

# Transrectal ultrasound-guided aspiration versus transurethral deroofing of prostatic abscess: A prospective randomized study

Mohammed Selem, Esam Desoky, Ahmed Eliwa, Amr Fawzi, Ehab Elkady, Maged M. Ali, Ahmed Ragab, Ahmed Sakr, Mohamed Omran, Mostafa Kamel

Department of Urology, Zagazig University, Zagazig, Egypt

## Abstract

**Aims:** The aim of this study is to compare between transrectal ultrasound (TRUS)-guided aspiration and transurethral (TU) deroofing in the treatment of prostatic abscess regarding safety and efficacy.

**Settings and Design:** This prospective randomized study was done during the period between April 2009 and March 2015 and included 32 patients with prostatic abscess.

**Subjects and Methods:** All patients were enrolled in the study after obtaining a written informed consent and approval of the local ethical committee. The patients were randomly allocated into two groups; Group A treated by TRUS-guided aspiration, saline wash, and local injection of antibiotics and Group B treated by TU deroofing of the abscess. All patients received broad-spectrum antibiotics during the period of treatment, and the follow-up was done on the 5<sup>th</sup> day by TRUS to ensure complete resolution of the abscess.

**Statistical Analysis Used:** Statistical analysis was done using online social science statistical calculators <http://www.socscistatistics.com/Default.aspx> using *t*-test for two independent means, Chi-square test, and Mann–Whitney U-test with  $P < 0.05$  considered statistically significant.

**Results:** The mean age was  $59 \pm 11.46$  and  $60 \pm 13.65$  years for Groups A and B, respectively. Diabetes mellitus was detected in 9 (56.25%) and 6 (37.5%) patients in Groups A and B, respectively, hypertension in 7 (43.75%) and 6 (37.5%) patients in Groups A and B, respectively, and two patients (12.5%) with liver cirrhosis in each group. The mean size of the abscess was  $3.36 \pm 0.86$  and  $3.04 \pm 0.86$  cm in Groups A and B, respectively ( $P = 0.29$ ). The abscess recurred in five patients (31.25%) and one patient (6.25%) in Groups A and B, respectively ( $P = 0.08$ ). TRUS-guided aspiration was done for all recurrent cases except for two patients (12.5%) in Group A required trans urethral deroofing of the recurrent abscess. The mean hospital stay was  $12.9 \pm 4.05$  and  $7.25 \pm 2.40$  days for Groups A and B, respectively ( $P = 0.000$ ). In Group A, one patient (6.25%) was complicated by urethrorectal fistula, whereas in Group B, one patient (6.25%) was complicated by septic shock, three patients (13.75%) with epididymo-orchitis and two patients (12.5%) with urethral stricture.

**Conclusion:** Patients with prostatic abscess treated with TRUS-guided aspiration show less morbidity, higher recurrence rate, and longer hospital stay than those treated with TU deroofing.

**Keywords:** Abscess, prostate, transrectal ultrasound, transurethral deroofing

**Address for correspondence:** Dr. Mohamed Omran, Department of Urology, Zagazig University, Zagazig, Egypt.

E-mail: moh\_omran2006@yahoo.com

**Received:** 18.03.2017, **Accepted:** 01.10.2017

Access this article online	
Quick Response Code:	Website: <a href="http://www.urologyannals.com">www.urologyannals.com</a>
	DOI: 10.4103/UA.UA_41_17

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**For reprints contact:** [reprints@medknow.com](mailto:reprints@medknow.com)

**How to cite this article:** Selem M, Desoky E, Eliwa A, Fawzi A, Elkady E, Ali MM, *et al.* Transrectal ultrasound-guided aspiration versus transurethral deroofing of prostatic abscess: A prospective randomized study. *Urol Ann* 2018;10:291-5.

## INTRODUCTION

Prostatic abscess is an important urologic problem that has a low incidence, but on the other hand, has a high morbidity and mortality if not properly treated.<sup>[1]</sup> Prostatic biopsy, endoscopy of lower urinary tract, and long-term catheterization are the most common precipitating factors, especially in high risk patients such as immunocompromised states, uncontrolled diabetes, and in patients undergoing dialysis.<sup>[2]</sup>

Different pathogens with different virulence factors are incriminated in the pathogenesis of this disease, for example, *Escherichia coli*, *Staphylococcus aureus*, anaerobes, and fungi. These virulence factors and patients' immune status determine the severity of clinical presentations that vary from mild lower urinary tract symptoms and perineal discomfort up to fever, rigors, and even life-threatening conditions as septic shock.<sup>[3,4]</sup> Fluctuating swelling or boggy sensation during digital rectal examination (DRE) can establish the diagnosis of prostatic abscess, but it is not present in all cases so, imaging techniques, for example, transrectal ultrasound (TRUS) and computed tomography are often needed to confirm the diagnosis and during follow-up after either medical treatment or surgical drainage of the abscess cavity.<sup>[1,3-6]</sup>

Drainage of prostatic abscess can be done either through transperineal route (open or aspiration), transurethral (TU) deroofing or TRUS-guided aspiration.<sup>[1-7]</sup>

### Aim of the work

The aim of the current study is to compare between TRUS-guided aspiration and TU deroofing of Prostatic abscess regarding cure and retreatment, complication rates, and hospital stay.

## SUBJECTS AND METHODS

This a prospective randomized study carried out at the Department of Urology, Zagazig university hospitals during the period between April 2009 and March 2015. This study included 32 patients with prostatic abscess (based on clinical features and TRUS findings). All patients enrolled in the study were consented for the participation. The local ethical committee approved our study. Patients were allocated using 1:1 randomization in two groups: Group A underwent TRUS-guided aspiration, and Group B underwent TU deroofing. All patients were admitted to the in-patients' department, and full laboratory investigations including urinalysis, urine culture, and sensitivity were done. In cases of

sepsis, blood culture was done. Empirical broad-spectrum antibiotic therapy (intravenous [IV] ciprofloxacin 200 mg/12 h or ceftriaxone 50 mg/kg/day, maximum 3 g/day) started in all patients before the intervention. Transrectal probe 7.5 HZ used to assess prostatic size and abscess size, number, and location.

### Transrectal ultrasound-guided aspiration Group A

Patients did cleansing enema 2 h before the procedure. Patients were positioned in the left lateral position. Local periprostatic infiltration anesthesia was given in the form of 5–10 ml of lidocaine 2%. A routine transrectal scan of the prostate was done in the transverse and longitudinal planes. Accurate localization of the abscess was done with the calculation of the abscess volume. Abscess drainage was done in the longitudinal view using biopsy mode of the transrectal probe and the metal biopsy guide fittings. An 18-gauge needle was used for abscess aspiration. After aspiration, 0.9% saline injected in the abscess cavity (for washing the abscess cavity) and drained again. Finally, 2–3 ml of garamycin was injected. The aspirate was sent for culture and sensitivity.

### Transurethral-deroofing Group B

Using 26 French monopolar resectoscope, 1.5% glycine and regional (spinal) anesthesia, resection was done with preservation of the bladder neck, the sphincter, and the healthy lobes. Resection was deep enough to ensure adequate drainage of all abscess cavities. In both groups, a urethral catheter was fixed for 5–10 days, antibiotic with antipyretic continued till fever subsided and return of leukocytosis to normal, and all patients continued on IV Cipro or ceftriaxone antibiotic until results of culture and sensitivity appear. TRUS done to ensure complete resolution of the cavity. In cases of recurrent abscess, TRUS aspiration done if failed to drain abscess completely or another recurrence occurred, TU deroofing done. Complications reported, classified according to modified Clavien system and compared between the two groups. Patients were discharged after fever subsides by 3 days on oral antibiotic for 1 week more. Catheter was removed for voiding trial after 5-10 days, if retained, recatheterization was done for another 2 weeks then voiding trial repeated if failed the patient scheduled for TURP.

Statistical analysis was done using online social science statistical calculators <http://www.socscistatistics.com/Default.aspx> using *t*-test for two independent means, Chi-square test, and Mann–Whitney *U*-test with  $P < 0.05$  considered significant.

**RESULTS**

This study included 32 patients with prostatic abscess [Figure 1] randomly allocated in two groups. Group A treated with TRUS-guided aspiration, and Group B treated with TU deroofing. Follow-up ranged from 12 to 28 months postdischarge from the department. No significant differences in patients' demographics, risk factors, or comorbidities between the two groups [Table 1].

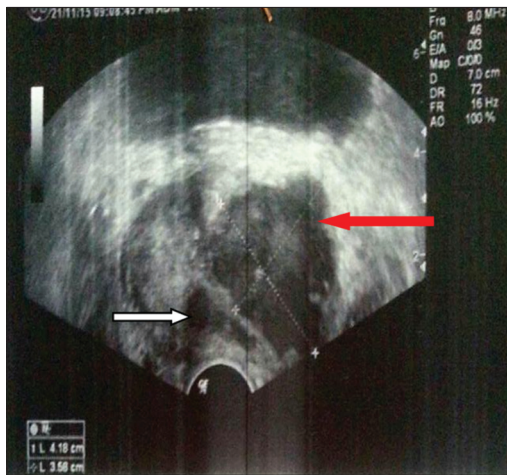
Fever was the main presentation in 27 patients (84.3%), lower urinary tract symptoms (LUTS) in 25 patients (78.12%), perineal discomfort in 23 patients (71.87%), acute retention of urine in 6 patients (18.75%), and sepsis in 10 patients (31.25%). Examination by DRE revealed boggy sensation or fluctuation in 13 cases (7 in Group A and 6 in Group B) by which diagnosis can be established. In the other 19 cases, suspicion raised by symptoms and tender prostate in DRE and was confirmed by TRUS. Fluctuation of the prostate was observed in cases where the abscess was larger and in a more peripheral part of prostate. The position of the abscesses was peripheral in 17 cases and central in 15 cases. Multiple abscesses founded in 8 cases [Table 1].

The mean abscess volume was (3.36 ± 0.85) ml and (3.04 ± 0.85) in Group A and B respectively (P = 0.29). Prostatic volume ranged from 34 to 98 cm<sup>3</sup>. Preoperative urine culture and sensitivity revealed *E. coli* as the most common organism in 14 patients (43.7%), *S. aureus* in 5 cases patients (15.6%) and no organism in 13 patients (40.6%). Whereas, culture of the retrieved pus yielded *E. coli* in 12 patients (37.5%), *Staphylococcus* in 8 patients (25%), *Pseudomonas* in 6 patients (18.75%), *Klebsiella* in 4 patients (12.5%), and no organism in

2 patients (6.25%). Blood culture revealed *E. coli* in 5 cases, *Klebsiella* in 2, *Pseudomonas aeruginosa* in 2, and *S. aureus* in 1 among the 10 cases with sepsis. Postoperative hospital stay ranged from 4 to 18 days for all patients [Table 2].

Incomplete abscess drainage was detected in 5 patients (31.2%) and 1 patient (6.25%) in Group A and B, respectively. All these patients were successfully treated with TRUS-guided aspiration except for 2 patients; (12.5%) in Group A in which recollection occurred and they were scheduled for TUR deroofing. The mean hospital stay was (12.9 ± 4.05 day) in Group A, whereas in Group B, it was (7.25 ± 2.4) (P = 0.000017) (t-test for two independent means) [Table 2].

Complications in our study (complications from the procedure or from the abscess) included one urethrocutaneous fistula in Group A (6.25%), 3 epididymo-orchitis (18.75%), 3 urethral stricture (12.5%), and finally, one patient (6.25%) had septic shock and admitted to the Intensive Care Unit (ICU) till his condition improved in Group B. Epididymo-orchitis was treated medically, fistula need surgical closure, and urethral stricture treated with



**Figure 1:** Prostatic abscess 3.5 cm × 4.2 cm (red arrow) with small pocket in the same lobe (white arrow)

**Table 1: Patient's demographics**

	Group		P
	A (%)	B (%)	
Mean age (years)	59±11.46	60±13.65	0.8
Comorbidities			
Diabetes mellitus	9 (56.25)	6 (37.5)	0.4
Hypertension	7 (43.75)	6 (37.5)	0.72
Liver cirrhosis	2 (12.5)	2 (12.5)	1
Presenting symptoms			
Fever	12 (75)	15 (93.75)	0.15
LUTS	12 (75)	13 (81.25)	0.67
Perineal discomfort	13 (81.25)	10 (62.5)	0.24
Retention	4 (25)	2 (12.5)	0.37
Sepsis	3 (18.75)	7 (43.75)	0.13
Boggy sensation or fluctuation	7 (43.75)	6 (37.5)	0.72
Mean abscess size (cm)	3.36±0.86	3.04±0.86	0.29
Multiple abscesses	5 (31.25)	3 (18.75)	0.41
Peripheral and central abscess	9 and 7	8 and 8	0.72
Mean prostate size (cm <sup>3</sup> )	67.75±20.22	63.19±15.31	0.48

LUTS: Lower urinary tract symptoms

**Table 2: Postoperative outcome**

	Group		P
	A (%)	B (%)	
Abscess recurrence	5 (31.2)	1 (6.25)	0.08
Mean hospital stay (days)	12.9±4.05	7.25±2.40	0.00017
Complication (Clavien grade)			
Urethrorectal fistula (IIIb)*	1 (6.25)	-	1.00
Epididymo-orchitis (II)*	-	3 (18.75)	0.22
Urethral stricture (IIIa)*	-	2 (12.5)	0.48
Septic shock (IVa)*	-	1 (6.25)	1.00
Severity of complication grades**	1	6	0.16
Later TURP for retention	7	5	0.47

\*Chi-square test, \*\*Mann-Whitney U-test. TURP: Transurethral resection of prostate

visual internal urethrotomy. Severity of complications according to modified Clavien system founded to be insignificant ( $P = 0.16$ ) (Mann–Whitney U-test) [Table 2]. Among the six patients presented with retention, 4 patients retained after catheter removal, failed to respond to medical treatment and operated by TRUP at least 1 month after subsiding of fever. Another 8 patients from those presented with LUTS develop retention later on during follow up and operated by TURP also.

## DISCUSSION

Prostatic abscess is still a challenging urological problem with serious hazards if not properly diagnosed and treated.<sup>[8]</sup> Many methods were described for abscess drainage including perineal drainage, TU deroofing of the abscess cavity, TRUS-guided abscess aspiration and finally TU holmium laser resection.<sup>[9]</sup> In our study, prostatic abscess recurred in 31.2% and in 6.25% in Groups A and B, respectively, and this was near to be of significant difference ( $P = 0.08$ ) Jang *et al.* reported abscess recurrence in 22.02% among 18 patients underwent TRUS aspiration within 1 month, but with the mean of abscess size in their patients was larger than that in our study ( $4.04 \pm 0.95$ ) versus ( $3.36 \pm 0.85$ ), whereas no patients showed recurrence in the TU deroofing group (23 patients) with also larger abscess size ( $3.87 \pm 0.38$ ) versus ( $3.04 \pm 0.85$ ).<sup>[10]</sup>

In another study by Elshal *et al.*, 7% of patients showed recurrence after TU deroofing, whereas no patients showed recurrence after TRUS aspiration with median abscess size 4.5 (2–23) mL and 2.7 (1.5–7.1) mL, respectively ( $P = 0.2$ ).<sup>[11]</sup> In these two studies, there was no significant difference in recurrence between the two treatment modalities. The higher recurrence in Elshal *et al.* study in the TURP group in contrast to our study and Jang *et al.* study may be explained by the presence of multiple abscesses in 50% of cases in both groups which cannot be detected intraoperatively during TU deroofing while it can be visualized well and drained by TRUS.<sup>[10,11]</sup>

Collado *et al.* reported successful drainage of prostatic abscess in 75% of their 24 patients, in 23 of them TRUS was used with 2 patients needed a second aspirate, 3 patients needed TU deroofing to drain abscess after failure of aspiration and one patient died.<sup>[12]</sup> Vyas *et al.* reported complete resolution of prostatic abscess in 41/48 (85.42%) patients after 1–7 procedures with 7 patients needed TU deroofing to reach complete abscess drainage.<sup>[13]</sup>

Hospital stay varied in the publications depending on the rules and protocols followed in different centers. In our

study the hospital stay was significantly different between the two groups with longer hospital stay in Group B. This significant difference in hospital stay may be explained by the higher number patient in Group B presented by sepsis and fever than in Group A (7 vs. 3 and 15 vs. 12) respectively although they were not significantly different ( $P = 0.13$  and 0.15). In Elshal study, the median hospital stay was 2 (1–11) and 1 (1–19) days in transrectal aspiration and TU deroofing, respectively ( $P = 0.04$ ). Whereas in Jang *et al.* study, it was relatively shorter in TU deroofing group versus TRUS aspiration group [ $10.2 \pm 2.8$  vs.  $23.5 \pm 5.35$ ] days with no dependent factor in multivariate analysis significantly affect the duration of hospital stay.<sup>[10]</sup>

Complications reported were more in TU group (6 vs. 1) and ranged from Grade II to IVa on modified Clavien system with no significant difference between the two groups ( $P = 0.16$ ). Complications were one fistula in Group A versus 3 epididymo-orchitis, 2 urethral stricture, and one serious complication (septic shock IVa) in Group B which admitted to ICU then managed later for recurrent abscess by TRUS aspiration.

In Elshal *et al.* study, 1 patient had urethral cutaneous fistula in the group treated with TRUS aspiration. In TUR deroofing group, 2 patients had septic shock, one patient had epididymo-orchitis, and one patients had urethral diverticulum and incontinence and was treated with diverticulectomy and sling with no significant difference between the two groups ( $P = 0.1$ ).<sup>[11]</sup>

*E. coli* was the most common identified organism in both urine and retrieved pus culture in our patients. Bansal *et al.* 2009 reported sterile urine culture in 6 out of their 8 patients with prostatic abscess, the other two revealed *E. coli*. While in the culture of drained pus, *S. aureus* was the most common identified organism 4/8 and one *E. coli*. In the other three patients no culture was done of retrieved pus.<sup>[14]</sup> Elwagdy *et al.* 2015 reported *E. coli* in about 78% of their 18 patients with prostatic abscess by pus culture.<sup>[15]</sup>

Our study is a prospective randomized study in contrast to the previously published retrospective descriptive studies with a limitation of short-term follow-up in majority of patients whom lost follow up due to many factors like death by other comorbidities.

## CONCLUSION

Transurethral deroofing of the prostatic abscess is an effective approach with high success rate but with a significantly longer hospital stay and a higher (non-significant)

complications rate in comparison to the TRUS-guided aspiration which is less invasive but with higher recurrence rate.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

### REFERENCES

- Ludwig M, Schroeder-Printzen I, Schiefer HG, Weidner W. Diagnosis and therapeutic management of 18 patients with prostatic abscess. *Urology* 1999;53:340-5.
- Trauzzi SJ, Kay CJ, Kaufman DG, Lowe FC. Management of prostatic abscess in patients with human immunodeficiency syndrome. *Urology* 1994;43:629-33.
- Oliveira P, Andrade JA, Porto HC, Filho JE, Vinhaes AF. Diagnosis and treatment of prostatic abscess. *Int Braz J Urol* 2003;29:30-4.
- Barozzi L, Pavlica P, Menchi I, De Matteis M, Canepari M. Prostatic abscess: Diagnosis and treatment. *AJR Am J Roentgenol* 1998;170:753-7.
- Tiwari P, Pal DK, Tripathi A, Kumar S, Vijay M, Goel A, *et al.* Prostatic abscess: Diagnosis and management in the modern antibiotic era. *Saudi J Kidney Dis Transpl* 2011;22:298-301.
- Gan E. Transrectal ultrasound-guided needle aspiration for prostatic abscesses: An alternative to transurethral drainage? *Tech Urol* 2000;6:178-84.
- Basiri A, Javaherforooshzadeh A. Percutaneous drainage for treatment of prostate abscess. *Urol J* 2010;7:278-80.
- Bhagat SK, Kekre NS, Gopalakrishnan G, Balaji V, Mathews MS. Changing profile of prostatic abscess. *Int Braz J Urol* 2008;34:164-70.
- Shah H. Transurethral holmium laser deroofing of prostatic abscess: Description of technique and early results. *Abstract. J Urol* 2010;183:e128.
- Jang K, Lee DH, Lee SH, Chung BH. Treatment of prostatic abscess: Case collection and comparison of treatment methods. *Korean J Urol* 2012;53:860-4.
- Elshal AM, Abdelhalim A, Barakat TS, Shaaban AA, Nabeeh A, Ibrahiem el-H, *et al.* Prostatic abscess: Objective assessment of the treatment approach in the absence of guidelines. *Arab J Urol* 2014;12:262-8.
- Collado A, Palou J, García-Penit J, Salvador J, de la Torre P, Vicente J, *et al.* Ultrasound-guided needle aspiration in prostatic abscess. *Urology* 1999;53:548-52.
- Vyas JB, Ganpule SA, Ganpule AP, Sabnis RB, Desai MR. Transrectal ultrasound-guided aspiration in the management of prostatic abscess: A single-center experience. *Indian J Radiol Imaging* 2013;23:253-7.
- Bansal P, Gupta A, Mongha R, Bera M, Ranjit K, Kundu A. Minimally-invasive management of prostatic abscess: The role of transrectal ultrasound. *Urol Ann* 2009;1:56-60.
- Elwagdy S, Abdelkhalek M, El-Kheshen A, Aun AA, Mostafa A. Role of transrectal sectional sonography (TRSS) in management of prostatic abscesses. *Urol Ann* 2015;7:334-8.