

SCINTIGRAPHIC IMAGING OF A BLIND-ENDING URETERAL DUPLICATION

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The scintigraphic image is compared with the urographic appearance of blind-ending ureteral duplication.

Ureteral duplications, particularly the "Y" type, were found in 0.5% of a large autopsy series (1). However, blind-ending duplications are a rarer anatomic variant; only 50 cases have been reported in the literature (2). Four of this latter group have been demonstrated by excretory urography alone, usually employing high-dose techniques [0.75 cc/lb of body weight of Conray 400 (66% sodium iothalamate)] (3). The remainder required retrograde urography for demonstration. No previous report of radionuclide imaging of this entity could be found in the literature. We wish to report the first case of radionuclide imaging of a blind-ending ureteral duplication.

CASE REPORT

A 64-year-old white man was hospitalized in April 1974 for a syncopal episode and chest pain. Physical examination, blood gases, electrocardiogram, serum bilirubin, serum glutamic oxalacetic transaminase, and lactic acid dehydrogenase were suggestive of pulmonary emboli. This was confirmed by pulmonary ^{133}Xe ventilation and $^{99\text{m}}\text{Tc}$ -microsphere perfusion studies. Persistent microscopic hematuria was also present. Because of the possibility of a renal infarct, $^{99\text{m}}\text{Tc}$ -DMSA (2-3-dimer-

captosuccinic acid) and ^{131}I -Hippuran (^{131}I -iodohippurate) studies were undertaken. The $^{99\text{m}}\text{Tc}$ -DMSA study was normal. The ^{131}I -Hippuran study was performed with a scintillation camera and a high-energy diverging collimator following injection of a bolus of 300 μCi of ^{131}I -Hippuran into an antecubital vein. Sequential images of 2-min intervals were obtained for 32 min. This examination was normal except for a persistent (32 min after injection) focus of radioactivity in the region of the right distal ureter throughout the study (Fig. 1). A high-dose excretory urogram revealed the location of this radioactivity to be in a blind-ending ureteral duplication, measuring 4½ cm in length (Fig. 2).

DISCUSSION

In the normal fetus the ureter develops as a bud from the mesonephric duct and eventually migrates toward and fuses with the metanephros or renal plate (4). Occasionally the ureteral bud bifurcates before reaching the metanephros and two buds then fuse with the renal plate, producing the classical "Y" type of partial ureteral duplication. In rare cases, one of the branches of the "Y" fails to fuse with the renal plate and results in a blind-ending ureter. This last anomaly possesses the same histologic layers as a normal ureter. By definition, the blind-ending

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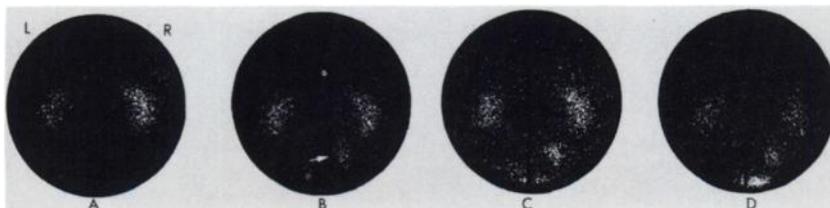


FIG. 1. Posterior views, ^{131}I -Hippuran images: diverging collimator, at 0-2 min (A), 4-6 min (B), 14-16 min (C), and 28-30 min (D) after injection. Persistent retention of radionuclide in right distal ureter (arrow) corresponds to blind-ending duplication as seen on excretory urogram.

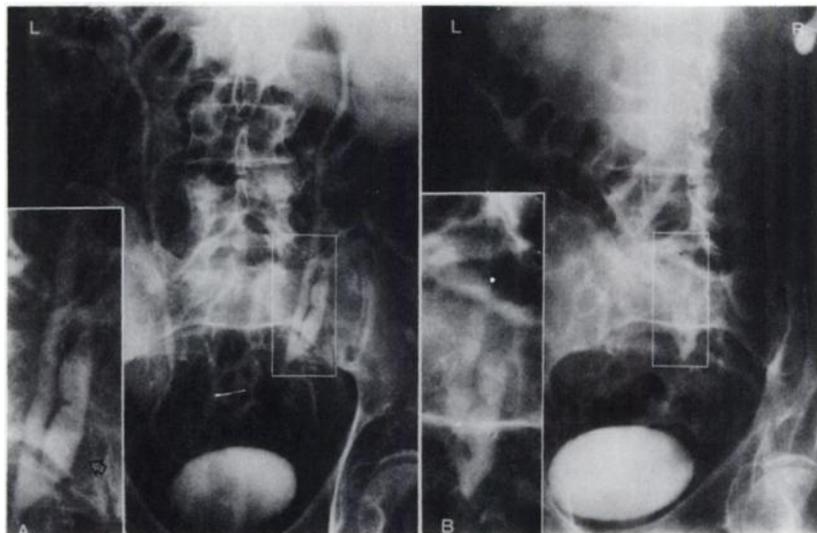


FIG. 2. Excretory urograms. (A) Ten minutes after injection of Conray 400 (66% sodium iothalamate), 4.5-cm long blind-ending duplication (arrow) of right ureter is apparent. (B) Twenty-five minutes after injection, contrast persists in duplication (arrow).

ureter is at least twice as long as it is wide, to differentiate it from a ureteral diverticulum (5).

Although a blind-ending ureter is rare, it should be included in the evaluation of hematuria, calculus, or urinary tract infection. Reflux from one ureteral segment to another in the classic "Y" type of duplication and in blind-ending duplications has been demonstrated using fluoroscopic retrograde pyelography; excretory urography alone is usually insufficient to show this entity. Area-of-interest studies of both ureteral segments during the renogram could be used to demonstrate this abnormality. Positive radionuclide imaging should prompt retrograde urography if high-dose urography is unsuccessful.

The differential diagnosis of a focus of radioactivity in the region of the ureters during radionuclide scanning would include a ureteral diverticulum and localized ureteral rupture, both of which can be dif-

ferentiated by history, clinical findings, and/or excretory urography.

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