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Jackstones in the renal pelvis: A rare calculus

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ABSTRACT

Jackstones are a rare subtype of calculi, characterised by radiating spicules. We describe a case of multiple jackstones in the urinary upper tract. A 53-year-old man was referred for evaluation of left flank pain. Imaging revealed a left pelvic-ureteric junction obstruction and several left renal calculi. A left supine percutaneous nephrolithotomy was performed and two jackstone calculi were extracted. The presence of multiple jackstones in the renal pelvis should prompt for evaluation for obstruction and complete stone clearance should be achieved to avoid recurrence.

1. Introduction

Jackstones are a rare subtype of urinary tract calculi with characteristic radiating spicules, which resemble toy jacks used in children's games. They are composed of calcium oxalate dihydrate and are usually found in the urinary bladder.[1] The stones have been described as light in weight and easy to fracture. Interestingly, this configuration of stone has been well described in veterinary literature, with reports in various animal species. Jackstones are rarely found in the kidney and a literature review revealed only two case reports.[2,3] We report a case that had a symptomatic presentation of two large jackstones and discuss the possible pathophysiological mechanisms.

2. Case presentation

A 53-year-old male was referred with a 1-month history of intermittent left flank pain with no history of haematuria or dysuria. His medical history was limited to Meniere's disease and his physical examination was unremarkable. Computerized tomography (CT) showed a dilated left renal pelvis and several left renal pelvis calculi (Fig. 1). The largest stone size was 20mm × 19mm with a branching configuration. During this work-up, the patient required treatment for a right mid ureteric calculus, which was uneventful.

A 99 m Technetium-DTPA (diethylenetriaminepentaacetate) scan demonstrated an abnormal left frusemide clearance T1/2 of 42.5 minutes suggesting obstruction at the left pelvi-ureteric junction (PUJ) and a normal right side. A left supine percutaneous nephrolithotomy was performed. Intraoperative retrograde pyelography revealed a PUJ obstruction configuration with high medial insertion onto the renal pelvis and a cluster of calculi (Fig. 2). Nephroscopy of the left kidney visualised two jackstones, several small round calculi and a baggy renal pelvis. Lithoclast and ultrasound fragmentation were used to fragment the stones and all stones were extracted rendering the patient stone free (Fig. 3). A 6Fr ureteric stent was placed which was removed a month later. His post-operative recovery was uneventful. Analysis of the stone demonstrated a composition of calcium, oxalate and uric acid. A repeat post-operative DTPA revealed resolution of the PUJ obstruction and an improved left T/12 of 11 minutes. The follow-up plans for the patient are annual reviews of his symptoms accompanied by a renal tract ultrasound and serum glomerular filtration rate (GFR).

3. Discussion

Jackstones typically form in the bladder, due to bladder outlet obstruction and stasis of urine. Other causes of bladder stones such as infection and foreign bodies do not form jackstones. It has been postulated that jackstones arise due to mucoprotein deposition at the tips of the spicules, acting as a scaffold for precipitation of loose crystalline matrix of calcium oxalate dihydrate.[4]

This is a case demonstrating a rare event of the formation of multiple jackstones in the renal pelvis. Upon review of related case reports, we discuss possible pathophysiological mechanisms. It is likely that in the case we present, the capacious renal pelvis caused by obstruction enabled formation of the jackstones. The cause of this configuration may

; CT, Computerized tomography; DTPA, Diethylenetriaminepentaacetate; PUJ, Pelvi-ureteric junction; ESWL, Extracorporeal shock wave lithotripsy.

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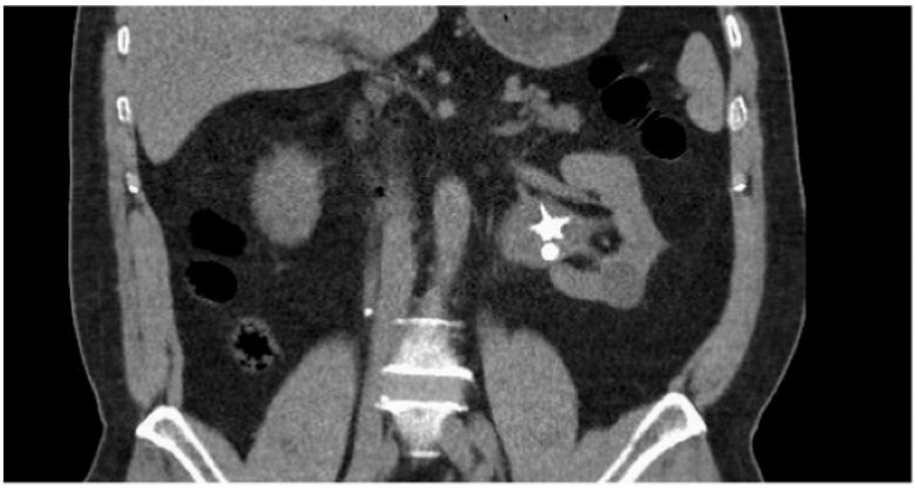

Fig. 1. CT demonstrating a dilated left renal collecting system, a large abnormally shaped calculus with a dense central core and radiating spiculations and an adjacent typical rounded calculus.

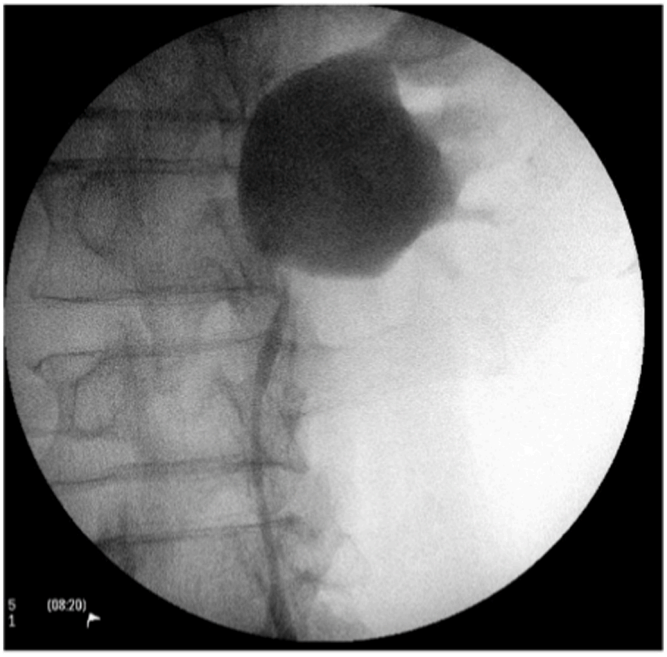

Fig. 2. Left fluoroscopic retrograde pyelography demonstrating a PUJ obstruction configuration and dilated renal pelvis.

Fig. 3. Post-operative picture showing retrieved jackstones (spicules had to be broken for retrieval).

have been due to the high medial insertion of the ureter onto the renal pelvis, compounded by inflammation caused by the multiple renal stones.

Notably, the other case reports described a solitary jackstone in the kidney whilst our case had two jackstones. The mechanism potentially responsible for the development of multiple jackstones is due to the saturation of other intrarenal stones that served as a nucleus for the stellate calcification to form.

These calculi may be incidental or may be symptomatic with pain or haematuria from the chronic mechanical urothelial irritation from the size and contour of the jackstones.[5] Although complications from upper tract jackstones have not been reported, complications of bladder jackstones include fistulas, obstruction and bladder perforation. In an obstructed renal pelvis, potential similar complications could be anticipated.

Jackstones in the bladder tend to be susceptible to fragmentation by extracorporeal shock wave lithotripsy (ESWL). However as multiple renal stones were identified and PUJ obstruction demonstrated on a functional scan, we did not offer ESWL as a modality.

4. Conclusion

Multiple jackstones in the renal pelvis is a rare but potential occurrence and may be recognised due to their unique radiological characteristics. Although cases can be symptomatic, they may also present without pain and haematuria. The presence of multiple jackstones should prompt for evaluation for obstruction and complete stone clearance should be achieved to avoid recurrence.

Declaration of competing interest

There is no conflict of interest associated with this publication and no financial support was required at time of submission.

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