Painless penile periurethral polymicrobial abscess causing urinary retention

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Introduction

Periurethral abscesses are rare in contemporary urological practice. They are often preceded by urethritis and associated etiological factors that include obstruction, trauma, urethral diverticula and urethral carcinoma.1,2 The proposed pathophysiology is predicated on the susceptibility of the pseudo-stratified columnar epithelium to microbial adherence with subsequent epithelial disruption allowing progression to the periurethral glands.3 Delayed detection and treatment may lead to complications such as urethral fistula, stricture and rarely, necrotizing fasciitis.1–3 We report a case of a periurethral abscess, with an atypical presentation, successfully treated with open surgical management.

Case presentation

A 61-year-old male with incomplete C3/C4 tetraplegia on long-term intermittent self-catheterization presented to our hospital unable to pass catheters urethrally. On further questioning, he revealed a two-week history of fevers, malaise and a painless, enlarging mass on the ventral aspect of his proximal penile shaft. Apart from the spinal cord injury (SCI) he had no medical conditions, medications and no previous issues with self-catheterization or urinary tract infections (UTIs). On examination, his temperature was 37.3°C Celsius and had normal observations. A painless, erythematous 3cm × 4cm fluctuant mass was palpable toward the left side of his penoscrotal junction. White cell count was 13.4 × 10^6/L and C-reactive protein was 182 mg/L. For symptomatic relief, a 16-French indwelling Foley catheter was placed with a guidewire using flexible cystourethroscopy. Cystourethroscopy revealed a reduction in urethral diameter due to mass effect and external compression but no evidence of fistulae, diverticulum or stricture.

Urine microscopy demonstrated >500 × 10^6/L leucocytes, 360 × 10^6/L erythrocytes and <10 × 10^6/L epithelial cells. An infectious process was suspected and intravenous piperacillin-tazobactam 4.5 g 6 hourly was commenced empirically. His urine culture grew Proteus mirabilis 10^8–10^9 CFU/L and an extended-spectrum beta-lactamase (ESBL) producing Escherichia coli 10^8 CFU/L (Table 1). Ultrasonography revealed a 4cm × 1.5cm x 3.5cm hypoechoic area within the corpus spongiosum (Fig. 1A and B). The patient became febrile to 38.9°C Celsius and bedside needle aspiration at this time produced 20 mls of purulent exudate confirming a diagnosis of periurethral abscess.

Incision and drainage under general anaesthesia yielded 50 mls of purulent fluid; there was no macroscopic urethral disruption or communication identified. Primary closure was achieved, and a temporary drain left in-situ. Intra-operative swab cultures from the abscess
Table 1
Urine - isolated organisms & antibiotic sensitivities.

| Escherichia Coli (ESBL-producing) | Amp | PTZ | AUG | CFZ | TMP | NIT | GEN | SXT |
|----------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| R                                | S   | S   | R   | S   | S   | S   | R   |

Amp = Ampicillin, PTZ = Piperacillin-Tazobactam, AUG = Amoxicillin-clavulanic acid, CFZ = Cefazolin, TMP = Trimethoprim, NIT = Nitrofurantoin, GEN = Gentamycin, SXT = Sulfamethoxazole, S = Sensitive, R = Resistant.

The polymicrobial nature of this abscess was particularly unusual, given that Peptostreptococcus asaccharolyticus, Streptococcus constellatus, Haemophilus parainfluenzae and Proteus mirabilis (Table 2). Targeted antibiotics with amoxicillin-clavulanic acid 875/125mg twice daily was instituted for 14 days. 24 months later, the patient was recurrence and complication free.

Discussion

The prevalence along with associated morbidity and mortality due to periurethral abscesses has changed over time, with preceding gonococcal or chlamydial urethritis being more prevalent in the 20th century. Campbell et al. found that 80% of patients with a periurethral abscess had a history of gonococcal urethritis and 84% had a history of a urethral stricture. However, improvements in patient education, widespread testing, contact tracing and antibiotics have led to a decline in sexually transmitted infections and presumably their role in periurethral abscesses. Causative microorganisms in reported cases have included the common abscess forming bacteria Streptococcus species, Escherichia coli, as well as Bacteroides species.

The polymicrobial nature of this abscess was particularly unusual, given that Haemophilus parainfluenzae, despite being a recognized opportunistic pathogen in abscess formation, is usually associated with pediatric urinary infections in the context of anatomical abnormalities and further to this, the anaerobic Peptostreptococcus asaccharolyticus has rarely been associated with urinary tract abscesses. However, both Peptostreptococcus asaccharolyticus and Streptococcus constellatus are commensal organisms on human mucosa and therefore possible pathogens to take part in a polymicrobial abscess. Further, long term self-catheterization is a risk factor for chronic urethral irritation, consequent altered host defense mechanisms and a potentially increased rate of UTIs. In this case, abscess formation was presumed to be due to urethral micro trauma and introduction of bacteria during community-based self-catheterization.

Contemporary risk factors include instrumentation or trauma, chronic diseases (i.e. diabetes) leading to immunosuppression, along with urethral strictures and carcinomas. In urethral stricture, the proposed mechanism involves the generation of high pressure proximal to the stricture and subsequent extravasation of urine or urethral secretions. A more recent trend, particularly in females, has been the occurrence of periurethral abscesses post injection of periurethral bulking agents for stress urinary incontinence with an estimated post-injection prevalence of 22%.

Common symptomatology and signs include pain along with fever, dysuria, pyuria and acute urinary retention. Importantly, if left undiagnosed or untreated, these abscesses can progress to sepsis. The case presented in this report is cautionary given a lack of most of these features, presumably due to the patient’s SCI. In light of this, broad consideration of differential diagnosis for urological presentations in SCI patients is prudent.

Multiple imaging modalities have been documented in the detection of periurethral abscesses including Ultrasound, MRI and CT. On Ultrasound, hallmark features for these abscesses include the presence of cystic structures with mixed echogenicity and on CT, enhancing circular formations with presence of gas or fluid are strong indicators. Additionally, MRI has been demonstrated to be useful for the assessment of periurethral abscesses. However, evidence surrounding imaging modality superiority is lacking and choice appears to be guided by physician preference. Similarly, reporting of management efficacy is limited to descriptive anecdotal evidence, ranging from antibiotic therapy, needle aspiration, or drainage (endoscopic or open). Historically open incision and drainage has been preferred. Despite demonstration of in-vitro susceptibility, treatment failure may be seen with piperacillin-tazobactam and amoxicillin-clavulanic acid when treating ESBL-producing organisms, however, effective source control through incision and drainage was the main component of infection management and likely led to cure.

Conclusion

To our knowledge, this is the first report of a periurethral abscess presenting as a painless penile mass causing urinary retention. The polymicrobial growth in this case highlights the broad etiology and the role of opportunistic pathogens in abscess formation. Periurethral abscesses are a rare but important consideration in assessing penile and perineal masses. Described treatments include antibiotics, aspiration or drainage (endoscopic or open).

Ethical approval

Our institution does not require ethical approval for reporting...
Table 2
Periurethral abscess - isolated organisms & antibiotic sensitivities.

| Prostate mirabilis | Amp | PTZ | AUG | CFZ | TMP | NIT | GEN | SXT |
|------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Heamophilus parainfluenzae | S   | S   | S   | S   | S   | –   | –   | S   |
| Streptococcus constellatus * | S   | S   | S   | S   | –   | S   | –   | S   |
| Peptoniphilus asaccharolyticus * | S   | S   | S   | S   | –   | –   | S   | –   |

Amp = Ampicillin, PTZ = Piperacillin-Tazobactam, AUG = Amoxicillin-clavulanic acid, CFZ = Cefazolin, TMP = Trimethoprim, NIT = Nitrofurantoin, GEN = Gentamycin, SXT = Sulfamethoxazole, S = Sensitive, R = Resistant. *Streptococcus constellatus & Peptoniphilus asaccharolyticus are reliably sensitive to penicillins, further sensitivities were not undertaken.

individual cases or case series.

Consent

Informed consent was obtained from the patient for the anonymised information to be published.

Guarantor

AT is the guarantor and willing to take full responsibility for the article, including for the accuracy and appropriateness of the reference list.

Author contribution

All authors (AT, AGS, PET, BFM, NTD, MJR) contributed to conception and design of this manuscript, along with contributions to generation, collection, assembly, analysis and/or interpretation of data. All authors assisted in drafting and revision of the manuscript and read and approved the final manuscript.

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