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General Principles of Cystourethroscopy

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As a form of minimally invasive surgery, endoscopy of the lower genitourinary tract of the pediatric patient can achieve diagnostic and therapeutic goals for a broad range of pathological entities. Advances in instrumentation have permitted endoscopic treatment of even premature infants and in utero fetal surgery.¹ This chapter focuses on general principles of pediatric cystourethroscopy. The reader is referred to other chapters for more detailed discussions of the management of other clinical entities.

Indications and Contraindications

Recurrent urinary tract infections (UTIs), urinary incontinence, obstructive uropathy, urosepsis, and radiological anomalies are the usual indications for lower tract endoscopy. Although many diagnoses are made before cystoscopy by using ultrasound, cystourethrography, CT scan, nuclear scan, IVP, and/or MRI, many pediatric cases require further delineation of the anatomy and physiology by endourological techniques. Cystoscopy followed by transurethral incision of posterior urethral valves for obstructive uropathy² is a common indication (Figure 11.1). Similarly, transurethral incision of ureterocele(s) for outlet obstruction or urosepsis³ is another clear-cut indication (Figure 11.2), while prophylactic intervention after prenatal detection is more debated. Cystoscopically guided ureteral or bladder neck injection of bulking agents is frequently employed to treat vesicoureteral reflux (VUR) and urinary incontinence, respectively (see subsequent chapters). Some surgeons recommend routine cystoscopy before open ureteral reimplantation to assess for the configuration of a prior reflexing ureter, missed ureteral duplication (Figure 11.3), or cystitis, which would cancel the open surgery. Male urinary incontinence should be evaluated cystoscopically after hypospadias repair or abnormal retrograde urethrogram, assessing for urethral stricture (Figure 11.4), urethral duplication (Figure 11.5) or urethrocutaneous fistula. In rare cases, gross hematuria in the pediatric patient may warrant study after a thorough negative medical and radiological evaluation. If clot retention occurs, clot evacuation can be achieved cystoscopically with the instillation of therapeutic agents if indicated. Cystourethroscopy can serve the purpose of ureteral access for retrograde or antegrade upper tract imaging and lithotripsy techniques, however a trial of medical therapy is warranted because many stones pass in children. Retrograde placement of an occlusion balloon at the ureteropelvic junction can prevent antegrade migration of stone fragments during percutaneous nephrolithotripsy. Retrograde ureteral stenting may be useful at the time of extensive tumor resection or at the time of laparoscopic pyeloplasty. Bladder stones can be endoscopically removed or fragmented via urethra, appendicovesicostomy or percutaneous cystostomy approaches. At the time of cystoscopy in the child with an open bladder neck due to epispadias (Figure 11.6) or classic bladder extrophy, a ballooned catheter can be used for cystography to measure bladder capacity under anesthesia and assess for vesicoureteral reflux.
FIGURE 11.1. Cold knife incision of posterior urethral valves. The “half moon” knife, seen in the center of the image, is cutting through the right valve leaflet. The pink verumontanum is seen in the right third of the image. The left valve leaflet is out of the image.

FIGURE 11.2. Ureterocele. Figure shows a right moderately sized ureterocele associated with febrile UTIs, right complete ureteral duplication, and a multicystic dysplastic hydroureteroepithelial upper pole moiety. It was transurethrally incised.

FIGURE 11.3. Complete ureteral duplication. View of the right trigone reveals two ureteral orifices, the lateral, cephalad refluxing orifice (black arrow) serving the lower pole and the medial, caudal orifice (white arrow) serving the upper pole duplex kidney.

FIGURE 11.4. Urethral stricture. Urethroscopy revealed a pinpoint lumen in the bulbar urethra at the site of a prior visual internal urethrotomy. Open primary urethroplasty was required to correct this recurrent urethral stricture.