Urology Case Reports 49 (2023) 102442

Contents lists available at ScienceDirect

Urology Case Reports

journal homepage: www.elsevier.com/locate/eucr

Endourology

Giant calyceal diverticulum with an extra-renal component: A case report

David Romeiro Victor [a,*], Carlos Antonio de Souza Filho [b], Rafael de Albuquerque Pereira de Oliveira [b], Guilherme José Alencar Amorim [b], Claudino Rodrigues dos Santos Júnior [b], Francisco José Cardoso Cavalcanti [b]

[a] Universidade de Pernambuco, Recife, Pernambuco, Brazil
[b] Hospital Universitário Oswaldo Cruz, Recife, Pernambuco, Brazil

ARTICLE INFO

Keywords:
Calyceal diverticulum
Diverticulum
Kidney
Laparoscopy

ABSTRACT

Calyceal diverticula are urine-filled non-secretory cavities that result from outpouchings of the kidney's calyx or pelvis. These cavities lie in the renal parenchyma and are linked to the kidney's collecting system through a narrow channel. They are generally small in size and present without symptoms. Here, we report the case of a middle-aged patient who was diagnosed, following imaging exams, with a giant calyceal diverticulum presenting with an extra-renal component, a remarkably rare finding. The patient's condition was successfully treated through excision by laparoscopic surgery.

1. Introduction

A calyceal diverticulum is a non-secretory cavity that results from the outpouching of the kidney's calyx or pelvis.[1] It lies in the renal parenchyma, being passively filled with urine through a narrow channel that links it with the kidney's collecting system.[1] It's a rare finding, with an incidence of 0,45% reported in a study by Timmons et al., in 1975, which examined 16,000 intravenous urograms.[2] In the same study, it was also found that stone formation occurred inside the diverticulum in 39% of cases.[2] Typically, calyceal diverticula are small in size, measuring on average 1.72 cm.[1] However, here we present an extremely rare case of a patient diagnosed with a giant calyceal diverticulum, measuring 8.0 × 3.7 cm in total, and featuring an extra-renal component. The patient successfully underwent laparoscopic surgery to remove the diverticulum.

2. Case presentation

A 51-year-old Brazilian female patient with a previous history of chronic kidney disease was referred to a Urology outpatient service complaining of low back and abdominal right flank pain for approximately six months. On physical examination, she demonstrated pain upon deep palpation of the right abdominal flank. A computerized tomography scan (CT) discarded the presence of lithiasis or hydronephrosis in the right kidney but questioned a right renal anatomical variation (Fig. 1).

Magnetic resonance imaging (MRI) of the upper abdomen and pelvis identified a fusiform formation located between the lower pole of the right kidney and the proximal portions of the pelvic cavity anteriorly to the iliopsoas muscle, exhibiting cystic characteristics, appearing to originate from the lower region of the right kidney and measuring approximately 8.0× 3.7 cm in the longest longitudinal and transverse axes respectively (Fig. 2) (Fig. 3). Furthermore, it was also observed that the formation was in continuity to the kidney's inferior pyelocaliceal system through an anomalous anterior narrow path. This connection was then confirmed during the excretory phase of the exam when the structure was completely filled with contrast. (Fig. 2) (Fig. 3). Finally, the formation didn't reduce in size after vesical drainage.

The patient was diagnosed with a giant calyceal diverticulum that included a large component that was outside the normal kidney topography. Laparoscopic surgery was conducted to remove the anomaly. During the procedure, a pedunculated and elongated cystic structure originating from the lower pole of the right kidney and extending into the pelvis was identified. The structure was carefully dissected, clipped, and excised. Postoperatively, the patient developed fever and leukocytosis and was started on antibiotic therapy with ceftriaxone. After finalizing antibiotic treatment, as the patient presented with stable laboratory exams and no signs of infection, she received hospital discharge. In outpatient follow-up, the retrieval of the anatomopathological examination of the tissue gathered during surgery ruled out any

* Corresponding author. Faculdade de Ciências Médicas da Universidade de Pernambuco, 310 Rua Arnóbio Marques, Recife, Pernambuco, 50100-130, Brazil.
E-mail address: davidrvictor98@gmail.com (D. Romeiro Victor).

https://doi.org/10.1016/j.eucr.2023.102442
Received 27 April 2023; Accepted 21 May 2023
Available online 22 May 2023

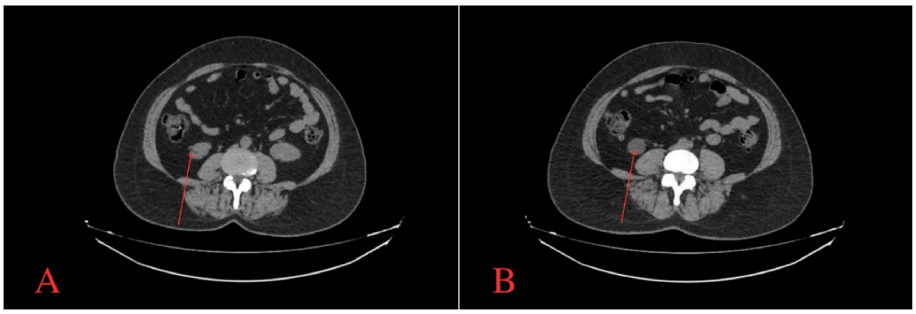

Fig. 1. CT without contrast. (A) The red arrow points to a transcortical path connecting the right kidney's inferior pole to an anomalous cystic formation. (B) The red arrow points to a cystic formation with no apparent vesical or ureteral linkage. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

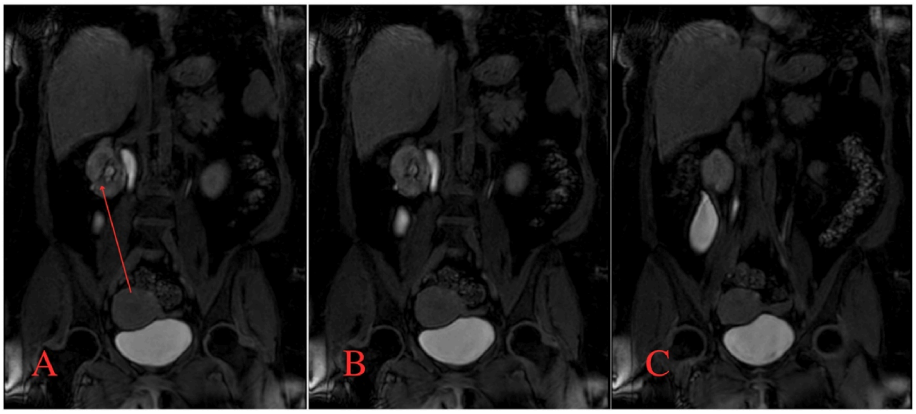

Fig. 2. Coronal plane of post-contrast infusion MRI displaying a narrow channel with an anterior pathway originating from the kidney's inferior pyelocaliceal system (A) that leads to a large elongated structure that completely fills with contrast (B and C).

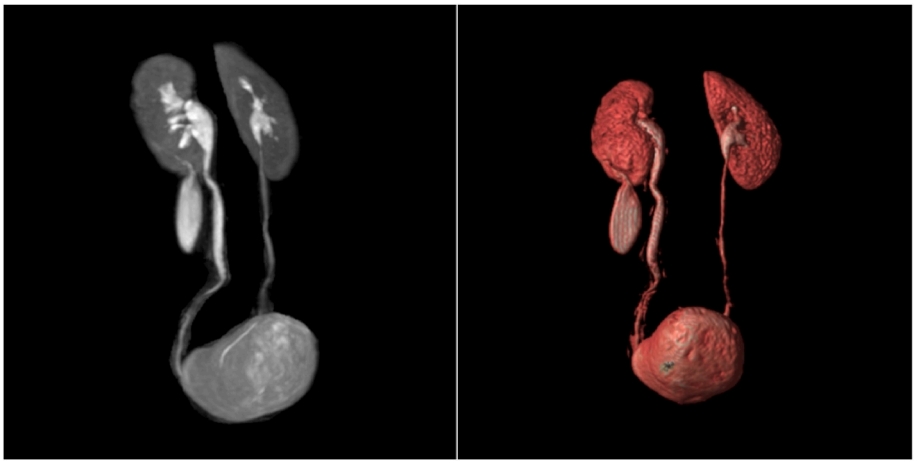

Fig. 3. 3D reconstruction of a contrast-enhanced MRI displaying a large fusiform extra-renal structure that fills with contrast during the excretory phase of the exam.

signs of malignancy.

3. Discussion

The etiology of calyceal diverticula formation remains disputed, with potential explanations ranging from congenital to acquired causes.[1] One possible embryologic origin is the failure of late ureteral bud divisions to degenerate during embryonic development.[2] On the other hand, acquired causes suggested include sphincter dysfunctions, trauma, infundibulum fibrosis, and obstruction resulting from lithiasis or infection.[1]

The imaging presentations of calyceal diverticula vary depending on the modality chosen.[3] When contrast is employed, the diverticulum fills by retrograde reflux through the connection between the kidney's collecting system and the diverticulum's neck.[3] This phenomenon can be observed during the excretory phase of contrast-enhanced CT.[3] In our case, the diagnosis was made using a contrast-enhanced MRI, which confirmed the retrograde filling of the diverticulum.[3]

As already mentioned, cases of calyceal diverticula are typically confined to the renal parenchyma. Nonetheless, a case involving a large extra-renal extension was previously reported in a 5-year-old child.[4]

Similarly, our patient also presented with a giant lower pole calyceal diverticulum that extended outside the normal kidney topography and into the pelvis, a remarkably rare finding.

Although patients with calyceal diverticulum usually don't exhibit symptoms, they can be present and include pain, urinary infection, and hematuria.[1] For these patients there are several treatment routes, and the optimal choice depends on factors such as the diverticulum's size and location, the presence of calculi, and the patient's clinical condition.[5] Laparoscopic surgery is one of these options and was the intervention employed successfully in our patient. The technique has been previously described in the literature with good symptom-free and stone-free outcomes and without major complications.[5] Still, some authors recommend reserving laparoscopy for selected cases when other minimally invasive options aren't reliable.[5]

4. Conclusion

To the best of our knowledge, this is the second case reported of a calyceal diverticulum presenting with an extra-renal component. Surgery through laparoscopy was successful in dealing with the anomaly.

Consent

Informed consent was taken from the patient to write this report.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Sectional headings

Oddities; Congenital Anomalies/Anatomical Variants.

CRediT authorship contribution statement

David Romeiro Victor: Conceptualization, Data curation, Writing – original draft, Project administration. **Carlos Antonio de Souza Filho:** Conceptualization, Data curation, Writing – original draft. **Rafael de Albuquerque Pereira de Oliveira:** Conceptualization, Data curation, Writing – original draft. **Guilherme José Alencar Amorim:** Writing – review & editing, Visualization. **Claudino Rodrigues dos Santos Júnior:** Writing – review & editing, Visualization. **Francisco José Cardoso Cavalcanti:** Supervision, Validation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

1. Waingankar N, Hayek S, Smith AD, Okeke Z. Calyceal diverticula: a comprehensive review. *Rev Urol*. 2014;16(1):29–43.
2. Timmons Jr JW, Malek RS, Hattery RR, Deweerd JH. Caliceal diverticulum. *J Urol*. 1975;114(1):6–9. https://doi.org/10.1016/s0022-5347(17)66930-1.
3. Mullett R, Belfield JC, Vinjamuri S. Calyceal diverticulum - a mimic of different pathologies on multiple imaging modalities. *J Radiol Case Rep*. 2012;6(9):10–17. https://doi.org/10.3941/jrcr.v6i9.1123.
4. Ferroni MC, Rycyna KJ, Dwyer ME, Schneck FX. Calyceal diverticulum with a large extra-renal extension in a 5-year-old child. *Urology*. 2015;85(1):230–232. https://doi.org/10.1016/j.urology.2014.09.015.
5. Rapp DE, Gerber GS. Management of caliceal diverticula. *J Endourol*. 2004;18(9):805–810. https://doi.org/10.1089/end.2004.18.805.