Prostatic Abscesses: Radiographic Findings and Treatment

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Objective : *To analyze the medical images and therapeutic strategies in patients with prostatic abscesses.*
Method : *From April 1999 to August 2002, 12 patients with prostatic abscesses at Srinagarind Hospital, Khon Kaen, Thailand were reviewed. The average age was 47 years (range 29 to 75). Diagnostic procedures included analysis of midstream urine, abscess fluid for pathogens and medical imaging with TRUS, CT and MRI. Therapeutic options were transrectal ultrasound-guided drainage or conservative medical treatment.*
Results : *Almost all patients had predisposing diseases. All patients showed hypo-echoic masses, plus internal septation in 5 cases. Most lesions were located at the central gland. Their sizes ranged from 0.5 to 2.75 cm (average 1.51 cm) in diameter. The main pathogen was B. pseudomallei. On TRUS imaging, patients with melioidosis had one or more hypo-echoic areas with internal septation, thickened wall and surrounding multiple small daughter abscesses. All abscesses resolved within 4 weeks, with no difference in the duration of treatment, despite different sizes or pathogens.*
Conclusions : *Transrectal ultrasonography is useful in the diagnosis of prostatic abscess as well as in the guidance for aspiration and the drainage of such abscesses. Our data showed sonographic patterns in prostatic abscess, especially with melioidosis.*

Keywords : *Prostatic abscess, Melioidosis*

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Prostatic abscess is an uncommon lesion most often encountered in the elderly and compromised patient. Abscesses can be secondary to prostatitis but can develop de novo from hematogenous spread of the inciting agents. Reflux of infected urine into the prostate gland with concurrent urethral obstruction is thought to be one of the contributory factors. Prostatic abscess is diagnosed only in 0.2% of patients with urologic symptoms and in 0.5-2.5% of patients hospitalized for prostatic symptoms[1]. The differential diagnosis between acute bacterial prostatitis and prostatic abscess is difficult to make on the basis of clinical examination.

Transrectal ultrasonography (TRUS) is particularly useful for early recognition and treatment of intraglandular fluid collections. Prostatic abscess drainage represents a simple alternative to more complex and dangerous treatments that can cause hematogenous dissemination[2]. Computed tomography (CT), magnetic resonance imaging (MRI) and scintigraphy are also used to improve the images of prostatic lesions[3-7].

In this paper the authors present our experience with the diagnosis and management of prostatic abscesses at Srinagarind Hospital. The radiological images include TRUS, CT and MRI.

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Patients and Method

From April 1999 to August 2002, 12 patients with prostatic abscess were diagnosed at Srinagarind Hospital, Khon Kaen University. The average age was 47 years (range 29 to 75). Physical examination, including a digital rectal examination (DRE), was performed. Analyses of midstream urine and urine culture were obtained. All patients underwent TRUS of the prostate (Aspen , 7.5 MHz end-fire endorectal transducer with a 90-degree image),

with additional color Doppler sonography (CDS) in one patient with *S. aureus*. CT scan (Siemens , multislice volume zoom spiral CT) was additionally performed in 3 patients (2 with melioidosis, 1 with AIDS) and MRI (GE medical system, Signa 1.5 T scanner) with pelvic coil in 2 patients with AIDS. Transrectal ultrasound-guided drainage was performed in 5 patients. One patient with TB underwent transurethral resection of the prostate (TUR-P). During follow-up, TRUS examinations and urine cultures were performed on an outpatient basis.

Results

Eleven patients had predisposing diseases, 3 with diabetes mellitus, 2 with AIDS, 1 each with acute tubular necrosis, nephrotic syndrome, thalassemia, myelodysplastic syndrome, Parkinsonism, and pulmonary TB. All patients showed hypo-echoic masses, plus internal septation in 5 cases (Table 1). Most lesions were located in the central gland (11/12 patients) and peripheral gland (8/12 patients). Half of them were single-zone lesions. Their sizes ranged from 0.5 to 2.75 cm (average 1.51 cm) in diameter. All abscesses resolved within 4 weeks, with no difference in the duration of treatment, despite different sizes or pathogens.

On TRUS imaging, 3 patients with melioidosis had one or more hypo-echoic areas with internal septation, thickened wall and surrounding multiple small daughter abscesses (Fig. 1A). CT findings were similar, showing an enlarged gland with non-enhancing fluid density collections that sometimes were multiseptated or had enhancing rims (Fig. 1B).

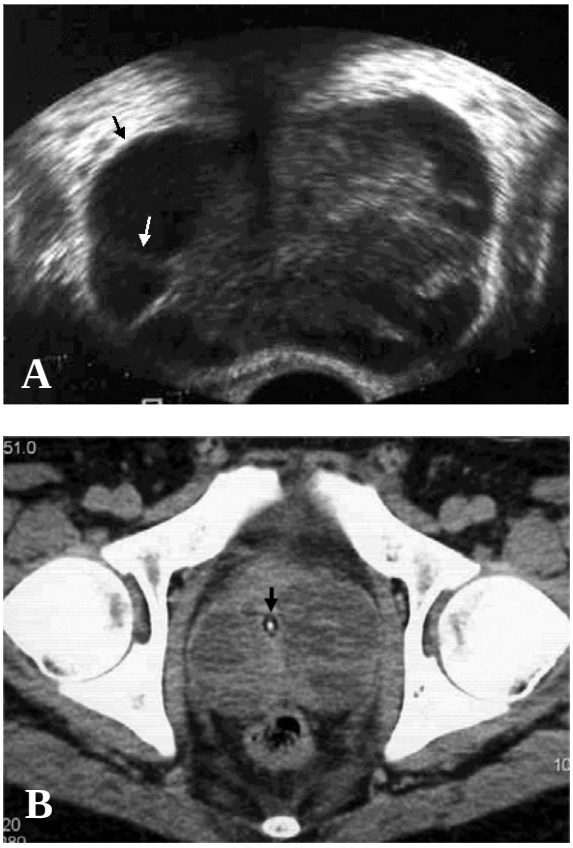

Fig. 1 Disseminated melioidosis (38 years old) (A) TRUS, transverse scan, hypo-echoic lesions (black arrow) with internal septation (white arrow) and thickened wall in CG and PG (B) CECT, enlarged irregular-shaped prostate gland with multiloculated abscess and internal septation involving the whole gland and compressing Foley catheter (arrow)

Table 1. Character of prostatic abscess

Case	Pathogen	Size (cm)	US finding	> 1 lesion	Location
1	*B. pseudomallei*	1 x 1.3	Septated	yes	PG
2	*B. pseudomallei*	1.1 x 2	Inhomogeneous	yes	CG, PG
3	*B. pseudomallei*	1.18 x 2	Septated	yes	CG, PG
4	*B. pseudomallei*	1.6 x 2.5	Septated	yes	CG, PG
5	*B. pseudomallei*	1.36 x 1.5	Inhomogeneous	no	CG
6	*B. pseudomallei*	0.88 x 1.06	Inhomogeneous	no	CG
7	*S. aureus*	2.05 x 2.75	Fluid	no	CG
8	Stap coag neg	1.48 x 1.55	Septated	yes	PG
9	Stap coag neg	0.8 x 1	Inhomogeneous	yes	CG, PG
10	Stap coag neg	0.9 x 0.9	Septated	yes	CG, PG
11	*P. aerugenosa*	0.67 x 1	Homogeneous	yes	CG, PG
12	*M. tuberculosis*	0.4 x 0.5	Inhomogeneous	yes	CG

CG = central gland, PG = peripheral gland
Stap = Staphyloccus, coag = coagulase, neg = negative

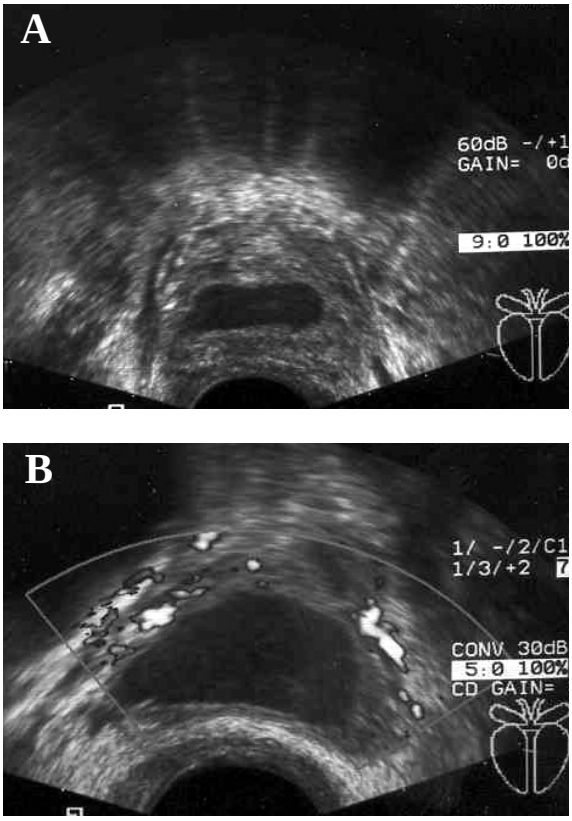

Fig. 2 Abscess from *S. aureus* with underlying Parkinsonism (68 years old) (A) TRUS, single large hypo-echoic lesion at CG with well-defined border (B) CDS, hyperemia of color flow surrounding abscess formation

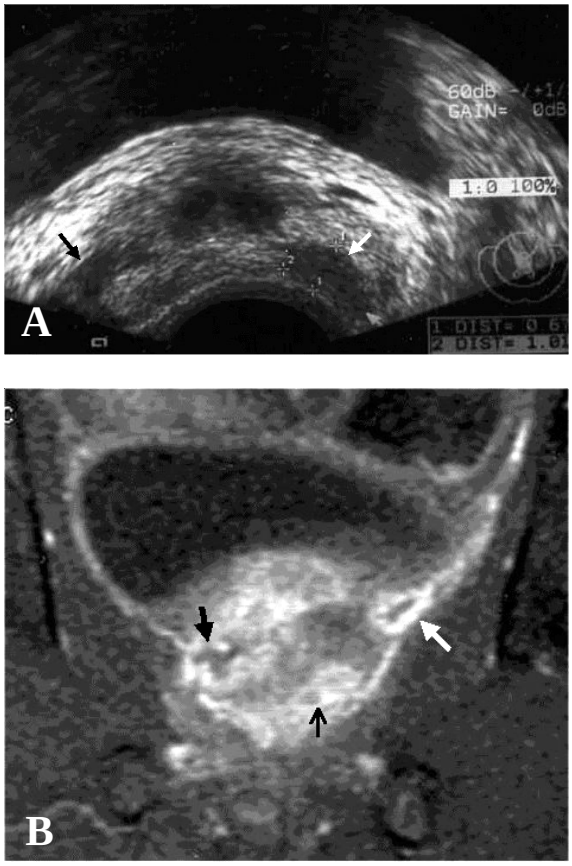

Fig. 3 HIV-positive patient (31 years old) (A) TRUS, multiple poor-defined hypo-echoic lesions in right CG (black arrow) and left PG (white arrow) (B) MRI, coronal T1-weighted FSE, enhanced thickened wall abscess in right CG (black arrow) and left PG (thin black arrow) with enhanced periprostatic tissue, noted small abscess at left periprostatic tissue (white arrow), near to bladder neck

One patient with *Staphyloccus aureus* showed a large cystic abscess with a well-defined border in the central gland (Fig. 2), it was the largest abscess in this study. A CDS was also performed in this case, showing hyperemia of color flow surrounding abscess formation.

Two patients with AIDS were infected by Staphylococcus coagulase negative. The first case showed multiple poorly defined border hypo-echoic lesions (Fig. 3A). The patient's MRI showed thickened wall abscesses with enhanced periprostatic tissue and a residual area of normal prostatic tissue by evidence of no enhancement in this area (Fig. 3B). Unlike the first, the second case showed diffused heterogeneous enhanced in the rest of the gland representing prostatitis (Fig. 4A) and a thickened enhancing wall of the seminal vesicles representing seminal vesiculitis (Fig. 4B). The patient with *Mycobacterium tuberculosis* showed multiple conglomerate tiny hypo-echoic lesions with calcification in the mid-part of the CG (Fig.5).

Discussion

Clinical diagnosis of prostatic abscess is problematic because of overlapping symptoms and signs occurring with prostatitis. The distinction is important because prostatitis is managed conservatively with antibiotics, whereas prostatic abscess may require drainage. Furthermore, left untreated, a prostatic abscess carries a higher risk of complications, including rupture into the ischiorectal fossa, prevesical space, periprostatic space, and peritoneum.

Imaging is important in assessment of the prostate when prostatic abscess is suspected. The sonographic pattern of a prostatic abscess is usually

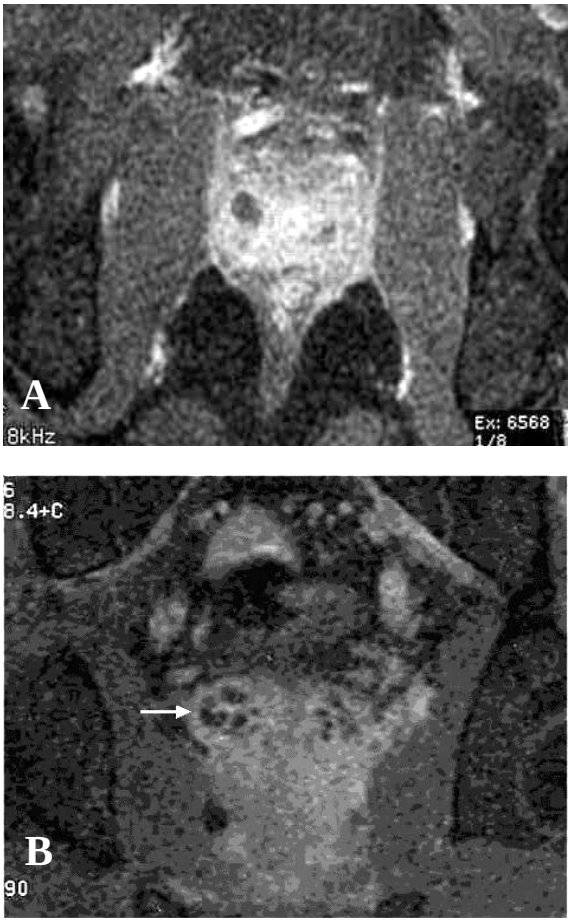

Fig. 4 HIV-positive patient (41 years old), MRI T1-weighted FSE (A) axial scan, two small abscesses in right CG and left PG, diffused heterogeneous enhancement in the rest of gland representing prostatitis (B) coronal scan, thickened enhancing wall of seminal vesicles representing seminal vesiculitis (arrow)

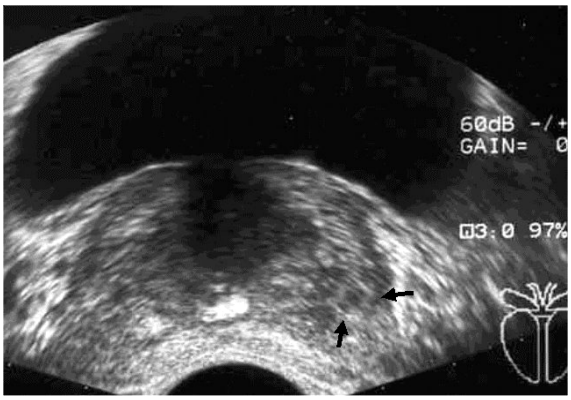

Fig. 5 TRUS of tuberculous abscess (57 years old) showed multiple tiny hypo-echoic lesions (arrow) in both CG with calcification in mid-part of CG

characteristic and can, thus, be easily differentiated from other glandular lesions[8]. Abscesses are located in the transitional zone or central gland in the classification of integrated zonal anatomy[9], whereas tumors are most frequently found in the peripheral gland. Abscesses generally appear as focal hypo-echoic or anechoic lesions; sometimes a hypo-echoic perilesional halo can be identified around an abscess, which is absent in tumors[10]. Other findings are a thickened wall with or without septation. Mullerian duct cysts and seminal vesicle or ejaculatory duct cysts may have similar sonographic features. Mullerian duct and seminal vesicle cysts are located outside the prostate and should be easily differentiated from prostatic abscesses in sonographic findings. CT has been useful to assess the extent of suppurative material that had collected in the periprostatic tissue and to detect gas in the fluid[10]. However, MRI, due to its higher spatial resolution, better tissue contrast, and multiplanar imaging capabilities, is advantageous compared with CT for assessment of the infectious involvement of the prostate gland itself. High-resolution MRI using an endorectal and/or pelvic phased-array coil is widely used in patients with prostate carcinoma[11].

Predisposing factors to the development of an abscess include diabetes mellitus, hemodialysis, immunosuppression, urethral trauma (instrumentation), carcinoma of the prostate, etc. In the pre-antibiotic era, prostatic abscess was caused frequently by *Neisseria gonorrhoeae*, and the mortality rate was between 6% and 30%[10]. The organisms most frequently isolated from prostatic abscesses are *Escherichia coli* and other gram-negative bacilli; other isolates include *Staphylococcus* species and an expanding spectrum of bacteria and fungi [6,12-15].

Unlike other studies[10,12], in this study the main pathogen was *Burkholderia pseudomallei* (old nomenclature: *Pseudomonas pseudomallei*). Melioidotic endemic area, predisposing factors such as diabetes, renal disease and thalassemia, may correspond to a higher incidence of melioidotic prostatic abscess. Melioidosis may occur in many forms, from localized abscesses to fulminant septicemia. The percentage of bacteraemia and overall mortality has been quoted as 60% and 44% respectively in Thailand[16], 46% and 19% in Northern Australia[17] and 52% and 46% in Singapore[14]. A high incidence of prostatic abscess is reported from Northern Australia as 18%[17], compared to 2.5% for Northeast Thailand[14]. This difference may be

explained by early detection. Australian patients routinely receive whole internal organ examination, whereas Thai patients are examined with TRUS only when a prostatic lesion is suspected.

In this study, melioidotic prostatic abscesses were commonly located in the central gland and half of them involved the whole gland, resulting in gland enlargement. It seemed to be more than 1 cm that larger than prostatic abscesses from other pathogens, similar to other reports[13,14]; and more than one abscess. The abscesses were variable in internal septation or inhomogeneous echogenicity due to stage of abscess formation or time of examination. CT scan findings were the same as other reports[18]; the prostate was enlarged in size with well-demarcated fluid collections and containing internal septation and enhanced walls in post contrast enhancement.

The patient with *S. aureus* showed a large cystic abscess in the central gland, differing from a previous report, where it was multi-loculated[3]. Color Doppler imaging was complementary to the gray scale appearance and provided useful adjunctive information. The diffuse pattern of hypervascularity observed in both the peripheral and central glands suggested an inflammatory process rather than a neoplasm. The lack of vascularity within the hypoechoic lesions was nonspecific.

Both patients with AIDS were confined to Staphyloccus coagulase negative, while other studies showed no specific organism[6]. Tuberculous prostatic abscesses have been reported only in HIV-positive patients without pulmonary tuberculosis[6]. The patient in this study developed prostatic abscess from pulmonary tuberculosis in spite of a non immuno-compromised condition.

Abscesses are a source of bacterial persistence and should be drained. Transrectal ultrasound of the prostate is the diagnostic modality of choice to diagnose and determine the extent of prostatic abscess[19]. A TUR-P is the treatment preferred by many clinicians[20]. There is, however, interest in less invasive techniques for drainage of prostatic abscesses with some clinicians performing percutaneous transperineal or transrectal drainage with success[9,19,21]. The benefit of this procedure may be in young patients in whom transurethral resection, especially loss of bladder neck function, is undesirable[21]. The difficulty with TUR-P in patients with large abscesses is the distortion of normal anatomy, obscuring the traditional landmarks for TUR-P. The authors prefer transrectal drainage in the cases with larger abscess (> 1 cm), and antibiotics alone with smaller ones.

In conclusion, predisposing factors are important in the pathogenesis of prostatic abscess. Digital rectal examination may not reliably reveal the presence of an abscess. Transrectal ultrasound and bacteriological confirmation are mandatory. Patients show hypo-echoic lesions, plus internal septation in most cases. Most patients have more than one lesion, and about half of them have single gland lesions. The abscess occurs mostly in the central gland. Melioidotic prostatic abscesses are found in half of the cases. Their appearance, septation, location are the same as other pathogens, except their size seems to be larger. Prompt diagnosis, adequate surgical drainage coupled with appropriate antibiotics are keys to a favourable outcome. Transrectal ultrasound also makes it possible to follow up abscesses treated with antibiotics alone or partial drainage.

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ฝีในต่อมลูกหมาก: ภาพทางรังสีวิทยาและการรักษา

ชลิดา อภินิเวศ, ขจิตร์ พาชีรัตน์, จิตเจริญ ไชยาคำ, วัลลภ เหล่าไพบูลย์, พจน์ชวิทย์ อภินิเวศ, วรินทร์ธร พุทธรักษ์

วัตถุประสงค์ *: เพื่อศึกษาภาพถ่ายทางรังสีวิทยาและการรักษาผู้ป่วยที่มีฝีในต่อมลูกหมาก*

วิธีการ *: ศึกษาประวัติการรักษาและภาพถ่ายทางรังสีวิทยาของผู้ป่วย ที่ได้รับการวินิจฉัยเป็นฝีในต่อมลูกหมาก ที่โรงพยาบาลศรีนครินทร์ จ. ขอนแก่น ระหว่างเดือนเมษายน 2542 ถึง สิงหาคม 2545 อายุเฉลี่ยของผู้ป่วยเท่ากับ 47 ปี (ระหว่าง 29-75 ปี) กระบวนการวินิจฉัย ประกอบด้วย การตรวจปัสสาวะ เพาะเชื้อจากหนอง และภาพถ่ายทางรังสีวิทยา วิธีการรักษาได้แก่ การระบายหนอง หรือใช้ยาปฏิชีวนะเพียงอย่างเดียว*

ผลการศึกษา *: ผู้ป่วยเกือบทุกรายมีโรคประจำตัวที่เสี่ยงต่อการเกิดฝี รอยโรคส่วนใหญ่ตรวจพบที่ส่วนกลางของต่อมลูกหมาก ขนาด 0.5 ถึง 2.75 ซม. (เฉลี่ย 1.51 ซม) เชื้อที่พบบ่อยที่สุดได้แก่ มิลิออยโดซิส ภาพที่ได้จากการตรวจด้วยคลื่นเสียงผ่านทางทวารหนัก ของผู้ป่วยมิลิออยโดซิส พบบริเวณที่มีเสียงสะท้อนต่ำ 1 ถึง 2 ตำแหน่ง ร่วมกับผนังภายในรอยโรคดังกล่าว ผนังภายนอกรอยโรคหนา และถูกล้อมรอบด้วยฝีขนาดเล็ก หลังการรักษา 4 สัปดาห์ ตรวจไม่พบฝีในผู้ป่วยทุกราย ไม่ว่าตอนเริ่มต้นรักษา ฝีจะมีขนาดเท่าใด เชื้อเป็นอะไร และรักษาด้วยวิธีใดก็ตาม*

สรุป *: การตรวจด้วยคลื่นเสียงผ่านทางทวารหนัก มีประโยชน์ทั้งในแง่ของการวินิจฉัย และช่วยชี้ตำแหน่งในการระบายหนองจากฝีในต่อมลูกหมาก*