Title Page

Different successful management strategies for obstructing renal parapelvic cysts

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Abstract

Parapelvic cysts originate in the renal parenchyma and extend into the renal sinus. A series of three patients with symptomatic obstructing parapelvic cysts is described, two with acute presentations, and one with chronic symptoms. In two of the three cases there was a significant delay in establishing a diagnosis. Although one individual was successfully managed by image-guided cyst aspiration, the second patient required repeated aspiration due to cyst re-accumulation. A high index of clinical suspicion and a combination of imaging modalities, including serial ultrasound, excretory-phase CT and MAG3 renogram, are necessary to establish the diagnosis and monitor response to treatment.

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Introduction

Parapelvic cysts originate in the renal parenchyma and extend into the renal sinus. These should be differentiated from peripelvic cysts, which originate within the sinus itself and are believed to be lymphatic in origin [1]. Parapelvic cysts represent a diagnostic challenge due to their rarity and because they may be easily misdiagnosed as hydronephrosis on ultrasound and non-contrast CT. Symptomatic parapelvic cysts present with flank pain, infection or haematuria, secondary to obstruction of the renal hilum. Potential complications include hydronephrosis, vascular compression, renin induced hypertension, stone formation, cyst rupture or haemorrhage [2]. We describe three patients with symptomatic, obstructing parapelvic cysts presenting at our institution over a nine-year period and provide valuable learning points in the investigation and management of this uncommon condition.

Case report

Two patients presented with sudden onset severe flank pain, in the absence of visible haematuria, lower urinary tract symptoms or signs of infection. Both patients were afebrile, with unilateral flank tenderness. Urine dipstick demonstrated microscopic haematuria in one patient, but not the other. Both individuals had acute kidney injury stage one (creatinine rise >1.5 times baseline) and raised inflammatory markers. In contrast, the third patient complained of a two-year history of intermittent dull right upper quadrant and flank pain. The subacute clinical course was evidenced by the absence of a disturbance in renal function and inflammatory markers.

Interestingly, in two out of three cases there was a significant delay in establishing a diagnosis. One patient had presented with similar acute symptoms one year previously at a different institution. Imaging had demonstrated proximal ureteric stenosis without an obvious cause and the patient had been treated symptomatically with insertion of a ureteric stent. Symptoms recurred several months after stent removal. The patient with the subacute presentation had visited his general practitioner on several occasions with pain and symptoms were initially attributed to gall stone disease. As such an outpatient ultrasound was undertaken, revealing longstanding hydronephrosis prompting further urological investigations.

In the first patient, contrast CT demonstrated a 3x5cm obstructing parapelvic cyst (Figure 1A) and renogram confirmed 25% function in the affected kidney, with acute obstruction and no drainage. Gross hydronephrosis impaired differentiation between the collecting system and cyst, therefore a nephrostomy was placed to decompress the collecting system, allowing delayed cyst aspiration one week later (Figure 1B). Subsequent renogram confirmed improvement in function of the affected kidney to 50%, with resolution of obstruction. The patient remains asymptomatic.

The second patient was initially treated with an ultrasound-guided cyst aspiration. Unfortunately, 18 months later she developed further acute symptoms with cyst re-accumulation (Figure 2A). A second cyst aspiration was performed, with reduction in cyst size and relief of obstruction confirmed on both ultrasound and CT (Figure 2B) and improved differential function on subsequent renogram (39% function improved to 48%). Due to recurrence of symptoms three months later, definitive management by elective

laparoscopic deroofing was planned. However, intra-operatively a retrograde study demonstrated no evidence of hydronephrosis. Intra-operative ultrasound revealed that the parapelvic cyst had not increased in size following the most recent aspiration. The decision was made not to proceed with surgery due to the relatively small cyst size and close proximity to the renal hilum. The patient remains asymptomatic four years later, with no evidence of increase in cyst size on serial ultrasound.

The third patient, who presented with a subacute clinical course, was found to have a 10x6cm partially-obstructing parapelvic cyst on contrast CT. Renogram demonstrated 41% function in the affected kidney, with slow excretion but no evidence of obstruction. As he remained symptomatic, the decision was made for definitive treatment with laparoscopic deroofing of the parapelvic cyst. The procedure was uneventful and the patient was discharged on the first post-operative day, with durable resolution of symptoms.

Discussion

A combination of imaging modalities (serial ultrasound, excretory phase CT and MAG3 renogram) are often necessary to establish the diagnosis of an obstructing parapelvic cyst and monitor response to treatment [1]. Treatment should be reserved for symptomatic parapelvic cysts alone. Management may be technically challenging due to the proximity to the renal hilum, and because cysts are often complex and multi-lobulated [3]. Sclerotherapy is generally avoided due to the potential for sclerosant extravasation into the retroperitoneum, which may induce severe peri-renal inflammation, secondary pelvi-ureteric junction obstruction or abscess formation [4]. Aspiration alone is associated with a

high recurrence rate, as demonstrated in one of our patients. Laparoscopic management remains the favoured option, particularly in patients with multiple or anteriorly located parapelvic cysts [2]. However, laparoscopic decortication for parapelvic cysts is technically more challenging and associated with significantly greater blood loss and operative time compared to surgery for peripherally sited simple cysts, though both procedures have similar complication rates [3]. Antegrade percutaneous nephroscopic ablation, with cyst wall fulguratation using a resectoscope with a rollerball electrode, has also been demonstrated to be safe and effective [2]. More recently, retrograde management with flexible ureteroscopy and incision and drainage of the renal cyst wall using a holmium laser has been demonstrated to be safe and effective [5]. Ureteroscopy is the least invasive option following simple aspiration, however it is reserved for smaller cysts and is contraindicated in the presence of ureteric stricture. It is recognised that CT imaging alone may be an inaccurate method of differentiating benign from malignant renal cysts [6]. Some authors thus advocate sending both fluid aspirated from the cyst and a portion of the excised cyst wall for histology to rule out malignancy, as fluid cytology alone has a low yield [3]. Cytology was negative in our patients.

There is a paucity of literature directly comparing different treatment options for symptomatic parapelvic cysts, due to the rarity of the condition [2]. Currently, the management of parapelvic cysts is determined by anatomical characteristics and patient choice, as well as the expertise of surgical and radiology departments. A greater awareness of the diagnostic and management challenges associated with this uncommon condition is paramount to establish a prompt diagnosis and enhance patient care.

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Consent

Written informed consent obtained (consent forms available on request).

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Figure legends

Figure 1A and 1B: Axial CT with contrast demonstrating a 3x5cm left sided obstructing parapelvic cyst (A). CT-guided cyst aspiration was facilitated by placement of a nephrostomy to decompress the collecting system (B).

Figure 2A and 2B: Coronal CT with contrast demonstrating 5 x5cm left sided obstructing parapelvic cyst (A), with reduction in size to 2x2cm following cyst aspiration and improvement in drainage as evidenced by the reduction in hydronephrosis (B).