CASE REPORT

Prostatic abscess: a rare complication of staghorn calculi

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SUMMARY

A staghorn calculus is a calculus accommodating the majority of a renal calyx extending into the renal pelvis. A conservative approach to its treatment may lead to high morbidity and mortality rates. Such morbidity usually manifests with renal failure, obstructed upper urinary tract and/or life-threatening sepsis. Prostatic abscesses have never been associated with staghorn calculi in the literature. We report a case of a 70-year-old man who presented with sepsis, which was found to originate from a complex prostatic abscess. The patient had no history of urinary tract infections or risk factors. The authors believe that the incidentally identified staghorn calculi promoted the growth of *Proteus mirabilis* which led to the development of the prostatic abscess. The patient underwent a transurethral resection and drainage of the abscess following a failed course of antibiotic therapy. This case also highlights the paucity of guidelines available in treating prostatic abscesses.

BACKGROUND

A staghorn calculus is a calculus accommodating the majority of a renal calyx extending into the renal pelvis. Presenting symptoms may range from asymptomatic to flank pain and sepsis. The treatment of staghorn calculus is based on multiple factors, including stone burden, location, functionality of affected kidney and patient fitness.¹

The recommended approach for a staghorn calculus by the American Urological Association is by a percutaneous nephrolithotomy (PCNL).² A PCNL is however not without its risks, with a reported complication rate of up to 83%,³ which may include pleural effusions, haemothorax, perinephric haematoma and pseudoaneurysm.⁴ Conversely, a conservative approach is not necessarily a safe alternative, with landmark papers concluding^{5,6} very poor outcomes for conservative management of staghorn calculi; however, newer evidence suggests the prognosis to be less bleak.⁷

Complications of an untreated staghorn calculus may mean repeated admissions, recurrent urinary tract infections, sepsis, progressive renal failure, dialysis dependence and a need for a nephrectomy.⁵⁻⁷ However, a prostatic abscess as sequelae of a staghorn calculus has never been documented in the literature. We present such a case and our experience in managing this complication in a district general hospital in the UK.

CASE PRESENTATION

A 70-year-old man with a background of a cerebrovascular accident (CVA), gallstones and diverticular disease, presented to the acute medical team with an exacerbation of his CVA symptoms (as reported by worsening hemiparesis) deemed secondary to a systemic infection. Shortly after admission, the patient began to exhibit features of sepsis with no specific symptoms. This was concluding by the rising white cell count (WCC) and high temperatures. A clinical history and examination did not clarify the source of the infection, and the patient was being treated with intravenous antibiotics for sepsis of unclear origin.

INVESTIGATIONS

Laboratory tests revealed a progressively rising WCC up to $19.7 \times 10^9/L$ and a C reactive protein (CRP) of 219 mg/L. A CT scan of the head revealed no evidence of an acute stroke. In view of mildly deranged Liver Function Tests (alkaline phosphatase 147 U/L, gamma-glutamyl transpeptidase 121 U/L), an ultrasound of the abdomen was performed to exclude a biliary cause of the sepsis. The ultrasound however reported a multiloculated bladder and a right-sided staghorn calculus instead. Following a liaison with the urology team, a CT urinary tract with contrast was performed for further clarification; which suggested an enlarged prostate gland of 10 cm in transverse diameter with multiple rim enhancing septate fluid collections as well as the right-sided staghorn calculus (figures 1 and 2).

DIFFERENTIAL DIAGNOSIS

- Cholecystitis/cholangitis.
- Urinary tract infection/obstructed urolithiasis.
- Cranial abscess.

TREATMENT

The sepsis was treated as per local guidelines, and the patient began to recover with 8 days of intravenous antibiotics. In view of the clinical improvement, the patient was switched to a broad spectrum quinolone following guidance from the microbiology department. The sepsis unfortunately relapsed and appeared to persist despite the antibiotic therapy. A digital rectal examination failed to release any purulent material. Urine cultures grew *Proteus mirabilis* which was sensitive to the quinolone. The presence of a *Proteus* organism was consistent with infective urolithiasis, which likely led to the development of

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Figure 1 An axial section of the CT scan revealing the staghorn calculus in the right kidney.

the prostatic abscess. Two blood cultures taken did not yield any bacterial growth. In view of the abscess being multiloculated, a decision was made to undertake a transurethral resection (TUR) of the prostatic abscess rather than a needle aspiration.

OUTCOME AND FOLLOW-UP

The patient made a remarkable recovery postsurgery and was subsequently discharged. His WCC settled to $7.8 \times 10^9/L$ and CRP 15 mg/L on discharge. In view of his poor mobility secondary to his previous CVA, the patient opted for a long-term catheter despite of the risk of future prostatic abscess.

The patient was not previously investigated or identified to have urolithiasis. He did not have a history of immunosuppression, urological instrumentation or a long-term catheter that may have made him susceptible to a prostatic abscess. The patient was deemed not suitable for surgical treatment of the staghorn calculus. No recurrence of the prostatic abscess has yet been reported in the patient.

DISCUSSION

Prostatic abscess is an uncommon diagnosis in this modern world. Its incidence is reported to be 0.5%–2.5% in all prostatic diseases.^{8–11} Like all abscesses, prostatic abscess is often associated with patients with diabetes and are immunocompromised,

Figure 2 A coronal section of the CT scan depicting a grossly enlarged prostate gland with multiple rim enhancing septate fluid collections.

which was not a feature seen in our case. More interestingly, prostatic abscesses have been reported in patients who had melioidosis infection,¹² coccidioidomycosis infection,¹³ postsalvage cryotherapy for prostate cancer¹⁴ and even in a child.¹⁵ A secondary cause to a staghorn calculus has not been reported before in the literature. The most common offensive pathogens in the antibiotic era tend to be *Escherichia coli* and *Staphylococcus*, unlike the *P. mirabilis* which we have encountered in our case.¹⁶

Dell'Atti has proposed a classification of prostatic abscess in his paper.¹⁷ He has proposed five different types of classifications of prostatic abscess based on ultrasound findings. Type I is a prostatic abscess present focally in a prostate lobe (≤ 10 mm); type II is a prostate abscess that is present in a prostate lobe (> 10 mm) and/or partially crosses the border of the midline prostatic glandular; type III is prostate abscess is present in both glandular lobes form of multifocal areas (≤ 10 mm); type IV is prostatic abscess is present in both glandular lobes form of multifocal areas (> 10 mm) and, last and not least, type V is a prostatic abscess involving intraprostatic or extraprostatic structures such as the bladder, urethra, seminal vesicles and prostatic capsule. Using this classification criteria, our case likely represents a type III, although our patient had a CT scan instead of an ultrasound scan.

Currently, there remain no guidelines for the management of a prostatic abscess. Treatment for prostatic abscess can be conservative with antibiotics or surgical treatments which include, TUR drainage, transperineal drainage, transrectal drainage and open perineal drainage. A review of 52 patients concluded that TUR drainage offers shorter hospitalisation than a transrectal needle-guided aspiration or antibiotic therapy alone.¹⁸ Another review conferred that TUR drainage of prostatic abscesses had better outcomes and do not necessarily warrant further procedures to treat the prostatic abscess, relative to ultrasound-guided transrectal and perineal drainage.¹⁹ However, performing a TUR drainage has its own complications, such as urethral strictures and urethral diverticulum as reported.²⁰

Treatment of a prostatic abscess must be aggressive to minimise morbidity and mortality.²¹ Mismanagement or a conservative approach may progress to form an intraperitoneal pelvic abscess.²² The urine sent from the TUR resection of the abscess did not yield any microorganism growth, likely due to the concurrent usage of intravenous antibiotics. A previous growth of proteus only 6 days prior to the TURP would be the likely pathogen for the abscess. Proteus in the urinary tract may lead to struvite calculi formation by its urease activity and may also be a consequence of persistent stone disease (struvite or non-struvite stones).^{23 24} In the absence of previous urinary tract infections or risk factors (long-term catheters, immunosuppression or urological instrumentation, etc); we feel that staghorn calculus led to the proteus presence, which eventually led to the prostatic abscess formation. This suggests a very unusual presentation of

Learning points

- ▶ Staghorn calculi may have several serious complications including prostatic abscesses.
- ▶ There is a need for better clinical awareness of recognising the salient features of prostatic abscess and the treatment options available for it.
- ▶ There is a need to create guidelines on the management of prostatic abscesses.

a staghorn calculus. Unfortunately, no stone sample was isolated for biochemistry analysis with the caveat that the presence of a non-struvite stone would be in keeping with our proposed hypothesis. We therefore emphasise the importance of addressing the presence of concurrent stone disease in the primary and secondary prevention of sepsis in the form of a prostatic abscess.

Contributors MKQ: identified case, manuscript drafting and literature review. YCP: literature review and consenting patient. WA: data collection and manuscript review. NL: senior author and manuscript review.

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