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Original Article

Frequency of Occurrence of Vesico-Ureteral Reflux in Kidney Transplanted Patients with the New Technique of Uretero-Neo-Cystostomy (Barry-Taguchi)

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ABSTRACT. There are several ways of performing vesico-ureteral anastomosis in kidney transplantation (Tx); they are broadly classified into two categories: extra-vesical and intra-vesical. Extra-vesical methods are preferred in kidney transplantation. In this study, we attempt to integrate two extra-vesical techniques of Barry and Taguchi and to evaluate the frequency of occurrence of vesico-ureteral reflux (VUR) with this technique. Also, an attempt is made to compare the results with other techniques reported in the literature. Fifty consecutive transplant recipients, who underwent uretero-neo-cystostomy (uretero-vesical anastomosis) by the new technique of Barry-Taguchi were evaluated for VUR by sonography and cystoureterography, six months after Tx. The mean age of the study subjects was 34.8 years; there were 33 males and 17 females. The mean time between Tx and evaluating for VUR was 6.6 months. Two cases of asymptomatic VUR (4%) were detected at the end of the study period. The occurrence of 4% asymptomatic VUR suggests that this technique is more acceptable compared to others. Because of the simple nature of the procedure as well as the short time required, this technique could be a suitable choice in kidney transplantation.

Introduction

Kidney transplantation is the preferred replacement therapy among patients with end-stage renal disease (ESRD). Since the first successful experience of kidney transplantation in humans, many attempts have been made in order to decrease the complications of transplantation, which can threaten the allograft.[1-5]

Having an appropriate choice among vascular and vesico-ureteral anastomosis techniques could prevent most of the surgical complications, especially vesico-ureteral reflux (VUR), the presence of which, can increase the probability of developing pyelonephritis due to lower urinary infection by eight-fold.[6]

Numerous innovations have been developed to circumvent uretero-vesical anastomotic failure.[7] Several different techniques have been suggested to perform anastomosis of the allograft ureter to the bladder. These techniques

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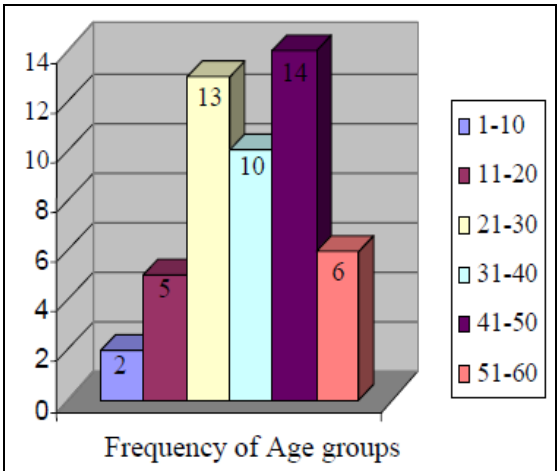

Figure 1. Frequency of age-groups in the study patients (n=50)

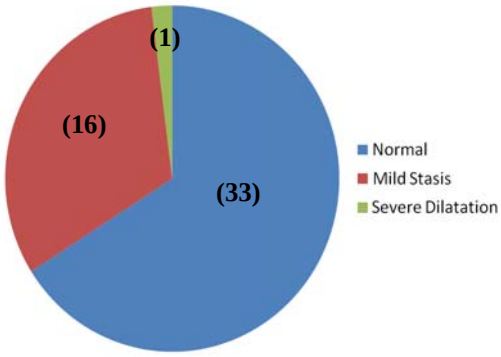

Figure 2. Results of ultrasonography in the study patients (n=50)

are classified into two general categories: extra-vesical and intra-vesical methods. The first group is more accepted. Some of the advantages of extra-vesical uretero-neo-cystostomy include: shorter operation time, avoidance of a separate cystotomy, virtually no hematuria, ability to use short ureters, no need for splints or stents, shortened foley's catheter drainage, and no interference with native ureteral function.[8]

Techniques with anti-reflux mechanism are more common among extra-vesical methods. Among these techniques, Barry, Lich-Gregoir and Taguchi methods are frequently used. The Barry method has an excellent anti-reflux mechanism due to the creation of a suitable sub-mucosal tunnel.[9] The Taguchi method attracts more attention because of simplicity, short duration and good results. These techniques were used earlier, in the transplantation center of the Imam-Khomeini Hospital in Urmia. In this study, we attempt to integrate two different techniques to extract the advantages of both. This method was suggested earlier by Capparos in a study in 1996;[10] unfortunately, there are no studies since then. Also, evaluation of the frequency of occurrence of VUR with this method has not been studied earlier, hence this study.

Materials and Methods

Study Population

Fifty consecutive transplant recipients in the department of transplantation at the Imam-Khomeini Hospital of Urmia, Iran who underwent uretero-neo-cystostomy (uretero-vesical anastomosis) by the new technique of Barry-Taguchi during 2005-2006 were enrolled in our study. Our exclusion criteria included presence of bladder anomalies, neurogenic bladder, history of cystoplasty, urethral stricture, patients who did not give consent to participate in the study, as well as those who expired, and those who underwent graft nephrectomy. The patients were enrolled in our study after explaining the procedure and obtaining informed consent.

The Barry-Taguchi Technique

At the beginning of surgery, the recipients' bladder was filled with 150-200 mL of antibiotic solution through the foley's catheter following which, the catheter was clamped. After vascular anastomosis and urinary flow through the transplanted ureter were established, the distal one centimeter of the ureter was dissected from the peripheral tissues and accurate homeostasis was established. The posterior surface of the ureter was then spatulated for 0.5 cm. The bladder was then exposed, and its fat tissue pooled over from the antero-lateral surface. Two transverse and parallel incisions, one cm in length and 2-3 cm apart, were made on the antero-lateral surface of the detrusor muscle and the vesical mucosa was exposed. After that, a sub-mucosal tunnel was created between these two incisions and the ureter was passed

through this tunnel.

In this step, a transient Double J ureteral stent was placed in the ureter and pelvis of kidney. When the distal tunnel mucosa was incised, we inserted the distal part of the stent into the bladder. The distal ureter was inserted and fixed to the bladder with a U-shaped single absorbable stitch (Vicryl 3.0) placed four cm from the cystostomy site. The distal detrusor incision was sutured by an absorbable stitch (3.0 vicryl). The indwelling ureteral stent was pulled out by cystoscope about 2-3 weeks after transplantation under local anesthesia.

Data Collection

The patients were followed-up for approximately six months after transplantation. During these six months, urine analysis (U/A) and urine culture (U/C) were checked monthly and in symptomatic cases, when needed. Ultrasonography was performed on all patients. After antibiotic prophylaxis, patients underwent voiding cysto-urethrography (VCUG) with urethral catheter. Sonography and VCUG were performed on all patients to evaluate probable reflux. If there was any reflux into the transplanted kidney, grading was determined according to the international classification. Data such as time taken for ureteric anastomosis were collected from medical records.

Statistical Analysis

We analyzed the data using SPSS software version 11.5. The results are presented in graphical form.

Results

The mean age of the study-group was 34.82 years (range, 6-59 years) (Figure 1). There were 33 male patients (66%) and 17 females (34%). The time taken for uretero-vesical anastomosis using the new technique of Barry-Taguchi with stent implantation was between 6 and 30 minutes, with a mean time of 17.26 minutes. Ureteral stent (DJ) was removed with cystoscopic guidance 10-18 days (mean time of 13.6 days) after transplantation, as outpatient and under local anesthesia.

The mean period between performing VCUG and ultrasonography and transplantation was 6.6 months (range, 4 to 8 months). Among 50 patients studied, 16 cases (32%) had mild stasis in the urinary collecting system of the transplanted kidney (Figure 2). In one case, there was moderate hydronephrosis; however, no obstruction was detected. Of the 50 cases that underwent VCUG, VUR was found in two cases (4%); one was a 20-year-old female patient who had grade-IV reflux, and the other was a 13-year-old male who had grade-III VUR into the transplanted kidney. Ultrasonography showed mild urinary stasis in the pyelocalyceal system. Several studies have indicated that in the presence of VUR, if we have lower UTI, the probability of pyelonephritis increases, particularly in kidney transplanted patients. During the study period, four patients were evaluated for fever associated with UTI with positive urine culture for *E. Coli*. None of them had VUR.

Discussion

The aim of kidney transplantation is to achieve satisfactory survival for patient and graft with minimal morbidity, and ultimately returning to a normal life. To achieve such goals, the technique of transplantation has progressed over the last century, especially in the last three decades. Now, renal transplantation is the renal replacement therapy of choice for patients with chronic renal failure.

Urological complications of allogenic kidney transplantation include VUR, which can result in graft threatening UTI. In the study of Praz et al, two consecutive vesico-renal refluxes led to the loss of the kidney graft in the long-term.[4] To prevent this complication, several uretero-vesical anastomosis techniques have been developed.[1-5,11-14]

Reconstruction of the urinary system during renal transplantation is usually performed with anti-reflux uretero-neo-cystostomy techniques and extra-vesical methods are usually preferred.[3] In the study of Mastrosimone, the frequency of VUR among kidney transplanted patients who underwent extra-vesical ureteral anastomosis was reported to be 86.4%.[6]

Ostrowski et al presented a comparison of three different techniques in their study: extra-vesical without anti-reflux mechanism, extra-vesical Witzel-Lich with anti-reflux mechanism and intra-vesical Leadbetter-Politano with anti-reflux mechanism. The incidence of VUR varied from 13.3 to 50%, depending on the anastomosis technique. No correlation was found between type of anastomosis and occurrence of UTI.[15]

In their study, Secin et al compared the incidence of urological and anastomotic complications, and the duration of ureteral re-implantation for the Taguchi and Lich-Gregoir techniques. There were no cases of symptomatic reflux in the Taguchi group. They reported that the Taguchi uretero-neo-cystostomy proved to be a more rapid method without increasing the incidence of urological or anastomotic complications. The Lich-Gregoir cohort was at greater risk for urological complications following live donor transplantation.[16]

Conlin et al reported the occurrence of Grade-I VUR in 3% of 182 unstented allograft ureters and five of 13 (46%) stented allograft ureters.[17] In another study by Gutierrez Baños et al, among 79 renal transplants with extra-vesical uretero-neo-cystostomy, no cases of VUR were reported.[18]

Gutierrez Baños et al in another study, compared two extra-vesical methods of Campos Freire with the Taguchi technique. Although both techniques achieved good results, they advocated the use of the Taguchi technique because it is easy to perform and the operating time is shorter.[19]

Lee et al performed a comparative outcome study of the standard Lich-Gregoir technique and the Taguchi technique, which resulted in dramatically higher complication rates with the Taguchi technique (23%) than with the modified Lich-Gregoir technique (7%).[2]

On the other hand, Moreira et al compared these techniques and reported that both techniques showed similar results; however, the Taguchi technique was reported to be simpler and quicker to perform.[20] In a study by Zargrar et al, the complication rate was less among patients in whom the Lich-Gregoir technique was used ($P < .02$) compared to the Taguchi technique.[7]

In the study of Nane et al using the Lich-Gregoir technique, post-operative VUR to the transplanted kidney was seen in 2.9% of the cases.[3] Whang et al reported less than 1% rate of VUR among 1083 ureteral re-implant operations using the Lich-Gregoir technique.[5]

By reviewing all these studies, it seems that the new technique of Barry-Taguchi for ureterovesical anastomosis is a suitable method because it is extra-vesical, needs less time and yields good results. The frequency of VUR was 4% by using this technique, which is in acceptable range compared with other methods reported in the literature. Further studies are needed to evaluate other complications of anastomosis such as stricture, urinary leakage, ureteral necrosis, etc.

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