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Imaging Misdiagnosis Analysis of a Rare Case of Renal Subcapsular Hematoma Located in the Renal Hilum and Collecting Area☆

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ABSTRACT

We report a rare case of renal subcapsular hematoma, which was located in the renal hilum and collecting area. Preoperative ultrasonography, retrograde urethrography, and computed tomographic examinations misdiagnosed the patient with simple hydronephrosis, without finding a lesion causing the hydronephrosis. We retrospectively summarized the imaging features and analyzed the reasons leading to the misdiagnosis.

Introduction

Renal subcapsular hematoma is uncommon in the clinical setting. The case we report in this study was of a large subcapsular hematoma in the renal hilum and collecting area and it was the only case treated in our hospital to date. The upper segment of the ureter was compressed by the large subcapsular hematoma, and a section of the hematoma separated away and lodged in the renal collecting area, leading to severe hydronephrosis of the left kidney. This condition is very rare and difficult to diagnose clinically and with radiologic imaging. We summarized the imaging features and analyzed the factors leading to the misdiagnosis of hydronephrosis in this case.

Case presentation

A 26-year-old man was admitted to our hospital for pain in the left flank with no obvious cause. The patient had no fever, abdominal pain, nausea, or hematuria. Physical examination revealed bilateral lack of flank swelling and no tenderness on percussion, nonpalpable kidneys, no deep tenderness bilaterally in the region of the ureters, no swelling over the bladder, or tenderness and palpable mass on palpation. Laboratory test results were as follows: urine white blood cell count, 2.30/μL; peripheral blood: erythrocyte count, 16.10/μL; white blood cell count, 7.25×10^{-9}/L; platelets, 118.0×10^{-9}/L.

Ultrasonographic examination revealed left kidney hydronephrosis, and left renal retrograde urography revealed severe dilatation of the left upper ureter and hydronephrosis (Fig. 1). Abdominal computed tomography (CT) scan also revealed severe left renal hydronephrosis (Fig. 2).

Surgery revealed left perirenal fat hypertrophy with diffuse inflammatory adhesions associated with the kidney capsule. The left ureter was considered normal. The entire pelvic wall was thin with elevated intrarenal pressure. The renal cortex was pouch-shaped, and incising the left kidney pole, 450 mL of dark red effusion was released. Pathologic analysis confirmed a diagnosis of kidney subcapsular hematoma with separation of the main section of the hematoma entering the renal collecting area (Fig. 3). The upper segment of the left ureter was compressed by the large subcapsular hematoma, leading to severe hydronephrosis of the left kidney.

Discussion

Renal subcapsular hematoma is a type of hematoma located between the renal capsule and renal parenchyma, and it is because of the rupture of blood vessels of the kidney or renal capsule. Trauma is the direct cause of the subcapsular hematoma, but most patients have associated kidney disease, vascular disease, pregnancy, heart disease with anticoagulant therapy, or other bleeding disorders. The most commonly reported causes are renal tumors, vascular diseases, urinary stones, and infectious diseases.[1–6]

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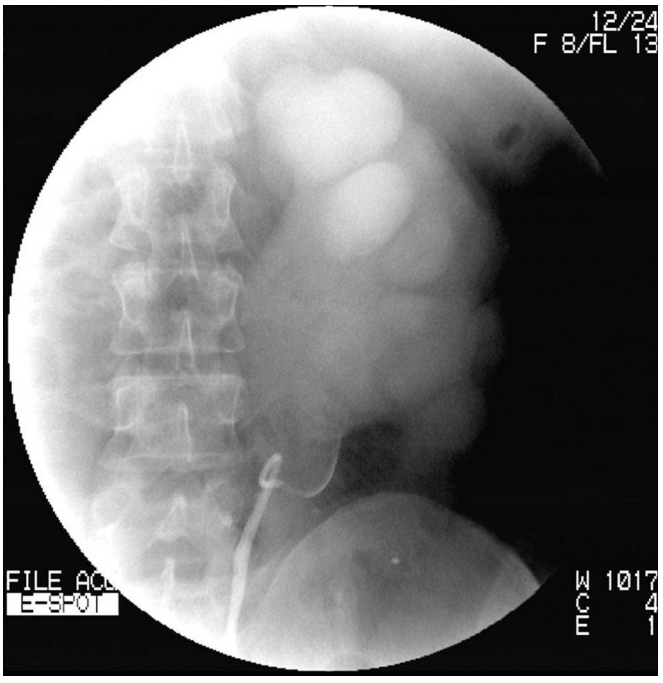

Figure 1. Left renal retrograde urograph showing compressed, tortuous, and displaced upper segment of the left ureter and the dilated renal collecting area.

Although the renal subcapsular hematoma in this case was large, it was uniquely located in the renal hilum and collecting area. In addition to causing hydronephrosis, the hematoma appeared as a liquid space-occupying lesion on CT. Hematoma walls are thin with a density similar to urine, causing difficulty with differentiation and diagnosis. In this case, all of the preoperative imaging diagnostics misdiagnosed the hematoma as simple hydronephrosis, without finding or considering the liquid space-occupying lesion in the renal collecting area.

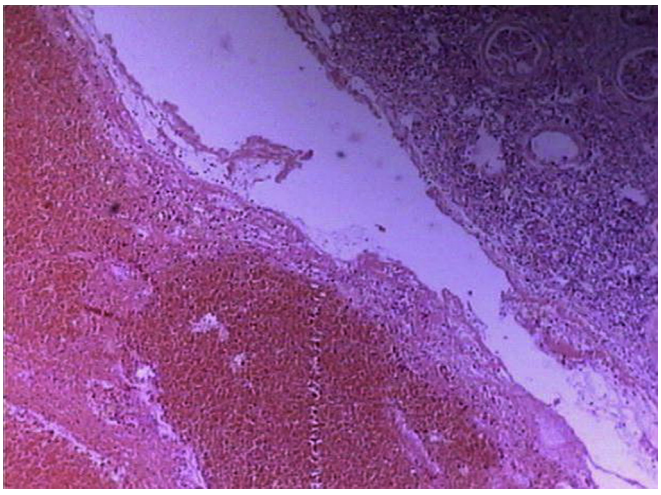

Figure 3. Histopathologic photomicrograph showing glomerular hyalinosis and a perirenal hematoma (hematoxylin and eosin, original magnification ×100).

Several lessons can be drawn from this case after reviewing the preoperative retrograde urography and CT scans. First, the retrograde urography imaging showed that the upper segment of the left ureter was compressed, tortuous, and displaced, without obvious expansion of the ureter itself (Fig. 1). Second, the plain CT images showed obvious expansion of the left renal collecting area,

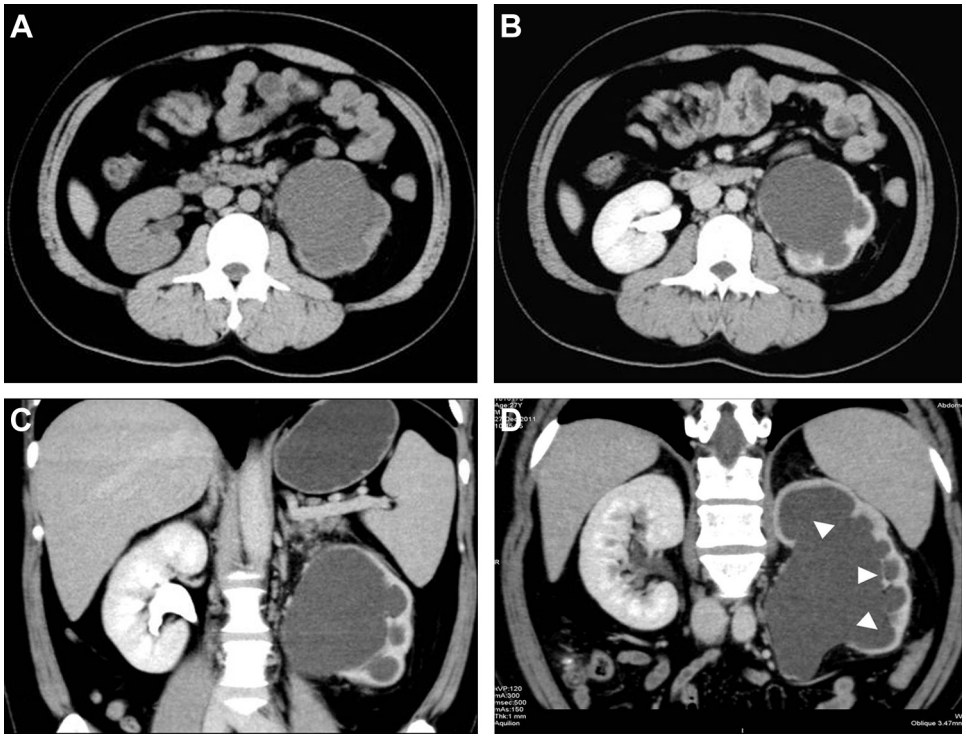

Figure 2. **(A)** Axial plain computed tomography (CT) scan showing the expanded renal collecting area, and the enlarged renal pelvis area was especially significant. **(B)** Axial enhanced CT scan showing that the edge of the liquid space-occupying lesion in the left renal pelvis was linearly enhanced and faintly visible. **(C)** Enhanced CT scan and coronal reconstruction showing an arc-shaped pressure change at the inner edge of the enhanced kidney column. **(D)** Enhanced CT scan and oblique coronal thin layer reconstruction showing the liquid space-occupying lesion filling the renal pelvis and transitional ureter with the thin linear cystic wall faintly visible (white arrow).

and the enlarged renal pelvis area was especially significant (Fig. 2A). The enhanced CT scan combined with multiplanar reconstruction revealed a curved thin linear-enhanced shadow faintly visible between the enlarged renal pelvis area and the renal calyces, with a pressure change at the inner edge of the kidney column along the linear-enhanced shadow (Fig. 2B-D). All the subtle signs differ from the signs usually seen with unilateral hydronephrosis and should prompt the consideration that a liquid space-occupying lesion exists in the renal hilum and renal pelvis. Third, our retrospective analysis determined that the imaging examination was not of ideal quality. With ideal quality examination, the lesion could have been found earlier leading to a more accurate diagnosis. First, during injection of contrast agent under real-time fluoroscopy, contrast detouring into the expanded calyces should have been detected. Second, a CT scan immediately after the retrograde urography could have clearly distinguished the renal pelvis filled with contrast agent and the liquid space-occupying lesion which did not communicate with the renal pelvis. Third, the enhanced CT scan delay time was too short. The enhanced delay time was only 5 minutes in this case and the contrast agent had not adequately entered the collecting system. If the delayed enhanced scan time had been long enough to allow contrast agent into the collection system, it might have clearly showed that the liquid space-occupying lesion in the renal hilum and collecting area did not fill with contrast agent. Additionally, because hematomas and urine have different signals on magnetic resonance (MR) imaging, [7] MR examination of the patient could better distinguish hematoma and renal pelvic calyces filling with urine, providing a better tool for diagnosis.

The renal subcapsular hematoma which is located in the renal hilum and renal collection area needs to be differentiated from parapelvic cyst and urine containing extravasation cyst caused by renal pelvis injury. The hematoma and urine have different MR signal characteristics, the contrast agent can be found getting into the urine containing cyst from the renal pelvis tear location in retrograde urography and CT enhanced delay scanning, they can be respectively identified.

Conclusion

For avoiding the imaging misdiagnosis of the liquid space-occupying lesion which is located in the renal collecting area, the correct ideal quality imaging examination and all the subtle signs should be paid enough attention.

Conflict of interest

The authors declare that no conflicts of interest regarding the publication of this article.

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