Procedural approaches to drainage of prostatic abscesses

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Prostatic abscesses are a rare complication of acute prostatitis, and an uncommon clinical entity in the antibiotic era. Despite their rarity, untreated abscesses still remain potentially life-threatening, and require formal drainage to permit resolution. The transurethral approach to drainage used in the past has more recently given way to percutaneous interventions aided by trans-rectal ultrasonography. Although none of the currently-used strategies have proven ideal for complex cases, improved imaging techniques are expected to further increase the efficacy of percutaneous interventions and establish them as the standard of practice for treating prostatic abscesses.

Introduction

Prostatic abscesses (PAs) are defined by the accumulation of purulent material in one or more focal areas of the prostate. With the advent of antibiotic therapy in the twentieth century, PA has become a rare clinical entity. However, it can still present as a complication of acute bacterial prostatitis, which itself is thought to be caused by intraprostatic urinary reflux, ascending urethral infection, or hematogenous spread from an infection elsewhere in the body. Left untreated, PAs can rupture and progress to sepsis, as well as fistulization of the bladder, urethra, and rectum. Thus, the need for expeditious diagnosis and treatment is not to be underestimated.

Symptoms of PA often mimic those of acute bacterial prostatitis (ABP) – fever, dysuria, low back and perineal discomfort, and pain upon palpation of the prostate. In the course of a digital rectal exam, the abscessed prostate is usually discovered to be enlarged, and sometimes fluctuant. The use of transrectal ultrasound or other imaging modalities such as computed tomography (CT) can provide radiological confirmation of the abscess even in the absence of prostatic fluctuation. On occasion the condition is suspected when the patient fails to respond to appropriately selected antimicrobial coverage.

Before the introduction of inexpensive and readily-available antibiotics, prostatic abscesses were often seen in sexually active young men as a result of infection with Neisseria gonorrhoeae. Because of the lack of diagnostic and interventional strategies, many patients presented with systemic infection due to spontaneous rupture of the abscess into nearby structures and cavities, and mortality has been estimated to have been as high as 30%. More recently, the advent of antibiotic therapy has seen a marked decrease in the morbidity and mortality associated with PA, as well as concomitant changes in bacteriology and epidemiology. The most common organisms now encountered include Escherichia coli and Staphylococcus aureus, and the disease is classically found in older men with predisposing factors such as diabetes, ongoing dialysis, or a history of urethral catheterization.

The microbiological profile of PAs has also shifted in the wake of the increasing prevalence of immunodeficiency. Patients with AIDS have been known to present with abscesses caused by Mycobacterium tuberculosis, and in other settings of immunodeficiency, such as immunosuppression following organ transplantation, organisms cultured from PAs have included Cryptococcus, Aspergillus, and Candida. There is also preliminary evidence indicating that the increasing prevalence of
diabetes in some regions is associated with a higher incidence of PA in younger men,\(^3\) which may reflect a significant ongoing epidemiological change that may be significant in the future.

Variable treatment modalities exist for the drainage of PAs. Transurethral unroofing, transrectal needle aspiration or transperineal needle aspiration are all options currently being used. This article will discuss the indications and methods for each therapeutic approach, as well as their respective risks and benefits.

**Transurethral approach to drainage of prostatic abscess**

Previously employed by urologists as the standard approach, the transurethral technique to drainage of a PA (otherwise known as unroofing) has recently been replaced by percutaneous measures.\(^7\) However, transurethral unroofing of PAs is still employed for persistent abscesses that recur despite minimally-invasive treatment.

![Figure 1](image1.png)

**Figure 1. Transurethral radical prostatectomy is performed with a resectoscope equipped with a diathermy loop. The instrument is passed down the length of the urethra and the resection is performed with constant irrigation.**

The procedure is typically performed under general anaesthesia with the patient in the lithotomy position (Figure 1). An electrosurgical resectoscope armed with either a Colling’s knife or resectoscope loop is utilized to unroof the PAs which often are visibly apparent as a bulging mass.\(^8\) Transurethral approaches to drainage of PAs carry a risk of widespread bacteremia as well as all complications related to general anaesthesia.\(^7\) Patients may also experience retrograde ejaculation and rarely urethral stricture and sphincter dysfunction following the procedure.\(^9\) Additionally, transurethral unroofing is ineffective in patients presenting with peripherally located abscesses and multiloculated abscesses. The location and complexity of these abscesses leads to incomplete drainage through the transurethral approach,\(^10\) a complication that can prove detrimental in immunocompromised patients. One case report has recommended the usage of sonographic guidance in conjunction with transurethral unroofing to treat complex abscesses; however, this has not been validated by further studies.

**Transrectal approach to drainage of prostatic abscess**

The first of two percutaneous methods to drain PAs, the transrectal approach utilizes a transrectal ultrasound (TRUS) to guide a needle through the rectal wall and into the PA for drainage (Figure 2). The procedure is performed under local anaesthesia with the patient in the left lateral decubitus position.\(^11\) Lavage following drainage allows for antibiotics to be introduced directly into the post-drainage cavity.

![Figure 2](image2.png)

**Figure 2. Transrectal drainage of a prostatic abscess using a transrectal ultrasound guided needle.**

In contrast to transurethral unroofing, the transrectal approach can be utilized for complex abscesses as TRUS enables direct visualization of the abscess and minimal tissue manipulation reducing the morbidity of the procedure. This technique requires no general anaesthetic and is less painful then the transperineal approach. Despite the advantages of TRUS guided drainage, Gan et al have demonstrated that repeat procedures for multiloculated abscesses are common using this method.\(^12\) Formation of rectourethral fistulae and potential prostatic contamination by rectal bacteria may also complicate recovery following drainage.
Transperineal approach to drainage of prostatic abscess

Another percutaneous approach to drainage of PAs, the transperineal approach also employs the use of TRUS to guide a needle puncturing the perineum into the prostatic abscess. The procedure is painful and may require the use of general anaesthesia although most procedures are tolerable under local anaesthesia. The patient is placed in the lithotomy position and a needle is advanced from the perineum into the prostate (Figure 3). Following complete drainage of the abscess, a guidewire is placed into the cavity and dilatation of the puncture tract is achieved via the Seldinger technique. A loop catheter is then placed for further drainage and is left in place for several days.

The transperineal approach is preferred over the transrectal approach by some clinicians due to the increased chances of complete drainage via the loop catheter. Disadvantages of the transperineal approach are also related to the inability of the TRUS to adequately allow for complete drainage of multiloculated abscesses. However, the recent utility of 3D TRUS has shown promising results in the management of multiloculated abscesses by the transperineal approach.

Discussion

In the post antibiotic era, PA is a rare manifestation of a urinary tract infection. Regardless, a failure to diagnose and promptly treat can cause significant morbidity. Current practices utilize imaging for diagnostic purposes. Existing data shows that the use of TRUS for the diagnosis of prostatic abscess is as sensitive as CT or magnetic resonance imaging. With the ease of use and lack of ionizing radiation, TRUS is the gold standard for diagnosis and visualization of a prostatic abscess. The diagnostic criteria include the presence of hypoechoic areas containing thick liquid in the transition and central zones of the prostate permeated with hyperechoic areas as well as enlargement or distortion of the anatomy of the gland. There is also a role for urinary culture for selection of pre-procedural antibiotics.

Although all three approaches to drainage of PAs are still being employed, the percutaneous measures (transrectal and transperineal) have come into favour due to their less invasive nature and association with lower morbidity. Each procedure has been shown in literature to have potential for incomplete drainage although the recent evidence favouring 3D TRUS showed
complete drainage in all 7 patients studied.\textsuperscript{13} Regardless of procedure, antibiotics are a key component in the management strategies of PAs. Antibiotics should be given orally or intravenously before any procedure to drain a PA.\textsuperscript{8} Once drainage is complete, culture and sensitivity testing allows for a more targeted approach towards eradication of the infection.

**Conclusion**

With the incidence of prostatic abscess at a historic low, it is likely that many clinicians may go their entire careers without encountering what was once a fairly common presentation. However, the possibility of severe sequelae pursuant to an untreated PA and the suggestion that its incidence may rise in the future represent a strong impetus for becoming acquainted with the diagnostic and interventional strategies required to treat PA. Percutaneous transrectal or transperineal needle aspiration with ultrasonographic guidance have shown to be effective and minimally invasive treatment modalities, and future refinement of current ultrasound technology promises to extend successful treatment to more complex and resistant abscesses.

**Acknowledgements**

Figure 3 reprinted with permission from Weinberger M, et al. (1988), copyrighted University of Chicago.

**References**