

Renal Pelvis Epidermoid Cyst Mimicking Staghorn Calculus: Successful Treatment with Percutaneous Approach (PCN)

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Abstract

Background: Renal pelvis epidermoid cysts are extremely rare and often misdiagnosed as stones or tumors. Only one previous case has been treated via the percutaneous approach (PCN).

Case Presentation: A 67-year-old diabetic female on Empagliflozin presented with imaging suggestive of a staghorn calculus. During Percutaneous Nephrolithotomy (PCNL), whitish keratinous material was found in the renal pelvis along with a small obstructing stone. All material was evacuated through the Amplatz sheath. Urine culture was negative. Histopathology confirmed an epidermoid cyst. Postoperative CT scan at one month showed complete resolution.

Discussion: Epidermoid cysts can mimic staghorn calculi radiologically. A Fungal ball was initially suspected due to diabetes and SGLT2 inhibitor therapy, but radiopacity, negative culture, and histology ruled this out. PCNL served as both a diagnostic and therapeutic procedure, preserving renal function.

Conclusion: Renal pelvis epidermoid cysts should be considered in the differential diagnosis of opaque pelvic lesions. PCNL is a minimally invasive, kidney-preserving treatment that can be performed as a renal-sparing procedure.

Introduction

Epidermoid cysts are common in the skin but rare in the renal pelvis. Most reported cases have been managed with radical or partial nephrectomy due to suspicion of malignancy.

⁽¹⁻³⁾. Only one previous case has described management using Percutaneous Nephrolithotomy (PCNL) ⁽⁴⁾. We report the second such case, highlighting the diagnostic challenge and minimally invasive management in a diabetic patient on Empagliflozin,

which increases the risk of urinary tract infections. ⁽⁵⁾ We emphasize that this benign condition can be treated using the percutaneous approach.

Case Presentation

A 67-year-old female with type 2 diabetes on Empagliflozin presented with intermittent flank pain. She had no history of fever or weight loss. Ultrasound and CT scan suggested a staghorn calculus. (Fig 1) Urine culture was negative.

The patient was scheduled for PCNL. Under general anesthesia, a 6-French ureter catheter was inserted into the right pelvis using a cystourethroscope. Then, percutaneous access was performed in the prone position under ultrasound guidance. The tract was dilated using a 10-French dilator, and then a 30-French dilator was introduced on an Alken metal antenna as previously reported. ⁽⁶⁾ Finally, a 30-French access sheath was introduced over the Amplatz dilator, and nephroscopy started using a 28-French Wolf nephroscope. At this step, we noticed whitish keratinous material in the calyces and pelvis. (Fig 2) These materials were removed completely, and fluoroscopy confirmed no residual particles. The lesion did not show any connection with the urothelium, and no unusual bleeding occurred. A small renal pelvis stone was also removed. With suspicion of probable infection, the materials were sent for culture, which later revealed negative results. Histopathological examination of the specimen showed a cyst lined by keratinizing stratified squamous epithelium with lamellated keratin debris, confirming an epidermoid cyst. (Fig 3) One-month postoperative CT-Scan demonstrated complete resolution. (Fig4)

Discussion

Epidermal cysts of the pyelocaliceal system are exceedingly rare and may radiologically resemble renal calculi. In cases presenting with filling defects within the renal pelvis, differential diagnoses should include calculi, blood clots, neoplasms, tuberculosis, and fungal balls. In our patient, preoperative ultrasonography and CT imaging suggested a renal calculus. Intraoperatively, the presence of whitish material within the pelvis raised the suspicion of a fungal ball, particularly given the patient's diabetes and Empagliflozin therapy, which is associated with an increased risk of urinary tract infections. However, histopathological evaluation ultimately confirmed an epidermoid cyst. Unlike fungal balls, which are usually radiolucent and seldom calcified, epidermal cysts can appear radiopaque. Some reports show fungal balls may be effectively managed through PCNL. ⁽⁷⁾ We report here that epidermal cysts may also be successfully treated with this less invasive approach.

Most previous cases were treated with nephrectomy due to suspicion of malignancy ^(1, 3). Kim et al. (2004) reported the first case that was diagnosed as a renal stone and managed with PCNL, demonstrating that the cyst could be evacuated minimally invasively while preserving renal function ⁽⁴⁾. In their patient, residual fragments were detected in the postoperative radiography, and the patient was scheduled for periodic follow-up. In contrast, our patient's postoperative CT scan was completely normal at the one-month follow-up. To the best of our knowledge, we report the first case of complete removal of the lesion percutaneously.

Our case adds several unique aspects: the patient was diabetic on Empagliflozin, which initially led to suspicion of a fungal ball; there was a coexisting small pelvis stone treated simultaneously; and postoperative CT confirmed complete resolution. This reinforces PCNL as both a diagnostic and therapeutic approach for rare renal epidermoid cysts.

Renal tuberculosis (TB) is another rare but important differential diagnosis for radiopaque renal lesions. TB may present with hematuria, flank pain, and non-specific imaging findings such as calcifications in the renal pelvis, which can mimic staghorn calculi or cystic lesions. Gao et al reported a case of lower pole cystic lesion mimicking TB abscess, which was treated by partial nephrectomy after empirical medical treatment with anti-TB medications. The pathological evaluation showed an epidermal cyst ⁽²⁾. It should be noted that TB lesions are often associated with parenchymal scarring, ureteral strictures, and systemic signs such as fever or weight loss. Sterile pyuria and high ESR may be present. In our patient, the absence of systemic symptoms, negative urine cultures, and histopathology confirming an epidermoid cyst excluded TB as a possible diagnosis. However, awareness of renal TB is essential, particularly in endemic regions, to avoid misdiagnosis, unnecessary interventions, and the possible risk of sepsis after surgery in an untreated patient ⁽⁸⁾.

Conclusion

This is the second reported case of a renal pelvis epidermoid cyst treated via PCNL. Awareness of this rare entity, especially in diabetic patients with suspected fungal balls or stones, can prevent misdiagnosis and unnecessary radical surgery.



Figure 1 – Preoperative CT: Dense renal pelvis and lower pole opacity mimicking staghorn calculus.

a

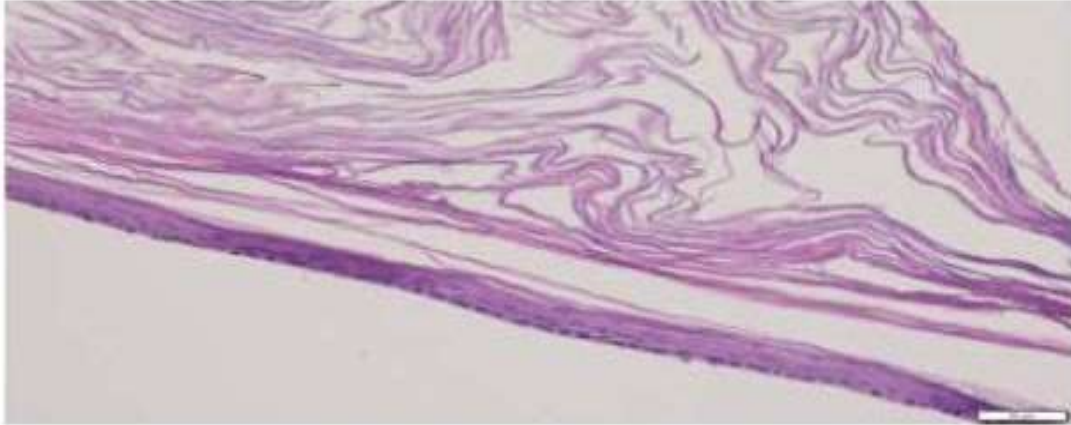


b



Figure 2 – Intraoperative PCNL: Whitish keratinous material evacuated through Amplatz sheath.

a



b



c

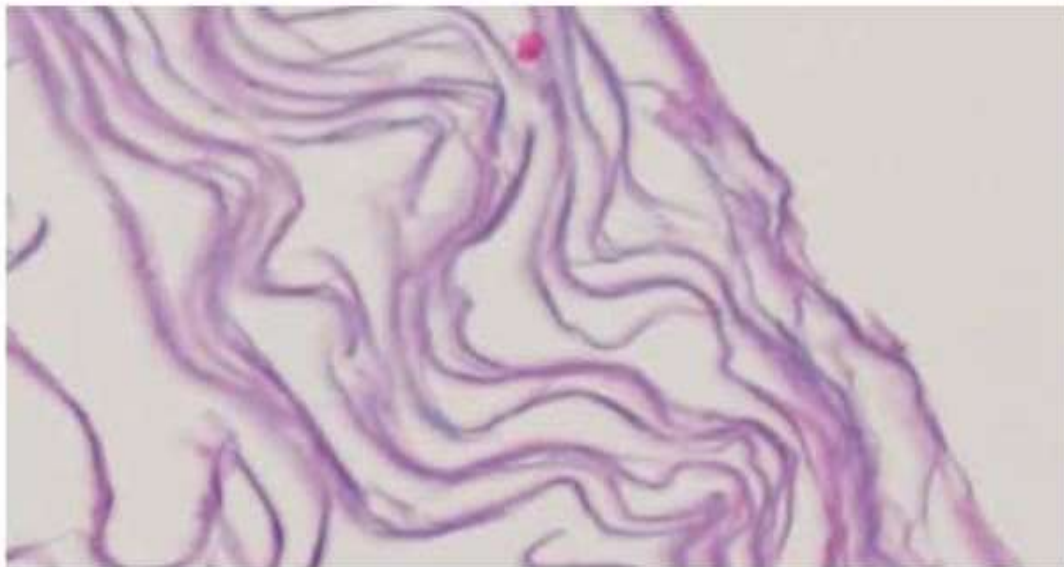


Figure 3 – Histopathology: cyst lining by a stratified squamous epithelium contains keratin material

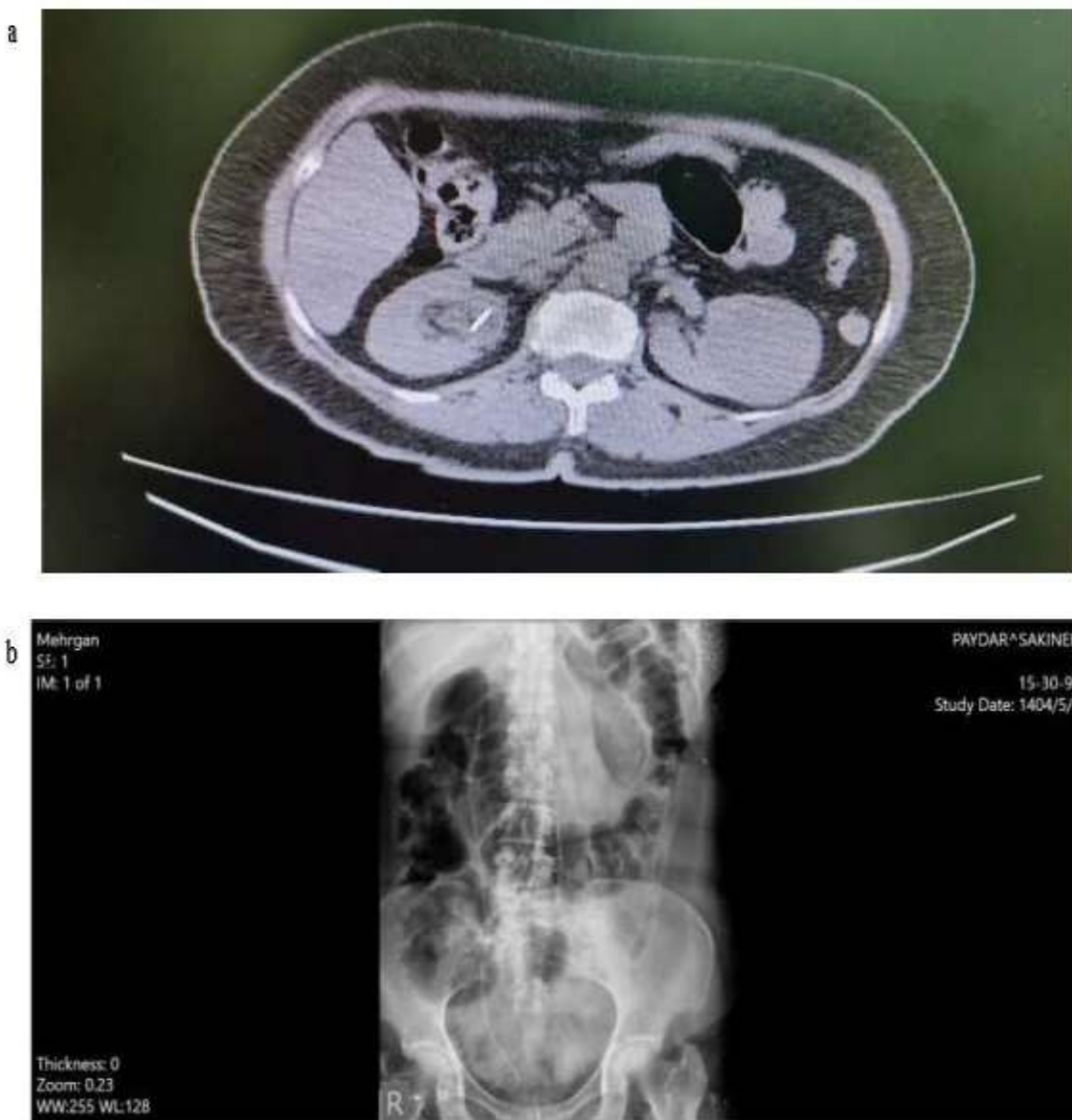


Figure 4 – Postoperative CT (1 Month): no residual component of renal pelvis lesion. Double J Stent is observed in the pelvis

References

- (1) D, P., S, S., S, S., al., e.: Epidermoid Cyst of the Renal Pelvis Masquerading as Malignancy. *Indian J Pathol Microbiol*, **60**: 571, 2017
- (2) J, G., Y, L., J, Z., al., e.: Renal Epidermoid Cyst Mimicking Renal Tuberculous Abscess: A Case Report. *Front Med*, **12**: 1632764, 2025
- (3) KI, A.-O., al., e.: Epidermoid cyst of the kidney: case report and literature review. *Urol Ann*, **6**: 245, 2014

- (4) SZ, K., TI, P., SH, L., JS, K.: Epidermoid Cyst in the Renal Pelvis: A Case Report. Korean J Pathol, **38**: 270, 2004
- (5) JF, L., al., e.: SGLT2 inhibition and risk of genital and urinary tract infections. Diabetes Care, **32**: 2013, 2009
- (6) Nouralizadeh, A., Pakmanesh, H., Basiri, A. et al.: Solo Sonographically Guided PCNL under Spinal Anesthesia: Defining Predictors of Success. Scientifica (Cairo), **2016**: 5938514, 2016
- (7) Karlin, G., Rich, M., Lee, W. O. N., Smith, A. D.: Endourological Management of Upper-Tract Fungal Infection. Journal of Endourology, **1**: 49, 1987
- (8) PB, P., al., e.: Renal tuberculosis: a review of radiological features and management. Indian J Urol, **32**: 50, 2016