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PROSTATIC DISORDERS
ORIGINAL ARTICLE

Outcome analysis of transrectal ultrasonography guided aspiration versus transurethral resection of prostatic abscess: 10 years' experience from a tertiary care hospital

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KEYWORDS

Prostatic abscess;
Transrectal aspiration;
Transurethral resection;
Transurethral deroofing

ABBREVIATIONS

CKD, chronic kidney disease;
TUR, transurethral resection

Abstract ***Objective:*** To compare the effectiveness and safety of two minimally invasive methods (transrectal aspiration vs transurethral resection (TUR)/deroofing) of treating prostatic abscess.

Patients and methods: A retrospective study was conducted, from 2007 to 2016, of patients with prostatic abscesses not responding to antibiotics and/or with large (> 2 cm) or multiple abscesses. Patients were divided into two groups depending on treatment received: Group A, transrectal aspiration; and Group B, TUR/deroofing of abscess.

Results: The most common clinical presentation was dysuria (81.8%), followed by urinary frequency (68.2%), and fever (36.4%). Acute urinary retention occurred in seven patients. The most common infective organism in both groups was *Escherichia coli* (43.9%). The mean (SD, range) prostate volume was 36 (6.4, 17–68) mL and 37 (7.3, 21–72) mL in Groups A and B, respectively. The mean (SD, range) volume of the abscess was 51.24 (12.6, 21–215) mL and 48.34 (15.4, 15–240) mL in Groups A and B, respectively. Overall, 37 (84.1%) patients responded to treatment (68.4% in Group A and 96.0% in Group B, $P < 0.23$) after the first treatment session. Six patients in Group A and one patient in Group B had recurrence of abscess

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($P < 0.03$). Of the six patients in Group A with recurrence, four patients had complete resolution after repeat aspiration (average 1–3 times). The mean (SD) follow-up duration was 17.25 (6.3) months.

Conclusion: TUR of prostatic abscess is more effective (96%) than transrectal aspiration with a lesser hospital stay. However, transrectal aspiration was successful in 89% of cases, is less invasive and can be performed under local anaesthesia and or sedation.

Introduction

Prostatic abscess is a rare presentation in the era of effective and widespread antibiotic therapy. However, it is not an uncommon finding in developing countries, especially in high-risk population groups, e.g. diabetics, chronic kidney disease (CKD), haemodialysis dependence, cirrhosis, and immune compromised patients [1–3]. Historically, mortality rates vary from 6% to 30% [4]. The diagnosis of prostatic abscess is challenging, because of the vague symptoms resembling other causes of LUTS. TRUS has revolutionised the diagnosis of the prostatic abscess [5]. With the aid of TRUS guidance, minimally invasive treatment methods are being used more frequently than open drainage of prostatic abscesses [6,7]. Minimally invasive treatment includes transrectal transperineal aspiration or drainage, transurethral resection (TUR)/deroofing of the prostatic abscess, and TURP [7]. In the present study, we have compared different prostatic abscess treatment methods for effectiveness and safety.

Patients and methods

A retrospective study was conducted in the Department of Urology, King George's Medical University, India from August 2007 to October 2016. Ethical approval was obtained from the Institutional Ethics Committee. Informed written consent was obtained from all the patients. Prostatic abscess not responding to initial antibiotics and/or large (>2 cm) or multiple abscesses were included for analysis (see Fig. 1). Patients who underwent initial TURP for prostatic abscess were excluded from the study. The remaining patients were divided into two groups as per treatment received: Group A, TRUS-guided transrectal aspiration; and Group B, TUR/deroofing of abscess. Data were evaluated regarding clinical presentation, DRE, complete blood counts, TRUS, serum PSA, AUA symptom score, urine analysis and culture report, treatment provided, intraoperative findings, outcomes, complications, and follow up.

Surgical technique

All the procedures were performed by experienced urologists. All patients received preoperative antibiotic (ceftriaxone 1 g, i.v.) 30 min before the procedure. TRUS-guided aspiration was done in left lateral decubitus under local anaesthesia and/or sedation. We used a linear array probe (7.5 MHz) wrapped in a condom to measure the abscess in both transverse and longitudinal directions, and the volume was calculated using the ellipsoid formula (which is already incorporated in the US software). Lignocaine jelly (2%) was instilled (using a nozzle) 5 min before the probe was introduced. An 18-G Chiba needle (20 cm; Cook, and Bloomington, IN, USA) was inserted along the track on the US screen and pus was aspirated manually. After aspiration, a rectal pack soaked with lignocaine jelly was inserted in the rectum for 1–2 h.

In Group B (TUR), the abscess cavity was localised by preoperative imaging, bulging prostatic mucosa and or prostatic massage under spinal anaesthesia. In patients who had BPH in association with prostatic abscess, TURP was performed at $\geq$4 weeks of resolution of abscess to prevent septic complications. All aspirated pus samples were sent for bacterial, fungal and acid-fast bacilli (AFB) culture. The total duration of antibiotic therapy was 6 weeks and was selected according to the pus culture and sensitivity report.

Postoperative follow-up included, daily clinical assessment, complete blood counts after 2 days and TRUS after 4 days. If residual abscess was found, re-aspiration was done using the same method. If patients did not respond to at least three re-aspirations and or had a worsening clinical response, then patients underwent TUR. Success was defined as clinical improvement and or no residual abscess on follow-up.

Statistical analysis

The unpaired *t*-test was used to compare continuous data and Fisher's exact test was used to analyse categorical data. The Student's paired *t*-test was used to assess improvement in variables in comparison to baseline data. Statistical analysis was performed using the

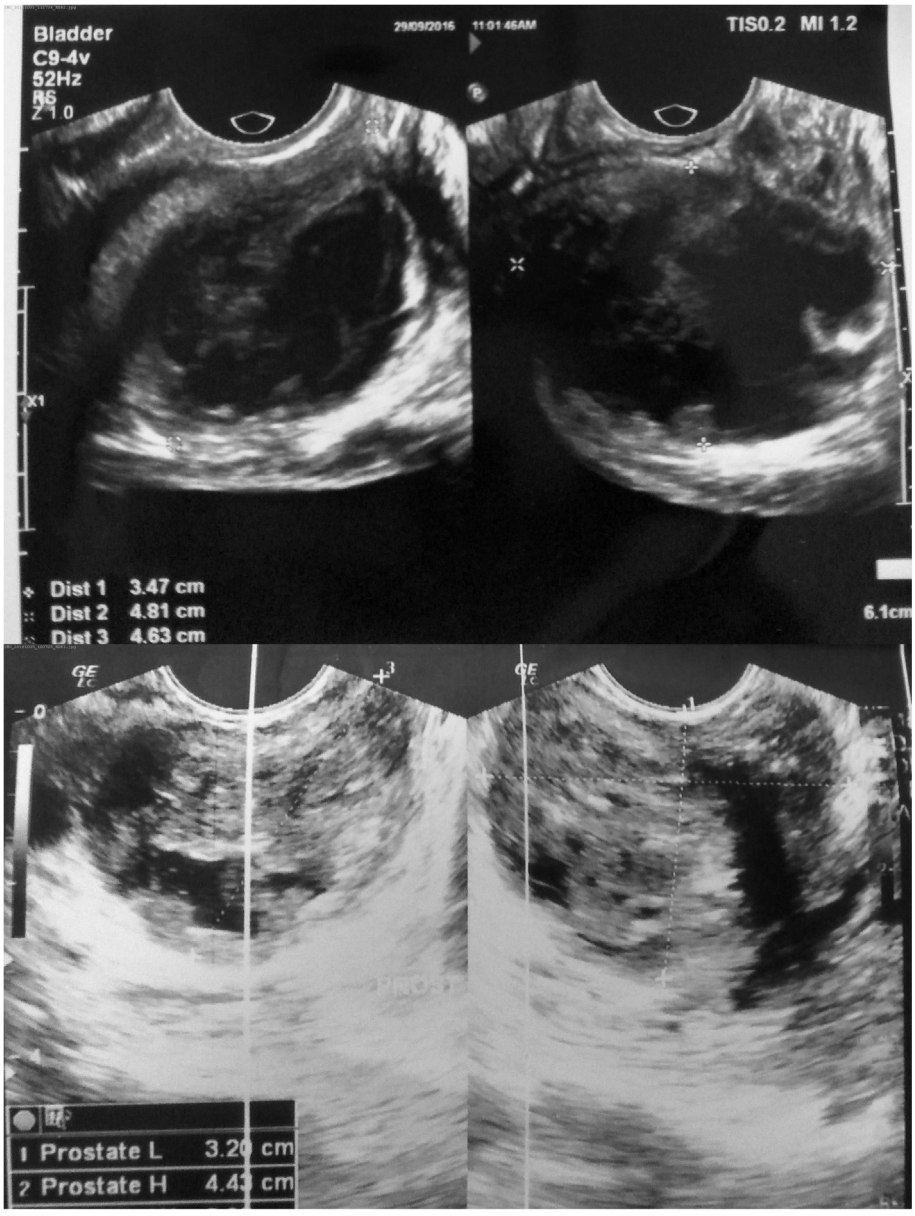

Fig. 1 Hypoechoic inhomogeneous collection on TRUS suggestive of prostatic abscess. Upper panel, large collection; lower panel, small collection.

Statistical Package for the Social Sciences (SPSS® version 16, SPSS Inc., Chicago, IL, USA). The statistical significance level was set at $P < 0.05$.

Results

The medical records of 51 patients with prostatic abscess were evaluated. Seven patients, who received conservative management, were excluded from the study. Thus, 44 patients were included in the final analysis.

The most common clinical presentation was dysuria (81.8%), followed by urinary frequency (68.2%), and fever (36.4%). Acute urinary retention occurred in seven patients who underwent catheterisation (five per urethral and two suprapubic). All patients had > 10 leucocytes/μL on urine analysis in both groups. The most common infective organism in both groups was *Escherichia coli* (43.9%) followed by *Klebsiella pneumoniae* (26.8%) and *Staphylococcus aureus* (17.1%). The mean (SD, range) prostate volume was 36 (6.4, 17–68) mL and 37 (7.3, 21–72) mL in Groups A and B, respectively. The mean (SD, range) volume of the abscess was 51.24 (12.6, 21–215) mL and 48.34 (15.4, 15–240) mL in Groups A and B, respectively. The location of the abscess was as follows: 22, central; 16, peripheral; and six large abscesses involved both the central and peripheral zones. The distribution of the abscess was similar in both groups.

The demographic profile and operative variables are given in Table 1. Overall, 37 (84.1%) patients responded to treatment after the first treatment session [68.4% in Group A and 96% in Group B ($P < 0.23$)]. Six patients in Group A and one patient in Group B had abscess recurrence ($P < 0.03$). Of the six patients in Group A, four underwent repeat aspiration (average, 1–3 times) for complete resolution. The success rate was increased (89.4%) after multiple sessions of aspiration in Group A. Two patients in the aspiration (Group A) required TUR, which was followed by improvement of their symptoms and resolution of residual collection. The one patient in Group B with recurrence required TURP for complete resolution of the abscess. The mean (SD) follow up duration was 17.25 (6.3) months (Table 2).

Discussion

Widespread antibiotic use has decreased the incidence of prostatic abscess. Acute prostatitis may present with abscess if left untreated or inadequately treated. Early diagnosis and treatment of prostatic abscess is warranted to prevent complications such as sepsis, cutaneous fistula, and death [8]. The main purpose of treatment of prostatic abscess is to completely aspirate or remove the pus. The initial management includes evaluation and supportive empirical antibiotics. Patients not responding to antibiotics may need surgical treatment. This can be achieved either via an open approach, transurethral approach or aspiration via the rectal or perineal route.

US is a safe, easily available and reliable diagnostic tool for prostatic abscess [13]. It has a good sensitivity for diagnosing an abscess and for treatment follow-up. However, initial stages of abscess formation may not be identified with US [14]. CT or MRI may be used for diagnosis and treatment of prostatic abscess, but it is costly and usually not required [11,12,15].

In a retrospective analysis by Vyas et al. [9], TRUS-guided aspiration of prostatic abscess was performed in 48 patients. TRUS was able to identify inhomogeneous hypoechoic areas suggestive of abscess in all of the cases. The mean (SD, range) abscess size was 3.2 (1.2, 1.5–8) cm and pus was aspirated in all cases. They achieved complete resolution after the first attempt in 20 patients (41.7%). However, a mean (range) of 4.1 (1–7) aspirations were required for complete resolution in 41 patients (85.4%). In their study, seven patients underwent transurethral deroofing of abscess for persistent symptoms and residual collection.

In a similar retrospective study of TRUS-guided transrectal aspiration of prostatic abscess, Göğüş et al. [10] achieved successful aspiration in five out of six patients and they did not encounter any complications. In our present study, we achieved an overall success rate of 84.1% after the first treatment session and seven patients (six in Group A and one in Group B) required re-treatment.

El-Shazly et al. [16] performed a retrospective analysis of 11 patients with prostatic abscess. TUR of the abscess was performed in seven patients, TRUS-guided transrectal aspiration in two, and transperineal aspiration in two. They achieved successful outcomes in all patients after TUR without any 're-look' surgery or treatment failure. However, they recommended transrectal aspiration for relatively young and localised abscess. This is also supported by other studies [17]. In our present study, we noted recurrence in patients with large and multiple abscesses.

Jang et al. [6] compared TRUS-guided aspiration vs TUR for management of prostatic abscess. TUR was used in 23 patients, a needle aspiration in 18, and conservative treatment in 11. Of the 18 patients that underwent needle aspiration, four (7.6%) had recurrence over a 1-month follow up. Two patients in the conservative treatment had died from sepsis. They concluded that TUR significantly decreased hospital stay compared to transrectal aspiration. In the present study, the TUR/deroofing group had a significantly shorter length of hospital stay compared to TRUS-guided aspiration (6.1 vs. 12.5 days, $P < 0.01$). Several studies have reported long hospital stays (average, >12 days) after minimally invasive therapy in comparison to TUR of prostatic abscess [5,6]. Most patients who undergo invasive treatment for prostatic abscess usually need regular observation and i.v. antibiotic therapy until resolution or relief of symptoms. This may have resulted in the longer hospital stay for the aspiration group in our present study. The adequate and wider drainage achieved by TUR may also be responsible for this difference. Sometimes the pus collection becomes so thick that simple needle aspiration may not be possible. This appears to happen more commonly after a prior course of antibiotics. In these cases, irrigation with saline or antibiotic solution through the needle and re-aspiration may be helpful. Although the success rate after aspiration was less than that of TUR, re-aspiration is a simple and easy procedure that can be done repeatedly.

Table 1 Presenting symptoms of prostatic abscess.

Sign/ symptoms	Overall, *n* (%) *N* = 44	Group A (transrectal aspiration), *n* (%) *N* = 19	Group B (TUR), *n* (%) *N* = 25
Dysuria	36 (81.8)	17 (89.5)	19 (76.0)
Urinary frequency	30 (68.2)	12 (63.2)	18 (72.0)
Fever	16 (36.4)	9 (47.4)	7 (28.0)
Perineal pain	15 (34.1)	7 (36.8)	8 (32.0)
Fluctuation in DRE	9 (20.5)	6 (31.6)	3 (12.0)
Acute urinary retention	7 (15.9)	3 (15.8)	4 (16.0)
Haematuria	3 (6.8)	1 (5.3)	2 (8.0)

Table 2 Patients' demographic and operative characteristics.

Variable	Overall $N = 44$	Group A (transrectal aspiration) $N = 19$	Group B (TUR) $N = 25$	*P*
Age, years				
Mean (SD)	56.34 (9.8)	55.62 (10.2)	57.32 (9.42)	0.24
Range	38–72	38–70	41–72	
Comorbidities, *n* (%)	12 (27.3)	7 (36.8)	5 (20.0)	
Diabetes mellitus	5	3	2	
CKD	2	0	2	0.34
Stricture urethra	3	2	1	
AUA symptom score	n = 32			
Mean (SD)	12.65 (2.6)	11.3 (2.4)	13.9 (3.1)	0.15
Urine culture, *n* (%)	41 (93.2)	18 (94.7)	23 (92.0)	0.43
E. coli	18 (43.9)	8 (42.1)	10 (40.0)	
K. pneumonia	11 (26.8)	4 (21.1)	7 (28.0)	
Staph. aureus	7 (17.1)	4 (21.1)	3 (12.0)	
P. aeruginosa	5 (12.2)	2 (10.5)	3 (12.0)	
PSA level, ng/mL				
Mean (SD)	20.13 (10.5)	19.52 (11.3)	20.41 (10.22)	0.51
Range	1.8–68	2.4–70	1.8–68	
Prostate volume, mL				
Mean (SD)	36 (8.4)	36 (6.4)	37 (7.3)	0.24
Range	17–72	17–68	21–72	
Abscess size, mL				
Mean (SD)	50.26 (11.5)	51.24 (12.6)	48.34 (15.4)	0.55
Range	15–240	21–215	15–240	
Single abscess, *n*	33	12	21	0.12
Multiple abscess, *n*	11	6	5	
Hospital stay, days				
Mean (SD)	10.23 (3.1)	12.5 (3.4)	6.1 (2.1)	0.01
Range	4–15	6–15	4–9	
Success after first session, *n* (%)	37 (84.1)	13 (68.4)	24 (96.0)	0.23
Recurrence	7 (15.9)	6 (31.6)	1 (4.0)	0.03

Antibiotic therapy is the most important initial supportive therapy. The choice of antibiotic should be according to local institutional protocols to avoid resistant organisms. Parenteral antibiotics, e.g. fluoroquinolones and amikacin (with normal serum creatinine), should be started empirically and changed accordingly after the urine or pus culture report. Metronidazole may be added for anaerobic coverage when the patient does not respond to initial therapy, along with consideration of surgery [13].

There are some limitations to the present study. Because of its retrospective nature, collection of data and data itself may have some bias. The small sample size is also a limitation of our study and all patients did not have uniform follow-up records. Despite these limitations, our present study will help in decision making and prognostication for patients with prostatic abscess regarding different treatment methods.

Conclusion

TUR of prostatic abscess is more effective (96%) than transrectal aspiration with a lesser hospital stay. However, transrectal aspiration was successful in 89% of cases and is less invasive and can be performed repeatedly under local anaesthesia and/or sedation. A randomised trial with a larger sample will be needed for better understanding of this issue.

Conflicts of interest

None.

Financial discloser

None.

Ethical approval

Provided by Institute Ethics Committee.

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