Scientific Research Publishing

Open Journal of Urology, 2024, 14, 514-518
https://www.scirp.org/journal/oju
ISSN Online: 2160-5629
ISSN Print: 2160-5440

Jackstone Caliciel Complicating a Kidney Cyst: Clinical Case and Literature Review

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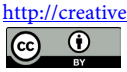
How to cite this paper: Karimoune Mossi, O., Amadou, S., Ousmane Manzo, M.S., Adamou Kaka, M.S., Dambaki, M.S., Moussa, A. and Boka Tounga, Y. (2024) Jackstone Caliciel Complicating a Kidney Cyst: Clinical Case and Literature Review. *Open Journal of Urology*, **14**, 514-518.
https://doi.org/10.4236/oju.2024.1410053

Received: September 1, 2024
Accepted: October 27, 2024
Published: October 30, 2024



Abstract

The jackstone is a rare type of urinary stone, recognized for its distinctive shape. While historically described in veterinary pathology, it has also been found in humans, most commonly in the bladder and typically associated with urinary stasis. However, its occurrence in the renal calyx is extremely rare. We report a case of a jackstone located in the renal calyx, secondary to a large Bosniak 1 renal cyst. The simultaneous presence of the calyceal stone and renal cyst prompted us to opt for open surgery, allowing for comprehensive treatment of both conditions. The patient's postoperative recovery was smooth, demonstrating that despite its invasiveness, open surgery remains a relevant option for managing complex stones, particularly in resource-limited settings.

Keywords

Jackstone, Renal Lithiasis, Renal Cyst, Nephrolithotomy

1. Introduction

A jackstone is a type of urinary calculus known for its distinctive shape [1] [2]. Initially described in veterinary pathology, jackstones have also been observed in human cases, though they are rarely reported [3]. In addition to its unique shape, it exhibits a very hyperdense appearance on the CT scans. It is most commonly found in the bladder and is secondary to urinary stasis [4]. It can also occur in the kidney, where it is similarly associated with urinary stasis [2]. The association of urolithiasis with its mechanical etiology necessitates selecting a surgical technique that can effectively manage both conditions [2]. This report presents a case of a

jackstone located in the renal calyx, caused by a large renal cyst. The patient was treated through open surgery in our department.

2. Observation

A 73-year-old male with a history of poorly managed high blood pressure presented with intermittent, fever-free right lumbar pain that had been ongoing for 3 years. He had no lower urinary tract symptoms (LUTS) and no haematuria associated with the pain. On clinical examination, the patient with a normal BMI, with tenderness on deep palpation of the right flank. Serum creatinine levels indicated normal renal function. A cytobacteriological examination of the urine showed no haematuria or evidence of urinary tract infection. An ultrasound of the urinary tract suggested the presence of a renal calculus, accompanied by right hydronephrosis. The prostate volume was 40 g with no post-void residual urine. Uro-CT scanning revealed a large 60 mm-long Bosniak 1 cyst in the right kidney, along with a jackstone-type calculus located in a renal calyx, measuring 15 mm in length (**Figures 1-4**). Its density was greater than 1000 Hounsfield units. Marsupialization of the cyst, along with nephrolithotomy was planned. Open surgery via lumbotomy was performed. Intraoperatively, a simple medio-renal cyst containing clear fluid was found. After draining the cyst, the calculus was palpable beneath the cyst wall. The cyst wall was excised, and the calculus was removed (**Figure 1**). Postoperatively, ultrasound scans were conducted at 1 and 3 months, both of which were normal. The patient remained pain-free and was declared "stone-free." There has been no recurrence after one year.

Figure 1. Jackstone-type right caliceal renal calculus (non-contrast phase).

Figure 2. Jackstone Jackstone-type right caliceal renal calculus (contrast-enhanced phase).

Figure 3. Large compressive kidney cyst (front view).

Figure 4. Large compressive kidney cyst on the right (profile view).

Figure 5. Kidney disease with jackstone-type calculus post-nephrolithotomy.

3. Comments

Jackstone-type urinary stones are rare and are typically located in the bladder or kidney as a result of urinary stasis [5] [6]. Renal localization is even rarer and most often affects the renal pelvis [2]. Our patient presented with a jackstone urinary calculus located in a calyx. Jackstone calculi are considered stasis calculi, and any cause of urinary tract obstruction can lead to urinary stasis and stone formation [7]. These stones can take various forms, including the jackstone type. Urinary tract obstructions, such as those caused by prostate pathologies or pyelo-ureteral junction syndrome, have been reported to lead to such stasis [8]. In this case, the patient had a large medio-renal cyst. The size and location of this cyst caused an obstruction of the calyx, resulting in intra-calyceal urinary stasis, which explains the formation of the stone. Jackstones are largely composed of calcium oxalate and are highly radiopaque [3]. In our patient, the density of the urinary calculus exceeded 1000 Hounsfield units. The reference surgical treatment for urinary calculi is minimally invasive surgery [9]. In this case, minimally invasive surgery would not have been able to provide comprehensive, single-stage care for the patient. Laparoscopy carries a significant risk given the size of the cyst and its association with lithiasis. Ureteroscopy and percutaneous nephrolithotomy (PCNL) were not feasible in this context, as the cyst made the stone inaccessible. Extracorporeal lithotripsy (ECL) was also a viable option due to the risk of rupturing the renal cyst and its limited effectiveness given the density of the kidney stone. Therefore, none of these minimally invasive techniques seem suitable for offering complete treatment in a single surgical procedure. However, several factors led to the choice of open surgery in this case, including the specific shape of the calculus, its high density, its intra-calyceal location, its size, and its association with a renal cyst. The open surgery, performed via lumbotomy, enabled the removal of the calculus and the marsupialization of the renal cyst in a single procedure, ensuring

good bleeding control and a reduced operating time. This approach was especially advantageous given our limited resources.

4. Conclusion

A jackstone is a rare type of urinary calculus, typically resulting formed as a result of urinary stasis, regardless of its location. Understanding its formation mechanism is crucial for determining an effective therapeutic approach.

Acknowledgements

Our thanks to Chalhoub Khalil for his contribution.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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