

Lower pole renal calyceal rupture on the basis of a calculus in an incompletely duplicated collecting system

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Section: Uroradiology & genital male imaging

Area of Interest: Kidney Urinary Tract / Bladder

Procedure: Diagnostic procedure

Procedure: Computer Applications-3D

Imaging Technique: Ultrasound

Imaging Technique: CT

Special Focus: Obstruction / Occlusion Calcifications /

Calculi Acute Case Type: Clinical Cases

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Patient: 56 years, female

Clinical History:

A 56-year-old woman was seen at the emergency department (ER) with acute, colic-type, right flank pain, haematuria and a medical history of nephrolithiasis.

Imaging Findings:

Abdominal ultrasound showed dilatation of the renal collecting system in the lower pole of the right kidney (Fig. 1), no visible calculi. No dilatation of the distal ureter.

The following day a CT urography was performed that confirmed the ultrasound findings of the right kidney but also showed bilateral incomplete ureteral duplication. (Fig. 2) A calculus obstructed the lower pole ureter proximal of the fusion with the upper pole ureter. The lower pole of the right kidney showed perirenal fluid density (average HU of 5) due to a renal calyceal rupture. (Fig. 3)

Discussion:

A. Hydronephrosis is dilatation of the renal pelvis and calyces due to urine outflow obstruction. Obstruction can occur at any level of the urinary tract from the renal pelvis to the urethra, both by intrinsic and extrinsic lesions. Common causes include congenital anomalies (such as UPJ stenosis and vesicoureteral reflux), urolithiasis and neoplasm. [1] Renal sinus cyst and an extrarenal pelvis can mimic hydronephrosis on imaging studies. [2]

B. Urolithiasis specifically refers to calculi anywhere in the urinary tract; when symptomatic a typical renal colic pain occurs. Prevalence of urolithiasis is 5-10% and is more common among men. Approximately 10% of the population will experience a renal colic at some stage in their life. In 2000 more than 1,100,000 patients visited the emergency

department in the U.S. with primary diagnosis of renal calculus or colic. [1, 3]

C. Ureteral duplication is a common anatomical anomaly. This abnormality is often associated with vesicoureteral reflux, incontinence, ureterocele, ureteral dysplasia and decreased renal function. Women are more frequently affected than men, prevalence of some form of urinary tract duplication is about 4%. Partial ureteral duplication with a distal common ureter are rarely symptomatic. In most cases of complete duplication the lower pole ureter usually inserts normally at the trigone of the bladder, while the upper pole ureter has an abnormal insertion. [2, 4]

D. Perirenal fluid attenuation in combination with hydronephrosis on (CT) imaging suggest renal calyceal rupture. The differential diagnosis of perinephric fat stranding is pyelonephritis. Although in practice it is a relatively frequent finding, literature search shows only a few case reports. The most common identified causes of obstruction resulting in forniceal rupture are ureteric calculi, followed by extrinsic ureteral compression. [5]

Written informed patient consent for publication has been obtained.

Differential Diagnosis List: Renal calyceal rupture on the basis of a calculus in an incompletely duplicated collecting system, Vesicoureteral reflux (VUR), Pyelonephritis

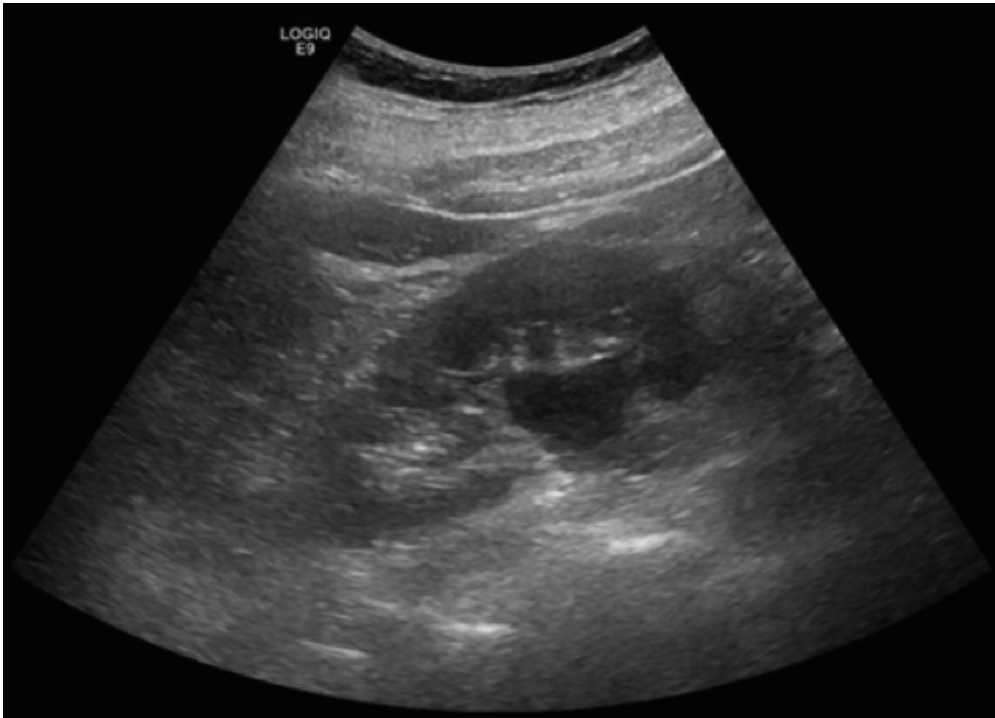
Final Diagnosis: Renal calyceal rupture on the basis of a calculus in an incompletely duplicated collecting system

References:

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Figure 1

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Description: Lower pole hydronephrosis right kidney **Origin:** Genzel P, Department of Radiology, Deventer Hospital, Deventer, The Netherlands

Figure 2

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Description: High partial duplicated collecting system, delayed excretion lower moiety right kidney due to obstruction by ureteral calculus (blue arrow) **Origin:** Genzel P, Department of Radiology, Deventer Hospital, Deventer, The Netherlands

Figure 3

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Description: CT urography. Hypodense area in the cortex of the right kidney (blue arrow) and perinephric fluid collection (yellow arrow) consistent with a calyceal rupture. **Origin:** Genzel P, Department of Radiology, Deventer Hospital, Deventer, The Netherlands