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Case report

Sonographic diagnosis of the ruptured hydatid cyst of the kidney

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Abstract. The clinical and radiological features of one case of renal hydatid disease communicating with collecting system are described. Introduction of hydatid elements into the renal pelvis due to rupture was accompanied by six episodes of renal colic. Although the sonographic features of renal hydatid disease have been described extensively, direct demonstration by ultrasonography of hydatid cyst ruptured into the renal pelvis has not, to our knowledge, been previously reported. The diagnosis has also been confirmed at surgery.

Key words: Ruptured hydatid cyst – Kidney – Urinary obstruction – US – CT

Introduction

Hydatid disease is endemic in parts of South America, Australia, Asia, southern Europe, New Zealand, the Middle East, and Turkey [1, 2]. Within the genitourinary tract the common sites are the kidney and retrovesical space [3]. Perforation of hydatid cysts of the kidney into the collecting system is a rare event and potentially severe complication. It may cause pain and hydatiduria with or without urinary tract obstruction [1]. Although the conventional radiological methods are insufficient, in the past preoperative diagnosis of the cyst rupture into the pelvicalyceal system was only tentative [4]. To date, there is no report in which sonography has been used to show spontaneous cyst rupture into the pelvis renalis.We present the US findings which led to the correct diagnosis in a case of rupture of a renal hydatid cyst into the pelvicalyceal system.

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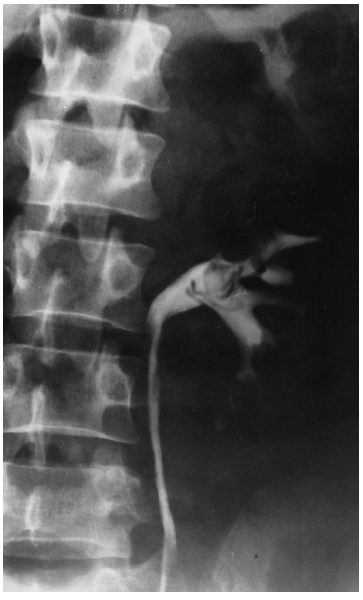
Case report

A 23-year-old woman was hospitalized with a history of left renal colic, weight loss, anemia, and dysuria. The patient had experienced approximately six attacks of left renal colic within a 2-year period and five attacks of left renal colic within the year prior to admission. During the third and fifth attacks she had noticed pieces of membrane resembling the skin of a grape in her urine. Physical examination revealed a left renal mass. There was left flank and costovertebral angle tenderness. She was cachetic and had anemia. Her white blood count (WBC) was 19000, red blood cells 2980000, and eosinophils 3%. Significant laboratory findings were: blood urea 40 mg/dl, creatinin 1.7 mg/dl, hematocrit 27, blood glucose 120 mg/dl, and hemoglobin 8.8 g/dl. Urinalyses showed a few white blood cells, but the urine culture was sterile.

A plain film of the abdomen demonstrated a soft tissue mass in the left renal area. On 21 December 1994 the excretory urogram (IVP) showed a normal right kidney, but a film taken 2 h after injection showed moderate dilatation of the left renal pelvis, calyces, and ureter. A space-occupying lesion was found in the upper pole of the left kidney on urograms. Retrograde pyelogram was made at a local hospital 1 month before admission to our hospital. Pyelogram revealed filling defects resembling yarn-like lesion within the left renal pelvis and contrast medium could not be introduced beyond the upper major calyx (Fig. 1). Ultrasound demonstrated a large thick-walled multiloculated cystic mass characteristic of hydatid cyst in the left kidney (Fig. 2a). Real-time examination showed in the pelvis renalis the presence of non-shadowing reflective material admixed with multiple daughter vesicles, which were moving freely with respiration. A diagnosis of hydatid cyst ruptured into the pelvicalyceal system was suggested. Sonography demonstrated an exact point of communication between the cyst and the upper pole major calyx (Fig. 2b). On the following sonographic examination we again ob-



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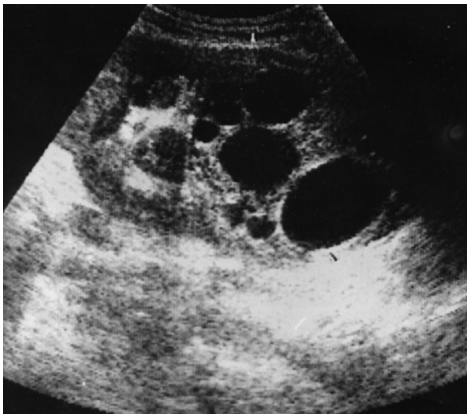

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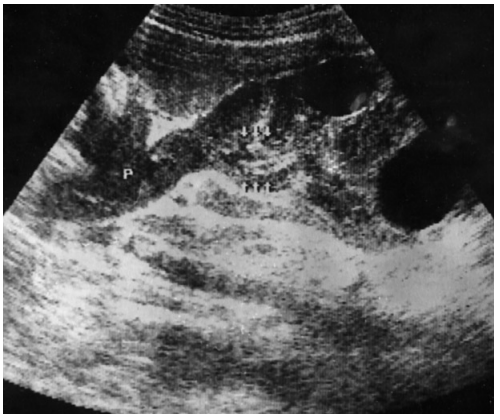

2b

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Fig. 1. Retrograde pyelogram demonstrates radiolucent multiple linear and circular filling defects as well as downward displacement of the upper calyx by a mass of the upper pole of the kidney

Fig. 2 a, b. a Ultrasound examination of the left kidney shows heterogenous hydatid cyst with multiple daughter vesicles found in the parent cyst. **b** US demonstrates clearly communication of cyst and pelvicalyceal system and the presence of non-shadowing reflective materials *(arrows)* in the dilated calyces and renal pelvis. *p* renal pelvis

Fig. 3. After cystic contents were evacuated, evacuated cystic cavity communicated freely with the upper major calyx and pelvis

served the dilated pelvicalyceal system which was filled with echogenic material. The final diagnosis was the rupture of the hydatid cyst with spontaneous evacuation of a part of its content via major calyx, which was complicated by hydronephrosis. Enhanced CT showed a multivesicular hydatid cyst in the left kidney with a hyperdense membrane and some daughter vesicles within the mother cyst. Moreover, the CT scan demonstrated urinary obstruction, pelviectasia, and dilatation of ureter.

At surgery half of the left kidney were found to be occupied by hydatid cyst which was originated in the upper pole. The lesion was solitary and approximately 7 cm in diameter. After cyst puncture, cyst fluid was aspirated via the trocar. The cavity was filled with an equal volume of sterile hypertonic saline (20 %) as a scolicidal agent. Then the cystic cavity was opened and it was found to be communicating freely with the upper major calyx of the kidney. This communication, which resembles a tunnel, had a diameter of 2 cm (Figs. 2 b and 3). A partial nephrectomy was performed. The patient with hydatid disease was given 50 mg/kg of mebandazole every day for 1 month prophylactically. After surgery, the patient was followed up every month over a period of 6 months. The laboratory and radiological findings of the last follow-up of the patient, 14 months after the operation, were:

1. In contrast to normal fasting blood sugar level, the red blood cells and hemoglobin levels were increased to 4 310 000 and 13.7 g/dl, respectively.
2. Her urine analysis was negative for urea and creatinin. Her excretory urography, US, and CT findings revealed that the left kidney has resumed its normal renal function, and hydatid cyst formation due to residual seeding was not observed (Fig. 4).

Discussion

Many patients with renal echinococcal cyst are asymptomatic. The most common presenting symptoms in the order of frequency are flank mass, renal pain, hematuria, and the drainage of hydatid cyst contents in the urine (hydatiduria) [1, 2, 4, 5]. The main complications observed with renal hydatid cyst are infection and rupture. Urinary scolices or daughter cysts are diagnostic. In our patient cystic contents after voiding were observed microscopically without the detection of hooklets. The renal colics and the obstructive uropathy due to ruptured cysts obviously implies the impaired renal collecting system. The exact incidence of this complication is not known [1]. However, the cystic contents, such as daughter vesicles, the fragments of germinative membrane, and hydatid sands, may be the reason for voiding obstruction physically and consequent renal colics [1, 3–7].

If the cyst ruptures into the collecting system of the kidney, excretory urogram may show the daughter cysts in the pelvis as irregular mass with or without urinary obstruction [1, 3, 6] and a non-functioning kidney [4].

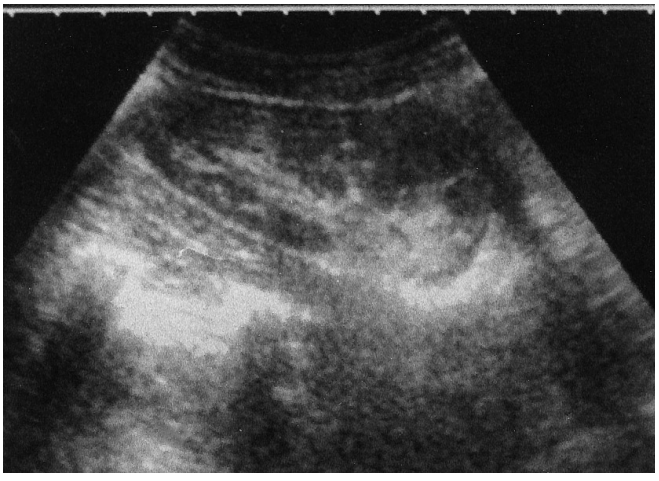

Fig. 4. Ultrasonographic findings obtained 14 months after the surgery reveals normal echopattern of the left kidney. The renal parenchyma and the renal sinus are clearly distinguished

Ruptured renal hydatid cysts presenting with urinary obstruction were described in 2 cases of a series of 12 cases [4]. Five cases of renal hydatid cyst ruptured into the collecting system have been reported by Gilsanz et al. [1]. Additionally, Ödev et al. [8] described 2 similar cases. In these cases in which the excretory capacity was retained, the deformity of the pelvicalyceal system due to echinococcus may not always appear so typical as in the retrograde pyelography and can resemble those produced by malignant tumors, tuberculosis, and hematoma. Also, the image on excretory urogram can be obscure and is not unusual for such cases. A pyelogram can be used for this purpose to illustrate the deformities. Because of contagious risk of cystic contents due to rupture, retrograde pyelography requires extreme caution. In our patient retrograde pyelogram showed a suspicious rounded mass and the presence of the filling defect within the pelvis renalis. This shadow is strongly suggestive of daughter cysts or urinary scolices.

Before the introduction of US, preoperative diagnosis of complicated renal hydatid cyst was difficult and tentative. Diagnosis was therefore based on clinical manifestations and the results of laboratory studies, but definitive diagnosis was limited to surgical exploration. Sonographic features of renal hydatid disease and its different patterns have been reported frequently [1, 2, 8–11], but US diagnosis of perforation of renal hydatid cyst into the pelvicalyceal system has not been elaborated adequately in the previous reports due to limited earlier experiences on the images of the perforated hydatid cysts [1, 2, 5, 7, 9–11]. Daughter cysts, hydatid sands, and ruptured membrane fragments which have been found ultrasonographically in the pelvicalyceal system of this patient (Fig. 2 b) suggests the preoperative utility of US diagnosis. Futhermore, the presence of echogenic membranes which were moving freely in the collecting system during inspiration and expiration are compatible with the evacuation of hydatic contents via the major calyx. The follow-up sonograms showed the persistance of intraluminal cystic contents which may be the cause of an obstruction and eventual pelvicalyceal ectasy in this patient. Exploratory surgery also confirmed communication between calyx and hydatid cyst (Fig. 3) as well as the numerous membrane fragments in the collecting system.

Ultrasonographic appearances of the ruptured renal hydatid cyst need to be differentiated from cystic renal tumors, cystic renal cell carcinoma, multilocular cystic nephroma, hematoma, and abscess. Wide variations in US appearances occurring in these either unilocular or multilocular renal masses can result in a considerable overlap of sonographic findings. Information gained from CT images is limited. It revealed the daughter cysts, the localization of the cystic mass, and the urinary obstruction, but it failed to provide information about the cystic materials in the collecting system and the communication between the cyst and the drainage system. Therefore, the diagnosis of perforated hydatid cyst with the passage of its contents into the urinary tract was assessed by US images and by the experiences gained in terms of learning about this disease.

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