

Mama had a Rolling Stone - An Unusual Complication and Management of an Infected Renal Calculus

Michelle L. Ricketts^{1,2}, Shelby Champion^{3*} and Daniele Wiseman¹

¹London Health Sciences Center, London Ontario, Canada

²London X ray Associates, London, Ontario, Canada

³Schulich School of Medicine and Dentistry, London, Ontario, Canada

*Correspondence to:

Shelby Champion
Schulich School of Medicine and Dentistry
Department of Medicine
Western University, 1151 Richmond St
London, Ontario N6A5C1, Canada
Tel: 519-614-0827
E-mail: schampio@uwo.ca

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Abstract

Renal stones are a common clinical finding. We present the rare case of nephrocutaneous fistulization following a longstanding history of asymptomatic nephrolithiasis. Fistula formation is typically associated with recent abdominal surgery, xanthogranulomatous pyelonephritis or tuberculosis. Due to unique circumstances this patient was unwilling to engage in conventional surgical options leading to the involvement of Interventional Radiology for percutaneous stone extraction with the placement of an abscess drain under fluoroscopic guidance.

Keywords

Infected renal calculus, Nephrocutaneous fistula, Recurrent pyelonephritis, Chronic nephrolithiasis, Subcutaneous abscess drainage

Abbreviations

CT: Computed tomography; **MRI:** Magnetic resonance image; **XGP:** Xanthogranulomatous pyelonephritis

Introduction

Renal stones affect approximately 10% of the general population [1]. Rarely, renal stones can take an unexpected course. Unusual complications have been reported of patients suffering from infected renal calculi which fistulize to adjacent organs such as bowel [2], bronchi [3] or cutaneous tissue [4-6]. These cases are often post abdominal surgery, trauma [7] or associated with xanthogranulomatous pyelonephritis (XGP), tuberculosis or debilitating comorbidities such as cancer [2].

Case Report

A 76-year-old lady presented to the Urology service with a 3-month history of left flank pain and a new palpable lump in the left posterior abdominal wall. This patient had a history of recurrent pyelonephritis and computed tomography (CT) scans dating back to 2006 revealed an uncomplicated left upper pole renal calculus presumed to be contained within a calyceal diverticulum. The calculus measured 1.6 cm in size (Figure 1). Plain films dating back to 1986 revealed the same stone. The patient was otherwise healthy. She was afebrile and denied night sweats, nausea or vomiting. On physical examination, the patient had a palpable firm flank mass on the left side associated with minimal tenderness. Blood work

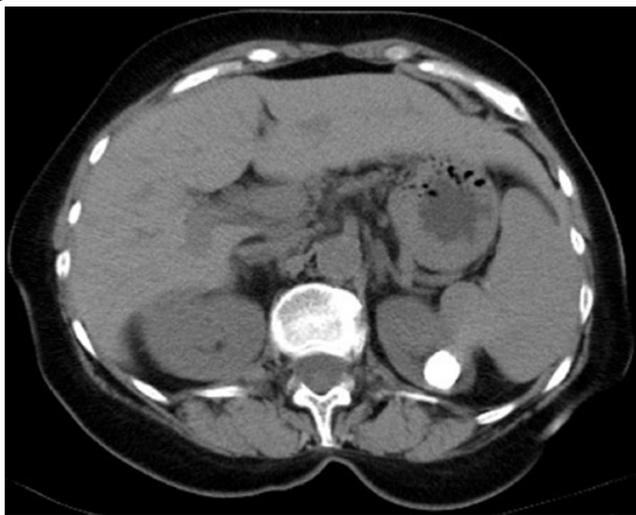


Figure 1: Axial slice non-contrast CT scan demonstrating a 1.6 cm renal stone within the upper pole of the left kidney, suspected to be contained within a calyceal diverticulum. CT performed approximately 5 years prior to symptomatic presentation.

and urinalysis revealed a normal creatinine and microscopic hematuria. A CT scan showed the previously seen left upper pole renal calculus had migrated into the posterior abdominal wall soft tissue and was surrounded by inflammatory changes (Figure 2). Antibiotic therapy was started. A combination of factors led to a delay in definitive therapy. These included an



Figure 2: Axial slice non-contrast CT scan revealing migration of the previously visualized renal calculus into the soft tissues of the posterior abdominal wall. Inflammation of the surrounding tissue is evident by edema and effacement of fat planes.

excessively busy Urology service, the patient's stoicism, her role as the sole caregiver of her husband, and the inclusion of lymphoma on the radiologist's differential leading to a 4-month interval magnetic resonance image (MRI). The MRI showed a fairly extensive subcutaneous abscess in the left posterior flank. The abscess was seen tracking to the posterior pararenal space (Figure 3).

Three months later, the patient presented to the emergency department complaining of a draining sinus arising

from the left flank. The skin surface had the appearance of a watering can spout but no pus could be expressed. The patient was admitted to the hospital and referred to Interventional Radiology for percutaneous abscess drainage.

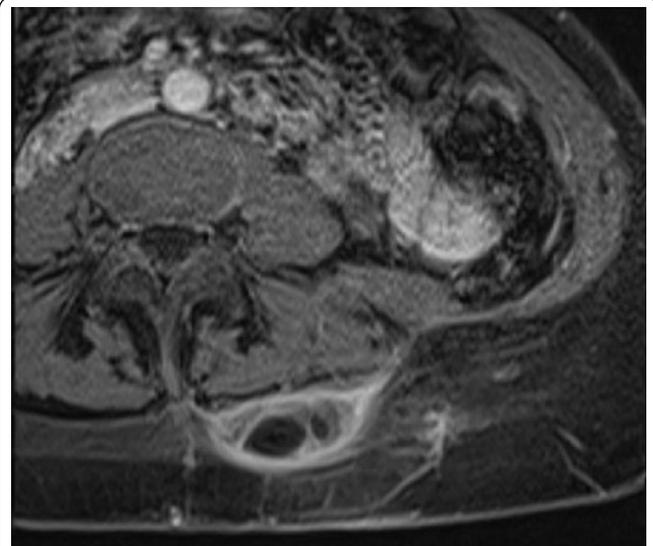


Figure 3: Axial MRI with contrast demonstrates a lobulated hypointense structure with rim enhancement in the posterior abdominal wall, in keeping with an abscess. An enhancing tract can be seen laterally.

In the interventional suite, an ultrasound showed a superficial abscess collection in the subcutaneous tissue of the left flank in which the calculus was sitting (Figure 4). Using ultrasound and fluoroscopic guidance, a 10 French abscess drainage tube was inserted. Approximately 30 ml of pus was aspirated, and the cavity was decompressed. Realizing how superficial the stone was and that the infection would never clear without removal of this infectious source, a discussion with Urology and the patient ensued. She was reluctant to have a return visit or prolonged hospitalization for surgery being acutely concerned about leaving her husband alone at home. Otherwise, the Urology service would have discharged her with an abscess drain, perhaps repeated imaging and eventually booked her for a retroperitoneal exploratory surgery and debridement.



Figure 4: Ultrasound of the left flank demonstrates a 1.8 cm calculus (white cross) with posterior acoustic shadowing. The stone is situated within an anechoic collection, likely representing the abscess seen on MRI.

Therefore, the skin was anesthetized, and a titrated dose of midazolam and fentanyl were given for sedation and analgesia. A 2 cm transverse incision was made directly overlying the eroded calculus using fluoroscopic verification of the exact position. Blunt dissection resulted in fragmentation of the stone. When no further fragments were palpable or visible on fluoroscopy the wound was packed, and the abscess drain was left in situ. The placement of the drain allowed for flushing and drainage of the cavity as well as repeat fluoroscopic evaluation for any ongoing fistula to the kidney (Figure 5). The patient was discharged the next morning with home wound care, Urology and Interventional Radiology follow up. At 10 days follow up, when no cavity or tract was seen on fluoroscopy, the abscess tube and packing were removed. A 4 month follow up CT showed appropriately enhancing renal parenchyma with

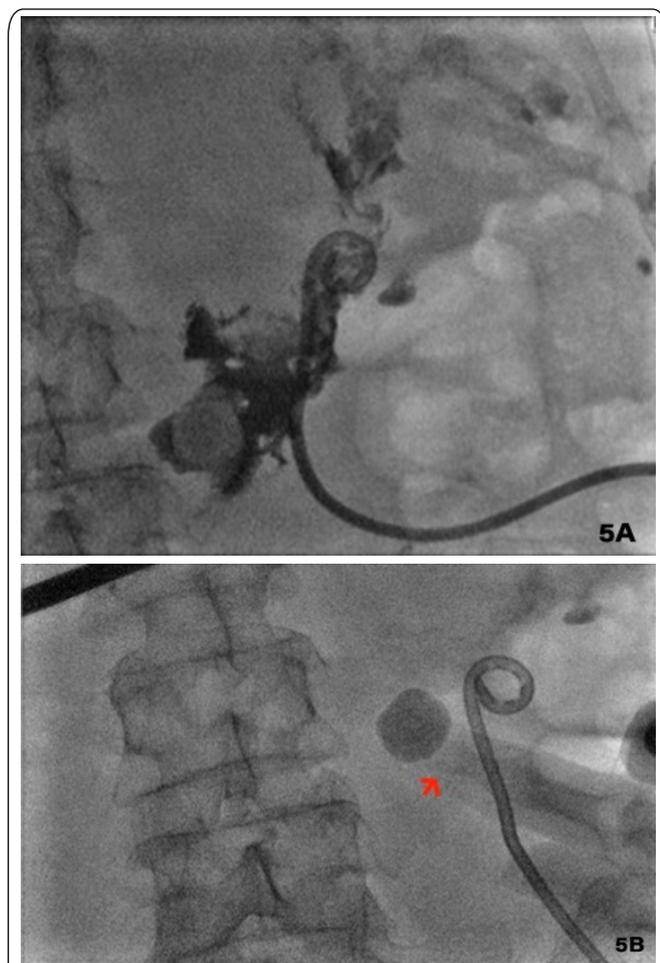


Figure 5: Selected fluoroscopic images with pigtail drainage catheter in situ within the subcutaneous abscess. (A) The extent of the abscess can be visualized through the injection of contrast media. (B) Fluoroscopic images post purulent aspiration and decompression. Fluoroscopy operator's digit (red arrow) can be visualized to assess feasibility of manual extraction of the renal calculi.

no further abscess or inflammatory changes (Figure 6). In the 9 years following the procedure there have been no additional kidney concerns or need for Urology services.

Discussion

Complications related to fistula are rare and most likely



Figure 6: Axial non-contrast CT performed 3 months following procedure showing resolution of the abscess and inflammatory changes.

seen in patients with a history of renal surgery or underlying medical comorbidities. In a review of the literature, XGP is the most common source of nephrocutaneous fistula formation. This subtype of chronic renal infection, often from longstanding obstruction, results in deposition of lipid-laden macrophages. This unique form of chronic inflammation can lead to destruction of renal parenchyma and may predispose patients to abscess and fistula formation [9]. XGP is a histopathological diagnosis however, it may be suspected based on the classic “bear paw’s sign” visualized on CT. Imaging will demonstrate an enlarged, non-functioning kidney with cortical atrophy and calyceal expansion [10]. Other predisposing conditions may be evident based on past medical and surgical history, and presenting systemic symptoms including fever, weight loss and hematuria.

The management of uncomplicated renal calculi has been well described in the literature. However, the treatment of extruded or fistulized calculi is patient specific and there is no clear consensus on the appropriate management. Although rare in occurrence, fistulas have been reported between the kidney and the pleural cavity, lungs and bronchi, bowel, and skin [2-6]. Fistula formation to organ systems other than skin often results in a more dramatic presentation and are therefore brought to medical attention at an earlier stage. This significant impact on functioning of not just the kidneys but additional organ systems often necessitates surgical management.

Treatment options for a nephrocutaneous fistula can include total nephrectomy, partial nephrectomy or isolated antibiotic therapy. Individualized therapies must be based on the patient’s renal function and their ability to tolerate surgical procedures. Conservative management with antibiotics may be trialed initially. If the patient fails to respond, treatment is often escalated to nephrectomy [4-6]. In many cases of nephrocutaneous fistula, the underlying cause of disease has resulted in a non-functioning kidney. In cases such as these, Tanwar, Rathore and Rohilla (2015) recommend radical nephrectomy and fistulotomy without delay in patients that are willing and able to undergo invasive surgery [4]. Our

case highlights the utility of Interventional Radiology to successfully provide minimally invasive treatment in line with the patient's goals of care.

We have described a case of healthy elderly woman with a longstanding left sided upper pole renal calculus who suffers an unexpected complication after presenting with vague flank pain and a palpable lump in the left posterior abdominal wall. Fistulization of infected renal calculi is a rare phenomenon but is a recognized complication of renal stone disease.

Conclusion

Our case provides an example of the importance of prompt intervention in patients with migrated calculi and how Interventional Radiology combined an abscess drainage procedure with an image guided, minimally invasive percutaneous stone extraction. This provided a cure to a chronic infection, negated a long hospital stay, a more invasive surgery and/or more protracted clinical course. The patient is well and very happy with her outcome.

Conflicts of Interest

None to declare.

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