Chronic bacterial prostatitis

Definition
- Represents type II prostatitis in the NIH classification system.
- It is a prostatic parenchymal infection lasting at least 3 months which may appear as a complication of acute prostatitis or in the absence of any initial infection.
- Suspected in cases of urinary symptoms without signs of acute prostatitis in men between the 2nd and 4th decade of life with recurrent infections (without catheterization) or in the context of an incidental bacteriuria.

Pathogenesis
- Incidence: affects 5-10% of patients with chronic prostatitis.
- The formation of biofilms or colonies of bacteria densely bonded together and wrapped in a gelatinous matrix which serves as a barrier to the antimicrobial immune response is a factor that perpetuates the intraprostatic infection. Bacteria that grow in conventional cultures would be referred to as free-floating or planktonic.
- E. coli is the most common microorganism (80% of cases), but it may also involve:
  - Accepted microorganisms:
    - Escherichia coli
    - Klebsiella spp.
    - Proteus mirabilis
    - Enterococcus faecalis
    - Pseudomonas aeruginosa
  - Doubtful microorganisms:
    - Staphylococcus
    - Streptococcus
    - Corynebacterium spp.
    - Chlamydia trachomatis
    - Ureaplasma urealyticum
    - Mycoplasma hominis
    - Mycobacterium tuberculosis

Symptoms
- Pain:
  - perineal (46%).
  - scrotal (39%).
  - penile (6%).
  - suprapubic (6%).
  - lumbosacral (2%).
  - inside of the thighs.
- Changes in semen: determinants of infertility.
- Sexual manifestations: erectile dysfunction, painful ejaculations, and even hematospermia.
- Urinary disorders: dysuria, urgency, frequency, and nocturia.
- DRE: nonspecific, ranging from a soft, normal prostate to a congestive, painful prostate.

Diagnosis
- Urinalysis: useful only for suspected acute prostatitis as pyuria is normally found.
- Urine culture with significant bacterial counts (>100,000 cfu/mL) in the culture of the midstream fraction of the urine.
- Exfoliative cytology of the prostate: detects the intense inflammatory reaction caused. Its interpretation is based exclusively on the recognition of polymorphonuclear cells, histiocytes, macrophages, lymphocytes, and plasma cells. Considered positive if there are >20 cells/40x field.
- PSA: may be high, but does not add specific information on prostatitis. One month should elapse after the diagnosis of prostatitis before screening for PC; this is the period necessary for PSA values to normalize after antimicrobial treatment.
• **Urodynamic study**: an increase in maximum urethral closure pressure will be observed along with a decrease in voiding flow, as well as increased voiding time and detrusor sphincter dyssynergia. The increased pressure facilitates the reflux of urine into the prostate.

• **Transrectal ultrasound**: can show intraprostatic abscesses, prostatic lithiasis, or seminal dilations. Can be accompanied by a biopsy in cases of diagnostic confusion.

• **Split culture analysis**: the main diagnostic method ([Fig 1](#)). It is based on obtaining separate cultures with significant counts from:
  - *Initial portion (5-10 mL) of the urine (VB₁)*.
  - *Midstream portion (5-10 mL) of the urine (VB₂)*.
  - *Expressed prostatic secretion (collected after massage) (EPS)*.
  - *Final portion (5-10 mL) of the urine (post-massage) (VB₃) with remnants of EPS*.
  - *Semen culture*: the fact that over 50% of healthy men have microorganisms in their semen cultures confirms its total ineffectiveness when used alone. Needs to be performed together with a split culture analysis to avoid false results (contamination).

---

**Fig 1. Stamey-Meares four-glass test**

• **The split culture analysis is considered + for chronic bacterial prostatitis if there is:**
  - Presence in prostatic secretions, post-massage urine, or semen of one or more *Gram*-negative bacteria that do not grow in cultures of the initial or midstream urine or when the counts for one microorganism are higher in a logarithmic split.
  - The VB₂ count must be <10³ cfu/mL since bacteriuria originating in the bladder prevents the identification of prostatic bacteriuria, which is quantitatively less.
  - The presence of more than 20 leukocytes/field in VB₃ is also significant.
  - When these criteria are not met, it is either a different non-bacterial prostatic syndrome or a false negative.
  - When counting *Gram*-positive bacteria, the split culture analysis is repeated and if the same microorganism is found, it is considered to be the cause and treated.
• **Mini-split**: because many urologists (>80%) feel that 4-glass testing is complicated and uncomfortable for the patient, two reduced testing forms have been developed:
  
  - **VB2 and VB3 samples**: Similar accuracy to 4-glass testing.
  - **VB1 and semen culture samples**: semen should be more sensitive than EPS in detecting Gram-positive and negative bacteria.

### Treatment

**Treatment**

- The intraprostatic diffusion of antimicrobials depends on:
  
  - *Shape and size* of the molecule.
  - *Binding* of the molecule to proteins.
  - *Liposolubility*.
  - *pH gradient*.
  - *Ionization*.

- **The high antimicrobial resistance rates** of *E. coli* to *Fluoroquinolones, Co-trimoxazole*, and *Ampicillin* should be taken into account before proceeding with empirical treatment.

- **The following are considered appropriate antimicrobials** for treating type II prostatitis:

<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Brand name®</th>
<th>Oral dose</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doxycycline</td>
<td>DOXYCYCLINE</td>
<td>1 caps of 100 mg/12 h</td>
<td>4 wks</td>
</tr>
<tr>
<td>Trimethoprim</td>
<td>TRIMETHOPRIM</td>
<td>1 caps of 160 mg/12 h</td>
<td>4 wks</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>CIRO</td>
<td>1 tab of 500 mg/12 h</td>
<td>4 wks</td>
</tr>
<tr>
<td>Levofloxacin</td>
<td>TAVANIC</td>
<td>1 tab of 500 mg/12-24 h</td>
<td>4 wks</td>
</tr>
</tbody>
</table>

- **The use of alpha-blockers** improves symptoms and reduces recurrences. Their mechanism of action may be related to a decrease in intraprostatic urethral resistance, which would theoretically limit reflux of urine into the prostate.

<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Brand name®</th>
<th>Oral dose</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alfuzosin</td>
<td>XATRAL, UROXATRAL</td>
<td>1 tab of 10 mg/24 h</td>
<td>4 wks</td>
</tr>
<tr>
<td>Doxazosin</td>
<td>CARDURA</td>
<td>1 tab of 4-8 mg/24 h</td>
<td>4 wks</td>
</tr>
<tr>
<td>Silodosin</td>
<td>SILODYX, RAPAFO</td>
<td>1 caps of 8 mg/24 h</td>
<td>4 wks</td>
</tr>
<tr>
<td>Tamsulosin</td>
<td>OMNIC OCAS, FLOMAX</td>
<td>1 caps of 0.4 mg/24 h</td>
<td>4 wks</td>
</tr>
<tr>
<td>Terazosin</td>
<td>HYTRIN</td>
<td>1 tab of 2-5 mg/24 h</td>
<td>4 wks</td>
</tr>
</tbody>
</table>

- **Prostate massage**: may have a beneficial effect through three mechanisms:
  
  - Relief of obstruction and increased ductal and acinar drainage.
  - Fragmentation of bacterial *biofilms* to allow antimicrobial diffusion.
  - Increased blood flow, which produces better distribution of drugs.

- **Intraprostatic injection of antimicrobials**: reserved for intractable relapses.

- **Possible evolution** after treatment:
  
  - **Complete healing**: the patient should be monitored.
  - **Recurrence**: prophylaxis with *Fluoroquinolones* for 6 months.
  - **Refractory infection**: prophylactic antimicrobials ± preventive regimen ± surgery.

- **So-called “Female prostatitis”**: a term coined by Gittes that refers to the inflammation/infection of Skene’s paraurethral glands. It presents with the appearance of pain when the paraurethral tissue is pressed against the back of the pubis during a digital vaginal examination. It is treated with *Tetracyclines* (in ♀ <30 years) or *Quinolones* (in ♀ >30 years) coupled with local application of heat and prophylactic application of antifungal vaginal cream.
Treatment of Chronic bacterial Prostatitis or Type II

Oral antimicrobial treatment (4 weeks):
- **Fluorquinolones** 500 mg/12 h
- **Trimethoprim** 160 mg/12 h
- **Doxycycline** 100 mg/12 h

- **Improvement**
  - Follow-up and localization cultures
- **No improvement**
  - Full-dose antimicrobial treatment 6 months
- **Recurrence**
  - Low-dose prophylactic antimicrobial treatment 6 months

- Pelvic CT scan
  - Transrectal US
  - Intraprostatic Abscess
  - Evaluation for prostatic surgery
  - US-guided drainage