

HOSPITAL PHYSICIAN®

UROLOGY BOARD REVIEW MANUAL

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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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Adult Ureteral Reconstruction

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Adult Ureteral Reconstruction

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INTRODUCTION

Many approaches are available for the management of ureteral strictures. Open surgical techniques for ureteral repair include ureteroneocystostomy, psoas hitch, Boari flap, ureteroureterostomy, transureteroureterostomy, ileal ureter substitution, and renal autotransplantation. Before deciding on definitive management of a stricture, the urologist must carefully consider the indications, contraindications, risks, and benefits of the various types of repair. A thorough workup will aid in properly diagnosing the cause of the defect and provide important information to guide therapy decisions. The length and location of the ureteral injury or stricture are key factors in decision making, as are prior medical history (eg, radiation exposure), pathology involving the contralateral collecting system, and the performance status of the patient. Knowledge of the anatomy surrounding the ureter at the upper, middle, and lower portions is critical. Although selecting the most appropriate approach is essential to achieving optimal outcomes, urologists should have a variety of treatment options within their surgical armamentarium, as the intraoperative course may require the urologist to perform alternative forms of surgical treatment.

This manual reviews forms of open surgical repair of ureteral injuries with a focus on indications, contraindications, surgical technique, success rates, and possible complications.

SURGICAL CONSIDERATIONS

ANATOMY

From a surgical perspective, the ureter is divided into the abdominal and pelvic portions. The renal pelvis is the upper border of the abdominal ureter, and the iliac vessels are the inferior border. The pelvic ureter extends from the iliac vessels to the bladder. Radiologically, the ureter is divided into 3 portions: the upper, middle, and lower ureter. The upper ureter is the

length between the renal pelvis and the upper border of the sacrum; this segment overlies the psoas muscle. The upper ureter receives its blood supply medially from branches of the renal artery, gonadal artery, abdominal aorta, and common iliac artery. The midureter extends from the upper border to the inferior border of the sacrum at the level of the iliac vessels and is located posterior to the gonadal artery and vein. It receives its blood supply from the gonadal artery, internal iliac artery, and the superior vesical artery. The lower section of the midureter crosses anterior to the common iliac vessels, a key landmark in identifying the ureter intraoperatively. This portion of the left ureter runs posterior to the sigmoid and descending colon, and the right ureter runs under the cecum. The lower ureter extends from the inferior border of the sacrum to the ureteral orifice and receives its blood supply laterally from the superior and inferior vesical arteries and the uterine, middle rectal, and vaginal arteries. An adventitial network of anastomosing vessels allows the ureter to be extensively mobilized without ischemia if the adventitia is preserved.¹

ETIOLOGY

Ureteral calculi, instrumentation, external malignancy, infection, fibrosis, radiation, and trauma are the major causes of ureteral strictures. Rare causes include schistosomiasis, tuberculosis, and endometriosis. Ureteral stricture is a complication in 4.5% of ureteroscopic procedures and in 1.1% of hysterectomies.² External violence is responsible for 6% of traumatic ureteral injuries.² Intrinsic ureteral malignancy is another potential cause of ureteral narrowing. Ureteroscopy, selective cytology, barbotage, and brush biopsies are important methods of evaluation for intrinsic ureteral malignancy that may lead to ureteral strictures.

Approximately 80% of ureteral injuries are iatrogenic,³ and 30% to 45% of these injuries are recognized intraoperatively. A study by Ghali et al emphasized that early diagnosis is the most critical aspect affecting outcome.⁴ Postoperative flank pain, fever, and evidence of possible adynamic ileus, such as nausea and vomiting, are highly suggestive of iatrogenic ureteric injury