Diagnosis of Obstructive Nephropathy

N evertheless, obstruction rarely can occur without hydronephrosis, when the ureter and renal pelvis are encased in a fibrotic process and unable to expand. In contrast, mild dilation of the collecting system of no functional significance is not unusual. Even obvious hydronephrosis in some cases may not be associated with functional obstruction [70]. Diuresis renography is helpful when the functional significance of the dilation of the collecting system is in question [71,72]. Renal Doppler ultrasonography before and after administration of normal saline and furosemide also has been used to differentiate obstructive from nonobstructive pyelocaliectasis [73]. Other techniques such as excretory urography, computed tomography, and retrograde or antegrade ureteropyelography are helpful to determine the cause of the urinary tract obstruction. The utility of excretory urography is limited in patients with advanced renal insufficiency. In these cases magnetic resonance urography can provide coronal imaging of the renal collecting systems and ureters similar to that of conventional urography without the use of iodinated contrast. RI—resistive index. (C, D, Courtesy of B. F. King, M.D.)

FIGURE 8-43
Diagnosis of obstructive nephropathy. A, Diuresis renography. B, Doppler ultrasonography. C, D, Magnetic resonance urogram utilizing a single shot fast spin echo technique with anterior-posterior projection (C) and left posterior oblique projection (D). Images demonstrate a widely patent right ureteropelvic junction in a patient with abdominal pain and suspected ureteropelvic junction obstruction. Administration of gadolinium is not required for this technique. Note also the urine in the bladder, cerebrospinal fluid in the spinal canal, and fluid in the small bowel.

Ultrasonography is the procedure of choice to determine the presence or absence of a dilated renal pelvis or calices and to assess the degree of associated parenchymal atrophy.

FIGURE 8-44
Diagnosis of obstructive nephropathy by postnatal renal ultrasonography, showing hydronephrosis in ureteropelvic junction obstruction. Renal ultrasonography is a sensitive test to detect hydronephrosis. The absence of ureteral dilatation is consistent with obstruction at the level of the ureteropelvic junction.
Mercaptoacetyltriglycine-3 renal scan with furosemide in a newborn with left ureteropelvic junction obstruction. A diuretic renal scan using 99mTc-mercaptoacetyltriglycine (99mTc-MAG-3) showing differential renal function (47% right kidney; 53% left kidney) at 1 to 2 minutes after radionuclide administration is seen. A significant amount of radionuclide remains in each kidney 15 minutes after administration. After administration of furosemide, however, the isotope is seen to disappear rapidly from the right kidney (t1/2 of radioisotope washout in 4.9 minutes) but persists in the hydronephrotic left kidney (t1/2 in 50.1 minutes). A t1/2 of the radioisotope in less than 10 minutes is thought to reflect a lack of significant obstruction. A t1/2 of over 20 minutes is suggestive of obstruction. Intermediate values of washout are indeterminate. The most appropriate therapy for infants with delayed renal pelvic radioisotope washout and diagnosis of ureteropelvic junction obstruction is controversial. Some authors advocate pyeloplasty to alleviate the obstruction based on renal scan results, whereas others advocate withholding surgery unless renal function deteriorates or hydronephrosis progresses.
Posterior Urethral Valves

FIGURE 8-46
Posterior urethral valves. A, Illustrative diagram. B, Pathology specimen. Valvular obstruction at the posterior urethra is the most common cause of lower urinary tract obstruction in boys. Anatomically, the lesion most commonly is comprised of an oblique diaphragm with a slitlike perforation arising from the posterior urethra distal to the verumontanum and inserting at the midline anterior urethra. (From Kaplan and Scherz [74]; with permission.)

FIGURE 8-47
Excretory urogram of a patient with posterior urethral valves. Bladder outlet obstruction results in bladder wall thickening, trabeculation, and formation of diverticula. Increased intravesical pressure may result in vesicoureteral reflux, as is seen on the left. Obstruction resulting in increased intrarenal pressure may result in rupture at the level of a renal fornix, producing a urinoma, or perirenal collection of urine, as seen on the right.

FIGURE 8-48
 Voiding cystourethrogram (VCUG) demonstrating posterior urethral valves and dilation of the posterior urethra. Urethral valves are best detected by VCUG. The obstructing valves are seen as oblique or perpendicular folds with proximal urethral dilation and elongation. Distal to the valves the urinary stream is diminished. Alleviating the bladder outlet obstruction is indicated, either by lysis of the valves themselves or by way of vesicostomy, in small infants until sufficient growth occurs to make valve resection technically feasible.