Diagnosis of Caliceal Diverticulum in Two Pediatric Patients: A Comparison of Sonography, CT, and Urography

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Received 22 April 2002; accepted 18 October 2002

ABSTRACT: Caliceal diverticulum is a rare disorder in which a urine-filled cavity is connected to the renal calix by a narrow isthmus. Treatment of caliceal diverticulum varies depending on the complications, which include recurrent kidney infections, hematuria, and symptomatic calculi. The use of sonography may be insufficient for accurately diagnosing this condition; contrast urography, CT, or both also may be needed. We report the cases of 2 pediatric patients whose initial sonographic diagnosis was renal cystic disease but whose final diagnosis was caliceal diverticulum on contrast-enhanced urography in 1 case and both urography and CT in the other case. The patients received no further treatment but continue to receive follow-up care to monitor for the presence of infections and calculi. Accurate diagnosis of caliceal diverticulum in both cases spared the patients and their families the psychological burden of unnecessary further investigation of renal cystic disease. These cases emphasize the importance of using contrast-enhanced imaging modalities for confirmation when sonographic findings suggest the presence of renal cystic lesions. © 2003 Wiley Periodicals, Inc.

Keywords: caliceal diverticulum; ultrasonography; excretory urography; computed tomography; kidney

Case Report

CASE 1

A 10-month-old boy was referred to our nephrology department because of a history of renal cysts that had been sonographically diagnosed 6 months earlier. The patient had been born to a healthy 34-year-old woman at 39 weeks’ menstrual age without complications. The patient’s parents were not consanguineous. In reviewing the family history, we noted that an aunt had angiomyolipoma in 1 kidney and that an uncle had unilateral renal agenesis. The results of a physical examination were normal.

Six months before, when the patient was 4 months old, symptoms of a urinary tract infection had prompted a sonographic examination, which had been performed using a Sonoline SL-1 scanner (Siemens, Erlangen, Germany) equipped with a 5–7.5-MHz sector transducer. Sonography had revealed 2 renal cystic lesions, 1 without septa-
tion or solid component, located in the upper pole of the left kidney, and the other with lobulated contour and septation, located in the middle zone of the right kidney.

At this 6-month follow-up visit, sonography revealed that both cystic lesions had grown by 0.5–1 cm in the largest diameter, ie, from 0.5 cm to 1 cm for the lesion in the left kidney and from 1.5 cm to 2.5 cm for the lesion in the right kidney (Figures 1A and 1B). To rule out a congenital caliceal abnormality, we performed urography. A delayed urogram, performed 2 hours after injection of contrast medium, demonstrated filling of the cystic areas with the contrast medium in both kidneys (Figure 1C), confirming the diagnosis of caliceal diverticulum. No treatment was required. The patient continues to be monitored by our pediatric nephrology department for such complications as infection and calculi.

CASE 2

A 4-year-old boy was brought to our hospital because of a 15-day history of intermittent abdominal pain. He had no other clinically significant medical history. He did not have a fever, nausea, vomiting, or diarrhea, and his pain had resolved.

FIGURE 1. Case 1. (A) Transabdominal sagittal sonogram of the left kidney with the 10-month-old patient in a prone position shows an anechoic cystic lesion (arrow) in the upper pole. (B) Transverse sonogram of the right kidney demonstrates a bilobate cystic structure with an internal septum. (C) Intravenous urogram obtained 2 hours after injection of contrast medium demonstrates delayed filling of the cystic lesions (arrows) in both kidneys.
without any medication. In reviewing the family medical history, we learned that the patient's mother had had urolithiasis and that his paternal grandmother had had several simple renal cystic lesions. The results of a physical examination and urinalysis were normal.

Abdominal sonography performed with an HDI 5000 scanner (Philips-ATL, Bothell, WA) equipped with a 4–7-MHz linear-array transducer revealed a cystic lesion with no solid component or septation at the corticomedullary junction in the upper pole of the right kidney (Figure 2A). A urogram obtained 20 minutes after injection of contrast medium showed curvilinear compression on the collecting system of the upper pole (Figure 2B). A delayed urogram, obtained 2 hours after contrast medium injection, showed faint enhancement of the cystic lesion. Subsequent CT scans obtained 15 minutes after injection of contrast medium revealed complete filling of the cystic lesion, confirming the diagnosis of caliceal diverticulum (Figure 2C). No treatment was necessary, but the patient continues to be monitored for possible complications.

**DISCUSSION**

Because sonography has become routinely used to assess cases of abdominal pain and urinary tract
infection, especially in pediatric patients, incidental sonographic detection of cystic lesions in the kidney may become important. In both of our cases, renal cystic disease was initially diagnosed on the basis of sonographic findings, but caliceal diverticulum was later diagnosed on the basis of contrast-enhanced examinations that demonstrated filling of the cystic lesions. The correct diagnosis spared the patients and their families further psychological burden and precluded the need for additional evaluation and follow-up for the erroneously diagnosed renal cystic disease.

The findings of renal sonographic examinations in these cases were nonspecific. Solid components were absent in both cystic lesions, and septation was present in 1. The walls of the diverticula were smooth. Contrast-enhanced urography and CT allowed visualization of the delayed filling of the diverticula. For patients in whom sonography reveals cystic formations in the kidney, contrast-enhanced imaging (excretory urography or CT) should be the next step in making a diagnosis.3

Previously reported cases support the need for contrast-enhanced examinations after sonography suggests a diagnosis of renal cystic lesions. Medani and Dunne4 reported the cases of 2 patients diagnosed with renal cystic lesions on the basis of sonography who were later diagnosed with pyelogenic cystic lesions on excretory urography, and they asserted that excretory urography is important in making a differential diagnosis of renal cystic lesions. Comparing the findings of sonography, CT, and urography, Barloon and Vince5 reported that CT performed after intravenous pyelography (IVP) was helpful in the noninvasive evaluation of a large cyst obstructing the renal calices. In their case, the cystic formation was easily imaged, and the anatomy of the kidney, calices, and ureter was clearly defined on CT, thus obviating the need for more invasive studies.5

Although a cystic lesion can be easily diagnosed on sonography, the dynamics of the fluid in the cyst can be evaluated only on IVP or CT. The diagnosis of a parapelvic cystic lesion should not be based on sonography alone but should be confirmed with subsequent IVP and CT, and caliceal diverticulum should be considered when one is making a differential diagnosis.

REFERENCES