

The not-so-simple renal cyst

Samantha Low, MD,¹ Maleeha Azim, MD,¹ Elaine Wan, MD,²
Vimal Hariharan, MD²

¹Department of General Surgery, Queens Hospital Romford, London, United Kingdom

²Institute of Cancer Research, The Royal Marsden Hospital, London, United Kingdom

LOW S, AZIM M, WAN E, HARIHARAN V. The not-so-simple renal cyst. *Can J Urol* 2013;20(6):7060-7063.

Simple renal cysts are most commonly found in the elderly, male population. The majority of simple renal cysts remain untreated, except on the rare occasion when they become complicated with hemorrhage, infection or rupture. We present the case of a 31-year-old female with a simple

renal cyst which was initially treated as acute pyelonephritis. A high clinical suspicion led to the diagnosis of an infected renal cyst which was treated with antibiotic therapy and radiological drainage. There were minimal complications and the patient made an uneventful recovery.

Key Words: renal cysts

Introduction

Simple cysts are common benign space-occupying lesions of the kidney. They are usually unilateral, solitary lesions with well-defined features and are asymptomatic incidental findings on abdominal imaging. Their incidence increases with age. Early studies based on autopsy findings showed that more than half of individuals over 50 years of age had one or more simple renal cysts.¹ These findings

have been confirmed with the advent of modern cross-sectional imaging techniques, and have also reaffirmed the suggestion that simple renal cysts are an 'acquired' pathology. The pathogenesis is unknown but observational studies report an association with urinary obstruction, especially in renal and urinary tract disease.² Complications of simple renal cysts are rare, with a reported range of 2%-4%;³ complications being hemorrhage, infection or rupture.

We present the case of a young woman with what appeared to be a simple renal cyst. Given our high index of suspicion, a repeat contrast computerized tomography (CT) scan was ordered and percutaneous drainage was performed. The investigation and dilemma in diagnosis is discussed in our case report.

Accepted for publication September 2013

Address correspondence to Dr. Samantha Low, Department of General Surgery, Queens Hospital Romford Rom Valley Way, Romford, Essex RM7 0AG United Kingdom

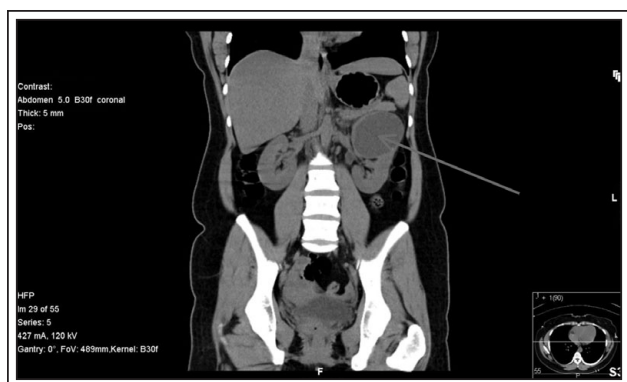


Figure 1. Unenhanced CT shows a 6.8 cm x 6.4 cm upper pole cyst in the left kidney.

Case report

A 31-year-old lady, originally from the Philippines, usually fit and well with an unremarkable past medical history, presented to the emergency department with acute left-sided abdominal pain and dysuria. An unenhanced CT scan of her kidneys, ureters and bladder reported an incidental finding of a 6.8 cm x 6.4 cm upper pole cyst in the left kidney, Figure 1. The patient was discharged with a course of antibiotics.

Six days later, the patient re-presented with persistent left-sided abdominal pain, localized to the flank. There was an associated 3 day history of vomiting and diarrhea, but no lower urinary tract symptoms. On examination, she was afebrile but tachycardic and tachypnoeic. Her abdomen was soft with tenderness in the left upper quadrant and flank.

A urine dipstick test demonstrated the presence of blood and protein. A urinary pregnancy test was negative. Laboratory tests showed a raised white cell count of $20.2 \times 10^9/L$ with normal renal function. Urine culture was positive for *Entamoeba coli* and

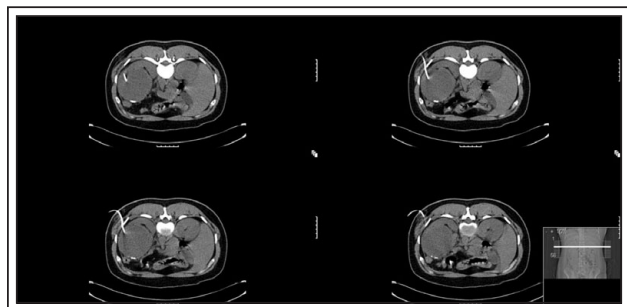


Figure 2. CT-guided percutaneous drainage of the renal cyst with a vacuum-assisted drain left in situ.

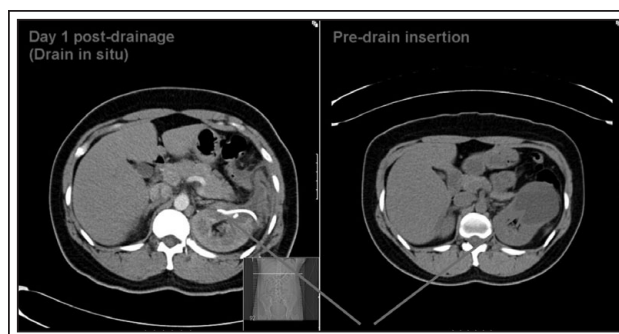


Figure 3. Comparison of contrast CT (left) on day one post-drainage with unenhanced CT (right) on patient's first presentation to A&E, shows significant reduction in the size of the left renal abscess.

sensitive to Gentamicin. The patient was admitted and started on intravenous antibiotics. The working diagnosis was acute pyelonephritis.

Despite intravenous antibiotics, the patient became septic (pyrexia of $38.4^\circ C$) with persistent abdominal pain. Blood inflammatory markers worsened to a WCC of $26 \times 10^9/L$ and CRP of 224 mg/L. Renal and bladder ultrasound reported a thick-walled cyst measuring 8.1 cm x 7.4 cm x 6.6 cm at the upper pole of the kidney. There were diffuse low level echoes within the cyst with some calcific areas on the interior cyst wall. No abnormal blood flow was seen on color Doppler. The working diagnosis was changed to an infected left renal cyst or abscess. The patient underwent a CT-guided percutaneous drainage of the renal cyst and a vacuum-assisted drain, Figure 2, drained 300 mL of frank pus.

The patient made an uneventful recovery. A CT scan performed day one post-drainage, Figure 3, reported reduction in the size of the left renal abscess with no peri-renal fluid extrinsic to the kidney. Mild reactive pleural change was also seen within the left lung base.

A fistulogram performed 10 days post-drainage confirmed a localized cyst infection with no cyst rupture.

Discussion

The first case of an infected solitary renal cyst was reported in 1925. A recent search on PubMed found 30 cases of reported infected solitary renal cyst dating from 1965-2013. In total, fewer than 100 cases have been reported over the last 90 years.

A classification of renal cysts, Table 1⁴ for their diagnosis, evaluation and management was introduced

TABLE 1. Criteria used in the Bosniak renal cyst classification system⁴

Stage	Cyst wall	Septa	Calcification	Enhancement
I	Hairline thin	No	No	No
II	Minimal regular thickening	Few, hairline thin	Smooth, hairline thin	No
IIF*	Minimal regular thickening	Multiple, minimal smooth thickening	Thick, nodular	No
III	Irregular thickening	Measurably thick, irregular	Thick, nodular, irregular	Yes
IV	Gross irregular thickening	Irregular gross thickening	Thick, nodular, irregular	Yes, tissue and cyst

*F in IIF is for follow up. Cyst size > 3 cm in diameter is another criterion for follow up and by extension inclusion in class IIF.

by Bosniak, based on their appearance and enhancement on CT. Contrast enhancement of the lesion is the main factor separating categories III and IV which are associated with malignancy, from the categories I, II and IIF which are benign processes.

We were unable to classify our cyst via the Bosniak classification as a non-contrast CT was performed. Based on the clinical picture, an intra-renal abscess could not be differentiated from an infected renal cyst. Clinical suspicion of an infected renal cyst was raised due to unresolving symptoms and ultrasonography findings.

In retrospect, on re-reviewing the initial non-contrast CT, what was initially thought to be a “simple” cyst could have been an abscess due to the thickness of the cyst wall. This was unfortunately overlooked by both the reporting radiologist and emergency department doctors. The urologists were not consulted on the imaging findings at this stage.

Ultrasonography is helpful in differentiating between simple cysts, neoplasms or infected cysts. The three major criteria for a solitary simple cyst on ultrasonography which allow it to be differentiated from a carcinoma or abscess:^{5,6}

- 1) The mass is round and sharply demarcated with smooth walls
- 2) There are no echoes within the mass
- 3) There is a strong posterior wall echo indicating good transmission through the cyst and enhanced transmission beyond the cyst.

Conversely, neoplasms or infected cysts have irregular borders with internal echoes.

Takashima⁷ also suggested that an infected renal cyst can be distinguished from a simple cyst by magnetic resonance imaging, as an infected renal cyst is less intense than a simple renal cyst on T2 weighted imaging.

Infected solitary cysts in the upper pole of the kidney can produce local inflammation and irritate

the diaphragm, causing ipsilateral shoulder pain together with abdominal pain that might be confused with pancreatitis, peptic ulcer disease or splenic pathology. This inflammatory reaction can also produce unilateral pleural effusion. A clinical history of acute pyelonephritis, an avascular lesion of kidney and ipsilateral pleural effusion or atelectasis may present a “triad” in these infected solitary cysts. These findings were demonstrated in our case where the initial working diagnosis was acute pyelonephritis.

Once a diagnosis is made, an infected renal cyst requires intervention without delay. Delayed intervention may cause the cyst to rupture due to increased intracystic pressure as well as weakening of the thin tissue walls separating the cyst from a closely adjacent collecting system or perinephric space.⁸ Other complications resulting from an interventional delay would include abscess formation and overwhelming septicemia.

The first line management of patients with infected renal cysts, renal or perinephric abscess is percutaneous drainage in conjunction with antimicrobial therapy.⁹ The only exception is when the abscess measures < 5 cm as these lesions frequently respond well to extended antibiotic therapy alone.¹⁰

For abscesses that are not amenable to percutaneous drainage, open surgical drainage with or without rescue nephrectomy may be required. This should be done under the cover of pre and postoperative broad spectrum antibiotics until culture and sensitivities of the cyst content are available.

This case illustrates the need to include an infected renal cyst as a differential diagnosis in the patient presenting with acute pyelonephritis or in the symptomatic patient with known or incidental renal cysts on diagnostic imaging. We also recommend that clinicians have a low threshold to consult the urologists in the event of a discrepancy between

radiology reporting and clinical findings. In a non-ruptured albeit infected renal cyst setting, urinary dipstick can be normal or show the presence of blood and/or proteins. There may be a need for multiple modalities of imaging to diagnose a complicated renal cyst. Finally, an infected renal cyst requires drainage without delay to reduce the risk of cyst rupture and metastatic infection. □

References

1. Kissane JM. The morphology of renal cystic disease. *Perspect Nephrol Hypertens* 1976;4:31-63.
2. Grantham JJ. Acquired cystic kidney disease. *Kidney Int* 1991; 40(1):143-152.
3. Bisceglia M, Galliani CA, Senger C, Stallone C, Sessa A. Renal cystic diseases: a review. *Adv Anat Pathol* 2006;13(1):26-56.
4. Israel GM, Bosniak MA. An update on the Bosniak renal cyst classification system. *Urology* 2005;66(3):484-488.
5. Bosniak MA. The small (less than or equal to 3.0cm) renal parenchyma tumor: detection, diagnosis and controversies. *Radiology* 1991;179(2):307-317.
6. Curry NS. Small renal masses (lesions smaller than 3cm): imaging, evaluation and management. *AJR Am J Roentgenol* 1995; 164(2):355-362.
7. Takashima M, Miyazaki K, Asari T, Fujita Y, Ikeda D, Yoshida M. A case of infected renal cyst: the usefulness of magnetic resonance imaging for preoperative diagnosis. *Hinyokika Kyo* 1993;39(9): 837-839.
8. Papanicolaou N, Pfister RC, Yoder IC. Spontaneous and traumatic rupture of renal cysts: diagnosis and outcome. *Radiology* 1986; 160(1):99-103.
9. Dembry LM, Andriole VT. Renal and perirenal abscesses. *Infect Dis Clin of North Am* 1997;11(3):663-680.
10. Siegel JF, Smith A, Moldwin R. Minimally invasive treatment of renal abscesses. *J Urol* 1996;155(1):52-55.