Spontaneous extrusion of renal calculi presenting as a retroperitoneal abscess

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Spontaneous extrusion of a kidney stone is an extremely rare event with few reported cases. We present the unusual case of a 62-year-old female who presented with worsening of fever and flank pain over a 5 day period. Imaging revealed retroperitoneal and abdominal wall abscesses that upon evaluation of prior imaging were attributed to spontaneously extruded kidney stones. Prior reports suggest surgical exploration and extraction is the preferred treatment option for extruded renal calculi. Based on the experience presented here, conservative management may be an attractive first-line treatment option for patients with extruded renal stones and associated retroperitoneal abscesses.

Key Words: nephrolithiasis; retroperitoneal abscess; computed tomography

Introduction

Nephrolithiasis is a common disease, with a prevalence of 10.6% among men and 7.1% among women in the United States.[1] Infrequently, forniceal rupture may occur as result of an obstructing stone, usually without adverse clinical consequences.[2] Herein, we describe the unusual case of a 62-year-old female whose kidney stones extruded through the parenchyma of her kidney resulting in retroperitoneal and abdominal wall abscesses managed with percutaneous drainage and antibiotic therapy. Given the rarity of this clinical phenomenon, no consensus exists as to whether stone extraction from the retroperitoneal tissue is required to ensure clinical improvement. Based on the experience presented here, conservative management may be an attractive first-line management option for similar patients in the future.

Case report

A 62-year-old healthy female with no history of nephrolithiasis presented to our emergency department (ED) with a 5 day history of right flank pain, intermittent low-grade fevers, night sweats, and right abdominal swelling. She had pain with right leg raise, which she attributed to her exercise regimen.

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Figure 1. A) CT urogram at time of initial presentation. Hypodense tract can be seen through posterior kidney with calcific debris within it, which was the presumed path of stone extrusion (left arrow). Psoas abscess can also be seen (right arrow). On delayed phase imaging, no contrast extravasation was observed.

Upon arrival to the ED, her vital signs were without evidence of fever, hypotension, or tachycardia. Her abdominal exam was notable for a 10 cm x 5 cm transverse asymmetric swelling along the right abdominal wall at the level of her umbilicus. Right-sided costovertebral tenderness was present. Laboratory evaluation was significant for thrombocytosis (409 $x10^9$/L), leukocytosis (13.9 $x10^9$/L), hyponatremia and hypochloremia (132 mmol/L and 96 mmol/L respectively). Her renal function was normal with a creatinine of 0.66 mg/dL and an estimated glomerular filtration rate of > 90 mL/min/BSA. Urine culture was ultimately negative.

Figure 1. B) Two separate retroperitoneal abscesses were present (arrows), one of which contained a 1.2 cm calculus.

Computed tomography (CT) urogram was obtained, which demonstrated a hypoenhancing tract within the posterior right renal parenchyma with small calcifications within it extending to rim-enhancing collections in the right psoas and right lateral abdominal wall, Figure 1a. The lateral collection was predominantly situated deep to the transversalis fascia with small intramuscular extension measuring 6.6 cm x 3.3 cm x 5.7 cm. The right psoas fluid collection measured 2.8 cm x 3.4 cm x 8.0 cm. A large 1.2 cm stone was evident within the lateral fluid collection, Figure 1b. On delayed phase imaging, there was no urine extravasation from the kidney and the tract did not fill with contrast, suggesting this did not represent a calyceal diverticulum.

Interestingly, upon review of a CT chest 13 months prior performed for lung cancer screening, a stone of the same size and shape was observed within the renal parenchyma in the same location as the hypoenhancing tract seen on the CT urogram, Figure 2. This seemingly confirmed a renal origin of the calculus and provided radiographic evidence of an evolving extrusion event.

Urology consultation was obtained and percutaneous drainage of the abscesses was recommended. Two 10 French multipurpose drainage catheters were placed into the fluid collections and purulent material was aspirated from both, which grew Proteus mirabilis resistant to tetracyclines. She was discharged home the following day with 2 weeks of oral antibiotics.

Two weeks later, sinograms demonstrated resolution of the abscess cavities and both drains were removed. The patient has not redeveloped pain or infectious symptoms 5 months after drain removal.

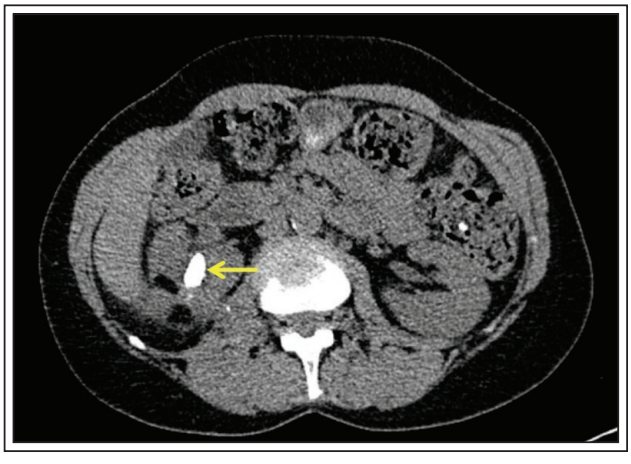

Figure 2. CT chest performed 13 months earlier imaged the superior portion of the kidneys (arrow). A stone of the same size and shape was seen within the renal parenchyma at that time along the tract of eventual extrusion, confirming renal origin of the calculus.

Discussion

Spontaneous extrusion of a renal calculus is an exceedingly rare phenomenon. To our knowledge, only eight cases have been reported in the literature since 1986.[3-8] Given the rarity of this clinical event, no consensus exists regarding the optimal treatment strategy, and almost all prior cases have been managed with open surgical debridement and extraction of residual stone material. Here, we report the unique case of a healthy female with spontaneous extrusion of a 1.2 cm renal stone from a morphologically normal kidney successfully managed with percutaneous abscess drainage. Considering the potential morbidity of retroperitoneal exploration for a retained calculus and the success of a nonoperative approach reported here, we advocate for an initial attempt at conservative management for similar cases encountered in the future.

A summary of previously reported cases of spontaneous stone extrusion can be found in Table 1.[3-8] There appears to be a female predilection and the majority of previously reported cases involved staghorn calculi in poorly functioning, atrophic kidneys. The most contemporary case involved a 29-year-old spina bifida patient with hydrocephalus and spinal hardware who extruded part of a staghorn calculous though a sinus tract in his flank after

TABLE 1. **Previous reports of spontaneous renal stone extrusion**

Reference	Age	Sex	Stone characteristics	Management	Outcome
Breatnach 1986[3]	72	M	Staghorn calculus in retroperitoneum with psoas abscess	Percutaneous abscess drainage, nephrostomy tube, antibiotics	Resolution of infection
Lewi and Scott 1986[5]	48	F	Staghorn calculus in retroperitoneum with psoas abscess	Open simple nephrectomy	Resolution of infection and sinus tract
Lewi and Scott 1986[5]	56	F	Staghorn calculus in retroperitoneum with left loin abscess	Incision and drainage followed by open exploration with stone extraction	Not provided
Lewi and Scott 1986[5]	89	F	Staghorn calculus in retroperitoneum with perinephric abscess and calculocutaneous sinus	Incision and drainage	Resolution of sinus tract once stone passively removed
Stott 1987[7]	83	M	Staghorn calculus migrated into psoas with associated abscess	Open exploration, drainage, and stone extraction	Removal of stone, destruction od ipsilateral renal function
Holm 1991[4]	63	F	12 mm upper pole stone migrated into retroperitoneal tissue with associated abscess	Incision and drainage of abscess cavity	Stone migrated through I&D tract, no loss of renal function
Vaidyanathan 2001[8]	29	M	Staghorn calculus extruded through nephrocutaneous fistula	Not provided	Not provided
Purkait 2016[6]	10	F	Staghorn calculus in psoas muscle with nephrocutaneous fistula	Extraperitoneal simple nephrectomy and excision of fistulous tract	Removal of stone and resolution of fistula

being misdiagnosed with pressure injury and spinal hardware infection.[3] In 1986, Breatnach and colleagues reported discovering a spontaneously extruded stone on CT in a male patient with a nonfunctioning kidney containing a staghorn calculous.[3] That patient, much like ours, developed peri and paranephric abscesses. Open surgical management was considered, however due to patient's comorbidities and nonfunctioning ipsilateral kidney, he was managed with percutaneous abscess drainage and experienced resolution of infection. Lewi and Scott reported on three different patients, all of whom were female, with spontaneously extruded stones all of which occurred in atrophic, non-functioning kidneys with staghorn calculi.[5] All three were managed with open abscess drainage and/or nephrectomy. To date, only one case of spontaneous kidney stone extrusion has been reported in the pediatric population. In that patient, open nephrectomy with excision of a fistulous tract was undertaken given the patient's stone burden and non-functioning kidney.[6]

While surgical intervention in the form of nephrectomy is a reasonable approach for cases associated with atrophic kidneys, the case reported here is relatively unique in the context of the prior literature in that there was no staghorn calculus and the affected kidney was not atrophic. Following clinical improvement with abscess drainage and antibiotics, retroperitoneoscopic stone extraction was considered and discussed with the patient. Ultimately, the decision was made to observe her after drain removal and only consider stone extraction if the abscesses returned, which has not occurred to date. In the face of clinical improvement, there does not appear to be an obligate indication for stone fragment removal. Indeed, the endourologic literature supports a conservative strategy whereby stone fragments extruded through the ureter during ureteroscopy can be left in the retroperitoneum without adverse clinical sequlae.[9] Therefore, based on the experience presented here, we advocate for an initial conservative management strategy for patients with a similar clinical presentation in the future.

Conclusion

Spontaneous extrusion of renal calculi is a very rare phenomenon and usually occurs in the context of a non-functioning kidney with staghorn calculi. When this event occurs in a healthy kidney and abscess(es) develop, conservative management with percutaneous drainage and oral antibiotic therapy should be considered as a first-line management strategy. □

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