Transplant International ISSN 0934-0874

CASE REPORT

Kidney transplantation with two donor ureters in patient with previous ileogastric conduit

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Keywords
bladder augmentation, kidney transplantation.

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Received: 6 February 2005
Accepted: 23 February 2005

doi:10.1111/j.1432-2277.2005.00141.x

Summary

The purpose of our publication is to focus upon the technical aspects of a rare combination of kidney transplant with two donor ureters in a patient with neurogenic bladder and previous reconstruction of a continent ileogastric conduit.

Introduction

Fifteen percent of patients who undergo renal transplantation have urologic anatomic or functional abnormalities. Myelodysplasia and posterior urethral valves are the most common causes of dysfunctional bladder [1–6]. Urinal diversion by means of the isolated ileal conduit has been extensively practiced but unfortunately followed by a high complication rate [3,5–9]. The current trend for bladder augmentation is enteral or gastrocystoplasty.

Long-term complications such as infections, stones and malignant degeneration are important in the immunocompromised kidney transplant recipient. Ureterocystoplasty and gastrocystoplasty is a new described technique, which may address these issues successfully. In the cases where bladder augmentation is contraindicated a modified gastroileal conduit can be used with good results [4,6,7,9,10].

Description of our case

A 26-year-old white female with neurogenic bladder as a result of myelomeningocele and ileal conduit requested a continent urinary reservoir to prevent complications associated with the ileal conduit. Combination of small bowel and gastric segment to augment the bladder was performed. Three years later she underwent a kidney transplant. Both techniques and review of the literature are thoroughly described.

Our technique

A segment of bowel about 25 cm in length in the region of the terminal ileal was taken down with a pedicle preserve. An ileostomy was performed in two layers with the first layer being 3–0 chromic in a running manner and the second layer 3–0 silk in a lembert type. The segment of small bowel was then intussuscepted proximally to create an antireflux nipple valve. The area of intussusception was 3–4 cm long. A circumferential row of silk was placed to assure that the intussuscepted bowel segment would not fall apart. The proximal part was then closed in two layers. The ureter was transected from the original ileal conduit and then anastomosed into the proximal aspect of the intussuscepted valve using 4–0 vicryl. The distal part of the ileal segment was then tubularized at its antimesenteric border. Anastomosing it with the ileal nipple valve flap then formed the patch of ileum that was detubularized from the ileal conduit. At this point a small gastric wedge of flap was created by the greater curvature of the stomach preserving the vascular supply from the right gastroepiploic artery. The wedge resection was performed by using the GIA stapler and was carried under the transverse colon

mesentery. In the center of the gastric flap a small strip of the wall was used to create the gastric tube for a continent catheterizable stoma. Using 4–0 vicryl over a 12 Fr rubber catheter approximated the gastric tube. Once this tube was formed it was then re-implanted into the stomach flap by creating a muscular tunnel. At this point the gastric patch with the catherizable stoma was approximated to the ileal flap that was seated by using both the native ileal conduit and the intussuscepted valve. After the completion of the anastomoses a suprapubic tube consisting of 22 Fr silastic catheter was placed through the area of the ileum. This was carried out into the skin in the left lower quadrant. The gastric tube was carried out to the area of the umbilicus through the fascia and the skin and then approximated by using 4–0 vicryl in an interrupted fashion. Three years later the patient underwent a kidney transplantation for unknown etiology chronic renal failure. The kidney was from a 25-year-old cadaveric donor with a double artery and ureter. A midline incision was selected and after a thorough lysis of adhesions the right iliac vessel was identified and dissected free. The transplanted kidney was placed intraperitoneally and the vessels anastomosed to the external iliac artery and vein. Both arteries were anastomosed with the native external iliac artery using a Carell aortic patch. The ileogastric conduit was identified using a foley catheter as a guide passing through the continent cutaneous stoma. Then a modified Politano-Leadbetter tunneled ureteral re-implant was performed with both ureters and the opening of the pouch was closed in three layers using 2–0 chromic cut gut for the mucosa and the muscular wall and 3–0 lembert stitch for the seromuscular layer (Fig. 1). No ureteral stents or drains were placed. The patient postoperatively had multiple episodes of passing clots and debris through the foley catheter requiring continuous irrigation. She was able to recognize the distention of the pouch as abdominal pain. The follow-up ultrasound revealed normal flow of the transplanted kidney and mild distention of the renal collecting system. A CT cystogram and a triple renal scan showed an intact urinary-conduit anastomosis 2 weeks after the transplantation. The patient was able to self-straight catheterize four times daily and maintained a normal renal function.

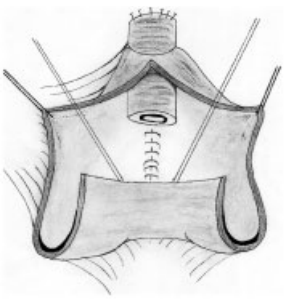

Figure 1 Schematic presentation of the neobladder widely opened with the gastric tube and the donor ureters implanted using a modified Politano-Leadbetter technique.

Discussion

The use of bowel as a substitute reservoir for the lower urinary tract is well documented in the literature [5,11]. In the past patients with serious abnormalities of the bladder were usually excluded as candidates for renal transplantation. Najarian *et al.* [5] underlined the important role of diversion for renal transplant candidates with dysfunctional bladders or congenital anatomic abnormalities. Subsequent reports establish cutaneous diversion as the method of managing patients with these kinds of problems [12,13].

Cutaneous diversion is well known today to be associated with significant long-term complications. Complications such as calculus formation, sepsis, urethral strictures, malignancy and bowel obstruction have been thoroughly described in the literature. Krieger *et al.* and Nguyen *et al.* [3,8] found that 32% complication attributable to intestinal conduit. Glass et al. [2] describe similar findings although the patient graft survival was not statistically significantly different between these patients and transplant recipients with a intestinal conduit or augmented bladders.

The current trend has been to rehabilitate the lower urinary tract prior to transplantation via bladder augmentation with ileal or ileocecal segments. Ileum, colon and stomach provide sufficient material to achieve a low pressure, high volume reservoir while maintaining the functional integrity of the gastrointestinal tract. The adequacy of the bladder for transplantation can be ascertained by pretransplant urologic evaluation. A voiding history, measurement of urine volumes, voiding cyctourethrogram and urodynamic documentation of intravesical volumes and pressures are important preoperatively. Allograft survival is adversely affected in patients with dysfunctional bladders [12]. Most of the patients require postoperatively intermittent self-catheterization and long-term antibiotics prophylactically. Chronic bacterial colonization, even after thorough and aggressive operative bowel cleansing, long-term antibiotics and intermittent catherization, is usual but symptomatic infections are uncommon. Intravesical gentamycin instillations are helpful for those patients with recurrent clinical infections [14].

Gastrocystoplasty was originally described with the potential advantages of less mucous production, better emptying and ameliorating metabolic acidosis [15]. A decreased incidence of infection has also been emphasized [16]. Complications of the procedure include dysuria and possible peptic ulceration. Autoaugmentation of the bladder by deliberate creation of a large diverticulum has been

promoted as well although no long-term follow-up is provided. Long-term complications include bladder perforation, malignancy and possible infections after enterocystoplasty make recently the use of mega-ureters an alternative biomaterial for bladder augmentation [17]. Churchill *et al.* and Ahmed *et al.* [4,18] popularized the method and many reports were published based on the potential advantages of ureterocystoplasty. Metabolic abnormalities, mucous secretions, malabsorption, nutritional deficits and potential future malignancies are not a concern because of the use of urothelium. Ideal candidates are patients with significant reflux and posturethral valves. Simultaneous ureteral cystoplasty with renal transplantation has been described with good results and without undue increased risk. In contradiction timing of bladder augmentation with enterocytoplasty before transplantation is important at least for 6–8 weeks. This allows a sufficient period for adequate healing prior to the implantation of the ureters [19].

Our technique of bladder-augmentation includes the use of gastroileal conduit as a continent urinary reservoir. A patient with an ileal conduit originally because of a hostile bladder with high pressures developed recurrence of urinary infections and stone formation requiring a continent urinary reservoir. A wedge of the stomach was chosen for the creation of the pouch and anastomosed with the small bowel. A continent valve was also created allowing straight catheterization of the patient at regular intervals. In performing a kidney transplant 3 years later, the same midline incision and anastomosis of both donor ureters to the gastric tube Mitrofanoff was used. The potential advantages of the procedure were less mucous secretions, decreased incidence of infections, amelioration of metabolic acidosis and less absorption through the gastric mucosa. Clean intermittent catheterization has been an integral part of the initial post-transplant management. Thorough irrigation of the pouch continuously or intermittently keep the reservoir clean from blood clots and debris and virtually eliminates the risk of infection and the abdominal discomfort due to distention.

The compliance of patient and family especially in the case of a reconstructed transplant recipient is undoubtedly of paramount importance to the success of such a demanding operation.

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