



CODEN [USA]: IAJPBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.3555438>Available online at: <http://www.iajps.com>

Research Article

**ACUTE PROSTATITIS, ETIOLOGY, RISK FACTORS AND
STRATEGY OF TREATMENT**¹Yazeed Naif Almatrafi, ²Abdulaziz Faisal Alrubayyi, ³Hammam Fahad Alkanhal,
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Article Received: September 2019 Accepted: October 2019 Published: November 2019

Abstract:

Prostatitis remains a common and aggravating medical disorder. Further research into improving prostatitis treatments are needed. Due to this reason, in review we discuss the background of acute prostatitis, risk factors and concentrate on prompt diagnosis and treatment methods of this condition. Targeted detailed search was conducted through databases; PubMed/Midline, and Embase, for these articles discussing the Acute Prostatitis, from different aspects and mostly Etiology, risk factors and strategy of treatment, with human subjects published up to October of 2019. Prostatitis might additionally take place without bacterial infection; nevertheless, the root causes of non-bacterial prostatitis are not known. Other factors that can add to development of prostatitis include diabetes mellitus, a suppressed immune system or a viral disease that worries the immune system. Studies have recommended that men with lasting prostatitis may have a somewhat higher opportunity of getting diagnosed with prostate cancer. Although a precise link has not been revealed, males with long-term prostatitis must have regular prostate checks.

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Please cite this article in press Yazeed Naif Almatrafi et al., *Acute Prostatitis, Etiology, Risk Factors and Strategy of Treatment.*, Indo Am. J. P. Sci, 2019; 06(11).

INTRODUCTION:

The prostate gland is placed in the true pelvis and plays a crucial role in the male reproductive system. Its primary function is to secrete alkaline fluid which protect sperm in the acidic environment of the vagina. This alkaline fluid is necessary in order to balance the acidity of the vagina, which grows the general life expectancy of the sperm, enabling utmost span of time to fertilize an egg successfully [1]. The fluid additionally includes proteins and enzymes that supply sustenance of sperm. The added quantity of the prostatic fluid to the seminal fluid and sperm enable much easier mechanical propulsion with the urethra.

Prostatitis represents 25% of all office checkups made to urological clinics and its efficient treatment stays an obstacle [2]. 35 - 50% of men are affected by symptoms suggestive of prostatitis during their life time and the real occurrence is about 8% [3]. "Prostatitis" is heterogeneous syndrome and is categorized by the National Institutes of Health (NIH) agreement classification as chronic prostatitis/chronic pelvic pain syndrome (CPPS). CPPS is split into four groups: (I) acute bacterial prostatitis; (II) chronic microbial prostatitis; (III) chronic prostatitis/CPPS; and (IV) asymptomatic inflammatory prostatitis. Asymptomatic inflammatory prostatitis is specified as inflammatory infiltrates in prostatic tissue that are not recognizably connected with medical signs and symptoms [4]. Swelling occurs in all classifications of disorders, although its systems may differ.

Prostatitis exhibits a bimodal peak of incidence, with men in between 20 and 40 years of age or older than 60 years affected most commonly [5]. The factors for this circulation or potential for confounding by sexually spread infections are unknown. In over 90% of men with fever and urinary system signs, prostatitis is the underlying problem in the absence of pyelonephritis signs [5]. Keeping that, prostatitis makes up nearly 8% of urologist goes to [6].

Generally, prostatitis remains a usual condition and study to improve its management would certainly be valuable.

Prostatitis remains a common and aggravating medical disorder. Further research into improving prostatitis treatments are needed. Due to this reason, in review we discuss the background of acute prostatitis, risk factors and concentrate on prompt diagnosis and treatment methods of this condition.

METHODOLOGY:

Targeted detailed search was conducted through databases; PubMed/Midline, and Embase, for these articles discussing the Acute Prostatitis, from different aspects and mostly Etiology, risk factors and strategy of treatment, with human subjects published up to October of 2019, We restricted this search to only English language published articles.

DISCUSSION:**• Anatomy Of The Human Prostate**

Prostate usually occurs in human body as walnut-sized organ which is at the base of the urinary bladder. The most often used classification to explain the framework of the human prostate is McNeal [7]. McNeal separated the prostate into three major locations that are histologically distinctive and anatomically detached (Fig. 1). These locations are the no glandular fibromuscular stroma that borders the organ and both glandular regions called peripheral and central areas, which consist of a complex yet histologically distinct ductal system. The main area was referred to as a wedge of glandular tissue that constitutes a lot of the base of the prostate and borders the ejaculatory ducts. The peripheral area comprised the remainder of the gland. It surrounded a lot of the main area and prolonged caudally to partially surround the distal portion of the urethra.

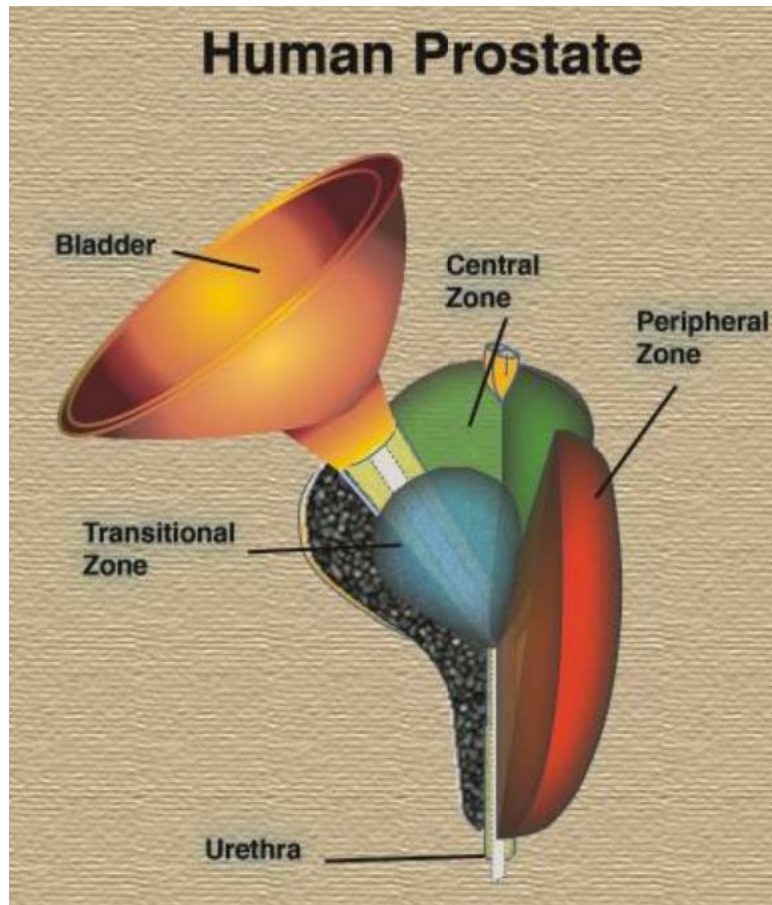


Figure 1. Figure of an adult human prostate showing the urethra and bladder in relation to the three major glandular regions of the prostate as described by McNeal ^[7].

• Prostatitis Classification

In order to classify Prostatitis, it worth to keep in mind that it is a broad medical diagnosis that encompasses 4 scientific entities. It covers from acute febrile health problem calling for prompt antimicrobial treatment to

a subordinate searching for in an asymptomatic male kept in mind throughout an evaluation for other urologic problems. Based upon clinical and laboratory discussion, prostatitis is identified right into the following classifications as suggested by the United States National Institutes of Health (Table 1) [4].

Table 1. National Institutes of Health Consensus Classification of Prostatitis ^[4].

Type	Description
<i>I. Acute bacterial prostatitis</i>	Acute inflammation of the prostate with PMNL and bacteria in urine
<i>II. Chronic bacterial prostatitis</i>	Chronic inflammation of the prostate with PMNL and bacteria in EPS/urine after prostate massage or in semen
<i>III. Chronic prostatitis/chronic pelvic pain syndrome</i> • <i>Inflammatory</i> • <i>Noninflammatory</i>	Symptoms of prostatitis and: • PMNL in EPS/urine after prostate massage or in semen • No PMNL in EPS/urine after prostate massage or in semen
<i>IV. Asymptomatic prostatitis</i>	PMNL and/or bacteria in EPS/urine after prostate massage or in semen or in the prostate tissue in an asymptomatic male

Abbreviations: PMNL = polymorphonuclear leucocytes, EPS = expressed prostatic secretions

- **Etiology**

General 3:1 proportion of group acquired acute prostatitis to nosocomial acute prostatitis. Society generated *E. coli* in (58% of acute prostatitis 68% neighborhood got α acute prostatitis) [8].

Unusual human microorganism such as *Raoultella planticola*, *Listeria monocytogenes*, *Pseudomonas aeruginosa* often can be considered as a reason of acute bacterial prostatitis [9]. There was research works analyzed the clinical and microbiological qualities in between bacterial prostatitis and transrectal biopsy associated acute prostatitis. Moreover, it was documented that 135 individuals admitted in hospitals

for acute prostatitis in 2013. They wrapped up a higher incidence of septicaemia and antibiotic resistance microorganisms in transrectal biopsy relevant individuals then spontaneous acute microbial prostatitis individuals [10].

Enterococci account for 5% to 10% of recorded acute infections. *Neisseria gonorrhoeae* ought to be suspected in sexually active guys more youthful than 35 years [11]. In individuals with immune shortages consisting of human immune deficiency viral syndrome (HIV), microorganisms such as *Mycobacterium tuberculosis*, *Serratia*, *Salmonella*, and fungi (*Candida*, *Histoplasma*, *Aspergillus*, *Cryptococcus*) have been discovered [12].

Table 2. Bacteriology in acute prostatitis [10-12].

Common Organisms	Uncommon Organisms
Escherichia coli (>50% of cases)	Chlamydia trachomatis
Pseudomonas aeruginosa	Fungi (Aspergillus, Candida, Cryptococcus, and Histoplasma species)
Klebsiella species	Mycobacterium tuberculosis
Enterococcus species	Neisseria gonorrhoea
Enterobacter species	Salmonella species
Proteus species	Staphylococcus species
Serratia species	Streptococcus species
	Trichomonas vaginalis
	Ureaplasma urealyticum

- **Risk Factors**

The incidence of mycobacterial prostatitis, concomitant with shared ailment, is raising in underdeveloped countries. Regions with prevalent sexually transmitted disease (STD) percentages and prostitution have a higher occurrence of acute bacterial prostatitis.

The most typical variant of the syndrome is acute bacterial prostatitis for the individuals younger than 35 years. HIV-related disorder is also mainly seen in younger individuals. Most situations of acute microbial prostatitis are caused by ascending urethral infection or intraprostatic reflux and are promoted by many risk aspects (Table 3) [13,14].

Table 3. Risk Factors for Acute Bacterial Prostatitis [13],[14].

Benign prostatic hypertrophy*
Genitourinary infections*
Epididymitis
Orchitis
Urethritis

Urinary tract infection
High-risk sexual behavior
History of sexually transmitted diseases*
Immunocompromised
Phimosis
Prostate manipulation*
Cystoscopy
Transrectal prostate biopsy
Transurethral surgery
Urethral catheterization
Urodynamic studies
Urethral stricture

*—Higher risk for infection.

DIAGNOSIS:

Clinical presentation:

The main difference between ABP and CBP is the accompanied symptoms of infection. Usually, ABP accompanies by sudden and continuous syndromes, while CBP is more discrete. The most widespread symptoms accompanied ABP are high temperature, malaise, myalgias, dysuria, urinary frequency/hesitancy, and pelvic pain. During physical checkups, the prostate seems to be bigger and exquisitely tender to palpation. Moreover, since energetic adjustment of the prostate gland might acutely intensify the patient's problem in ABP, thus this step should be avoided [15]. All the syndromes should be carefully evaluated and analyzed of urinary retention, which may offer with suprapubic inflammation and suprapubic fullness.

Evaluation:

To detect acute bacterial prostatitis usually it is sufficient to examine physical state of the patient along with his background. Physicians should get a urinalysis and midstream urine culture to sustain the

scientific diagnosis before carrying out antibiotics [15], [8].

Blood cultures must be collected before initiating prescription antibiotics in individuals with a body temperature more than 101.1 ° F (38.4 ° C), a possible hematogenous source of infection (e.g., endocarditis with *Staphylococcus aureus*), complicated infections (e.g., sepsis), or that are immunocompromised [17]. Although blood and urine cultures can aid in diagnosis and management, up to 35% of urine cultures in individuals with acute prostatitis will certainly fall short to expand a microorganism [8].

In males who are sexually dynamic and participate in risky sex-related behavior, a Gram stain of urethral swabs, a culture of urethral discharge, or a DNA boosting test should be acquired to assess for *N. gonorrhoeae* and *C. trachomatis* [15].

Urine screening before and after prostatic massage (referred to as the Meares-Stamey 2-glass or 4-glass examination) works in detecting chronic prostate and

pelvic conditions; nonetheless, such testing needs to not be performed in individuals with suspected acute microbial prostatitis since prostatic massage therapy boosts the danger of bacteremia, and ultimately, sepsis.

Several problems existing with similar symptoms and should be distinguished from acute bacterial prostatitis (Table 4).

Table 4. Differential Diagnosis of Acute Bacterial Prostatitis [14-17].

DIAGNOSIS	DISTINGUISHING CHARACTERISTICS
Benign prostatic hypertrophy	Obstructive voiding symptoms; enlarged, nontender prostate; negative urine culture
Chronic bacterial prostatitis	Recurring prostatitis symptoms for at least three months; positive urine culture with each episode
Chronic pelvic pain syndrome	Pain attributed to the prostate with no demonstrable evidence of infection
Cystitis	Irritative voiding symptoms; normal prostate examination
Diverticulitis	Left lower-quadrant abdominal pain; acute change in bowel habits; history of diverticulitis; tenderness to palpation localized to the left lower abdominal quadrant
Epididymitis	Irritative voiding symptoms; tenderness to palpation on affected epididymis
Orchitis	Swelling, pain, and/or tenderness to palpation in one or both testicles
Proctitis	Tenesmus; rectal bleeding; feeling of rectal fullness; passage of mucus through the rectum
Prostate cancer	Presence of constitutional symptoms; presence of nodules on prostate examination

Imaging:

Imaging with computed tomography (CT) scan or ultrasound might disclose an enlarged and inflamed heterogeneously occurring prostate but is not essential unless concern for prostatic abscess exists. Individuals who stay febrile after 36 hours or whose symptoms do not boost with antibiotics ought to undergo transrectal ultrasonography to review for prostatic abscess.

Urine evaluation and culture:

It is very important to do urine evaluation and society in case of acute microbial prostatitis. Midstream urine culture ought to be acquired and evaluated for the visibility of leukocyte. Diagnosis will be positive if the variety of leukocyte per high-power area is more than 10 [8]. If a patient has a palpable bladder or signs and

symptoms consistent with incomplete emptying, documents of residual urine must be done.

• TREATMENT

Acute bacterial prostatitis can be a condition of major attention related to severe local pain, basic signs, and fever. Septicemia and urosepsis are the essential threat aspects for ABP. To deal with ABP, it is essential to consider the following factors: the reason for urinary system blood poisoning, the medication of choice, urinary system drainage, dose regimen, aspects affecting treatment end results, and threat elements mitigating a hospital stay [19].

Outpatient therapy:

The treatment method in acute prostatitis relies on the patient's clinical discussion. Oral therapy is a choice if the patient is not systemically ill, could endure oral

intake, and does not have urinary retention, and this can be given as an outpatient. After urine cultures have been acquired, therapy is based on first urine Gram stain. Gram-negative organisms are typically treated with a fluoroquinolone, such as ciprofloxacin, levofloxacin or enoxacin, or trimethoprim sulfamethoxazole, at a dosage of 160- 800 mg each day. Quinolones are typically favored in these individuals, for their capacity to cover Gram-negative, Gram-positive, and some irregular organisms such as Pseudomonas, Chlamydia, and Mycoplasma [18]. Quinolones likewise gather in the prostatic tissue at a 3- 4-fold higher concentration than antibiotics in the β -lactam family [21].

Inpatient treatment:

For individuals in whom a hospital stay is needed, parenteral antibiotic treatment is launched. Although there is no consensus on the most effective regimen, and local patterns of antibiotic resistance must be considered, broad insurance coverage with a fluoroquinolone plus an aminoglycoside (gentamicin 3- 5 mg · kg- 1/day) with or without a penicillin (for instance, ampicillin 2 g split dosage, 4 times every day) or a second or third-generation cephalosporin (such as intravenous cefuroxime 750 mg 8-hourly, or intravenous or intramuscular ceftriaxone 1 g everyday) are advised [22]. Once the patient is clinically stable, afebrile, and without urinary retention, oral antibiotic treatment is started, based upon the results of blood and urine culture.

Duration:

The duration of antimicrobial treatment for many instances of acute prostatitis ought to be a minimum of 2 weeks, although 4- 6 weeks can sometimes be essential [23]. For instances judged clinically to be uncomplicated and moderate, a 10-day course of a fluoroquinolone can be prescribed [24]. Ciprofloxacin (500 mg twice daily) is most frequently utilized; nevertheless, levofloxacin (500mg day-to-day) has shown equivalent efficiency with once-daily application [21]. Adverse impacts connected with fluoroquinolones consist of drug communications with hepatic metabolic process, ligament tear, phototoxicity, and neurotoxicity- trimethoprim sulfamethoxazole is the preferred treatment if a patient experiences negative effects related to fluoroquinolone therapy. Despite which antimicrobial agent is made use of, urine must be recultured a minimum of 1 week after cessation of treatment to guarantee that the pathogen has been cleared.

Urinary drainage. Around 10 % of men with acute prostatitis will certainly have urinary retention which can be taken care of by suprapubic, periodic or indwelling catheterisation; nonetheless, suprapubic cystostomy positioning is usually suggested [25]. Using catheterisation without evidence of retention may raise the threat of development to chronic bacterial prostatitis [16]. Suprapubic tube placement is optional for those individuals that cannot tolerate a urethral catheter.

Hospitalization:

Hospitalization is required in case of prolonged vomiting, serious dehydration, hyperpyrexia, tachycardia, hypotension, tachypnea and other symptoms related to urosepsis. Hospitalization is suggested for high risk individuals such as: diabetic issues individuals, immunosuppressed individuals, older aged individuals, individuals with prostatic abscess, and those with serious nullifying disorders [19].

Drainage of prostate abscess:

Incision and drain of prostate abscess are required in picked treatment refractory individuals. The transurethral course seems the ideal option, but abscess might be drained pipes through the rectum, perineum, or transperineal path.

Auxiliary measures:

In order to reduce the signs and symptoms consisting of fever, it is advised to make use of nonsteroidal antiinflammatory agents [19]. For individuals that specifically present reasonably severe obstructive voiding signs and symptoms, it is a good idea to take Alpha-blockers in order to reduce the risk of urinary retention and convenience micturition [20].

• COMPLICATIONS:

If the patient fails to enhance with prescription antibiotics, a prostatic abscess needs to be believed, specifically in males that are immunocompromised, have diabetic issues mellitus or who have had current instrumentation of the urinary system tract [26]. Both computed tomography (CT) and transrectal ultrasound may be utilized to identify a prostate abscess [27]. If perineal leak of the abscess is prepared, ultrasound might guide the treatment [28]. Nevertheless, if surgical debridement of the abscess is prepared, a CT scan may be extra valuable to define borders of the abscess, prepare the surgical strategy and to explore for other irregularities in the genitourinary system [28].

Prostatitis might lead to urosepsis with considerable connected death in individuals with diabetic issues mellitus, individuals on dialysis for chronic kidney failure, individuals who are immunocompromised, and postsurgical individuals that have actually had urethral instrumentation.

Other potential sequelae of acute microbial prostatitis consist of progression to chronic prostatitis, septicemia, pyelonephritis, and epididymitis. Almost 10% of individuals with acute bacterial prostatitis develop chronic prostatitis and another 10% establish chronic pelvic pain disorder [26].

CONCLUSION:

Acute bacterial prostatitis is brought on by bacteria and is the easiest type of prostatitis to diagnose and treat, although severe complications might develop if it is not treated swiftly. Decreased fertility has actually been reported, but just in cases of massive microbial vaccination. Prostatic abscess is an uncommon however well-described complication of acute bacterial prostatitis. Although very rare, it normally happens in individuals who are immunocompromised, that have diabetes, who have urethral instrumentation or a prolonged indwelling urethral catheter, or that are on maintenance dialysis.

Prostatitis might additionally take place without bacterial infection; nevertheless, the root causes of non-bacterial prostatitis are not known. Other factors that can add to development of prostatitis include diabetes mellitus, a suppressed immune system or a viral disease that worries the immune system. Studies have recommended that men with lasting prostatitis may have a somewhat higher opportunity of getting diagnosed with prostate cancer. Although a precise link has not been revealed, males with long-term prostatitis must have regular prostate checks.

Therapy for prostatitis is standardized with antibiotics as the primary agents, empirically carried out in acute prostatitis and after sensitivity screening in chronic microbial prostatitis. Fluoroquinolones exhibit even more beneficial pharmacological properties; for that reason, fluoroquinolones have been recommended as first-line representatives in the therapy for chronic bacterial prostatitis. Antibiotic resistance to fluoroquinolones, however, is enhancing and is posing substantial medical troubles. Refresher courses on alternate anti-biotics energetic within the prostate are as a result needed.

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