

HOSPITAL PHYSICIAN®

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The *Hospital Physician Urology Board Review Manual* is a study guide for residents and practicing physicians preparing for board examinations in urology. Each quarterly manual reviews a topic essential to the current practice of urology.

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Renal Transplantation: Surgical Procedure and Complications

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Renal Transplantation: Surgical Procedure and Complications

Stephen Corrigan Rayhill, MD, FACS

INTRODUCTION

This manual is the second in a 2-part review of renal transplantation. The discussion began with a review of renal transplant recipient criteria and evaluation, kidney donation, and transplant immunology. It continues here with an overview of the surgical procedure and the complications inherent in renal transplantation and immunosuppression.

The results of kidney transplantation have improved over time (**Figure 1**).¹ According to transplant data collected in the United States between 1992 and 2001, 1- and 5-year patient survival rates following renal transplantation are 94% and 80%, respectively, for deceased donor transplants and 98% and 90% for living donor transplants.² In addition, 1- and 5-year graft survival rates are 88% and 63%, respectively, for deceased donor transplants and 94% and 76% for living donor transplants.²

Despite improving graft and patient survival rates, surgical complications of renal transplantation and post-transplantation graft dysfunction remain important clinical concerns. Renal transplantation is a complex vascular and urologic surgical procedure that requires expertise to perform the operation successfully and to adequately manage its surgical and nonsurgical complications. In-depth knowledge of renal transplantation and postsurgical complications is important for urologists, who perform a large fraction of renal transplantation procedures and often are called upon to address the many urologic complications of the procedure. In addition, as transplantation has become commonplace, more renal transplant recipients are being treated for nontransplant-related urologic disease.

RENAL TRANSPLANTATION PROCEDURE

The standard renal transplantation procedure involves placement of the donor kidney in the iliac fossa. A curved flank incision typically is made from the pubic tubercle to a point 2 to 3 finger-breadths inferior to the

costal margin. For recipients of a third or fourth renal transplant or for pediatric transplant recipients, a mid-line abdominal incision can be used to provide maximal access to the vasculature for graft implantation. The retroperitoneum is entered by carefully dividing the lateral abdominal wall muscles while avoiding the peritoneal lining. The iliac vessels are dissected free of their investing lymphatic tissue. The lymphatic tissue is carefully ligated to prevent a subsequent lymphocele.

Once the vascular structures are exposed, the donor renal vein is sewn end-to-side to an iliac vein, and the donor renal artery is sewn end-to-side to an iliac artery (**Figure 2**). If there are multiple renal veins (a common occurrence, since the veins within the kidney are non-segmental and anastomose with one another), the accessory renal veins can be safely ligated.³ Even if 2 large veins exist, one can be ligated. Alternatively, the veins can be implanted separately or can be sewn together and then implanted. For cadaveric donor kidneys, a Carrel patch of donor aorta is used to facilitate the arterial anastomosis. For multiple renal arteries (also common), the arteries can be sewn together for a single anastomosis or implanted separately. Separate renal arteries supply separate renal segments; thus, ligation of a renal artery will create a zone of ischemia. Nevertheless, a small upper pole accessory artery can be ligated with no significant clinical consequence to the recipient. Lower pole arteries, however, may provide important arterial flow to the ureter and must be maintained. Once the vascular anastomoses are complete, the clamps are removed and the kidney is reperfused.

The donor ureter is attached to the recipient bladder via the Liche technique, in which a running mucosa-to-mucosa anastomosis is created using an absorbable monofilament suture. The anastomosis can be bolstered with a few interrupted detrusor muscle sutures, being careful not to constrict the ureter. If necessary, a donor-to-native ureteroureterostomy may be performed instead of anastomosing the transplant ureter to the bladder. A stent may be placed across the anastomosis, according to preference.⁴⁻⁶ For uncomplicated ureteral attachments, the stent can be sutured