary urological complications (7.1%) in 1,000 consecutive renal transplants with a minimum follow-up of 12 months. In that study most ureteral complications were treated by an open operation. They concluded from these results that urological complications after renal transplantation can be treated successfully using surgical correction. Although they had no graft loss due to urological complications, two patients died because of sepsis and hemorrhage, and post-operative morbidity was not described clearly.⁽²²⁾ Although surgical operation was an acceptable approach for management of urological complications in kidney transplant cases, technologic development and fantastic success of endourological methods drew the surgeons' attention to new approaches.

With increasing endoscopic expertise, double-J stent insertion, balloon dilatation, and cold knife incision the need for open intervention was approximately obviated. Benoit and colleagues⁽¹⁷⁾ reported on eight kidney-allograft patients treated for delayed ureteral obstruction. In all cases, standard endourological dilatation was performed using a balloon catheter, and this was followed by insertion of a pigtail stent. All eight cases showed improvement 1 month after dilatation (decrease in serum creatinine level and caliceal dilatation). At 6 months, renal function had deteriorated in six patients but remained good in two. One of the six patients was redilated with apparently good results. The remaining five underwent open surgery. They concluded that while internal drainage helps in distinguishing between obstruction and other causes of creatinine increase, antegrade dilatation is the treatment of choice for delayed ureteral obstruction. Reviewing the previous studies in this regard showed success rates using balloon dilatation

from 38 to 100 percent.^(10, 11, 12, 15) Based on our results percutaneous and retrograde approach is comparable with antegrade ureteral dilatation.

Urological complications will be more common with increasing numbers of transplantations as well as increasing graft survival secondary to improvements in immunosuppression.⁽¹⁶⁾ Predisposing factors for urolithiasis in RT include obstructive uropathy, recurrent urinary tract infection, hyperoxaluria, decreased fluid intakes, and internal stents.⁽⁸⁾ In a historical cohort study on 42096 RT recipients in the united states, nephrolithiasis was uncommon after RT (104 cases per 100000 person years), but was still more common than in the general population. The only risk factor identified for nephrolithiasis was renal failure due to stone disease. Kidney stones were more common than ureteral stones, and percutaneous procedures were more common than ureteroscopy or extracorporeal shock wave lithotripsy (ESWL).⁽¹⁹⁾ This article did not clearly report the success rate of ureteroscopy for management of ureteral calculi. Nowadays, with advancement in endourology and shock wave equipment and greater experience of urologists, ESWL and ureteroscopic procedures play a great role as the first choice in management of kidney and ureteral stones, respectively.

Urolithiasis in transplant kidney is a serious clinical problem and management seems to be based on anecdotal experience, rather than analysis of larger series. In a study by Klingler and colleagues, 19 RT patients were treated for 19 renal and 3 ureteral stones. They tried to find the best modality for treatment of urolithiasis in RT cases regarding the size, location and analysis of stones. They recommended that ESWL is the treatment of choice for caliceal stones sized 5 to 15 mm. However, for stones greater than 15 mm or for ureteral stones, antegrade endoscopic procedures was seemed to be more favorable.⁽⁹⁾ Due to paucity of ureteroscopy cases the obtained results are not reliable.

Percutaneous and antegrade approach to the renal allografts has been successful in managing several complications including ureteral stricture, foreign-body migration, ureteral calculi and obstruction, but this approach may carry significant morbidity.^(4, 10, 11, 12, 14) According to our

experience, ureteroscopy is feasible with good result and low morbidity. Our main difficulty was: a) finding the ureteral orifice and b) negotiating the ureteroscope through the intramural ureter.

Del Pizzo et al reported 100% success rate for endoscopic removal of ureteral calculi in RT recipients. They reviewed 540 consecutive renal allografts to determine the feasibility and morbidity of diagnostic and therapeutic ureteroscopy in renal allograft ureters. Of these, 14 patients (2.5%) had indications for endoscopic intervention of the allograft ureter. Ureteropyeloscopy was successful in 93% of the patients. A diagnosis was made in all cases, including one unsuccessful ureteroscopy, as this patient had allograft ureteral necrosis preventing passage of the endoscope into the renal pelvis. All of the migrated stents could be seen, and all but one was retrieved. All of the ureteral calculi were removed endoscopically. The only complication was ureteral perforation, which occurred in the patient with ureteral necrosis. They concluded that transplant ureteral endoscopy is a technically challenging intervention, but both diagnostic and therapeutic ureteroscopy can be performed with acceptable outcomes and minimal morbidity.⁽²⁾ The method of ureteroneocystostomy was not described in this report. In addition, flexible ureteroscope was used in all of the cases but urinary calculi.

Our study showed ureteroscopy was successful in seven (78%) out of 9 patients with upward migrated ureteral stents. Percutaneous antegrade extraction of the stent and open surgery were done for two remaining patients, respectively. Then complete stent removal was possible by standard endourological techniques in 89%. In the study of Del Pizzo et al three cases had migrated double-pigtail stents. In that study, all of the migrated stents could be seen, and all but one was retrieved.⁽²⁾ Ureteroscopy seems to be the first choice for removal of migrated stent.

CONCLUSION

Modern endourological procedures including ureteroscopy have replaced open reconstructive surgery in the majority of RT patients with ureteral obstruction. These modalities are usually accompanied by low complications. In our

series, two complications of retrograde renal access including one urinary leakage and one symptomatic urinary tract infection occurred who were managed conservatively. Further large scale prospective studies are needed for better declaration of the role of ureteroscopy.

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