IDBR INFECTIOUS DISEASE BOARD REVIEW AUGUST 22-26, 2026

Prostatitis, Epididymitis, and Orchitis

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6/4/2026

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IDBR INFECTIOUS DISEASE BOARD REVIEW AUGUST 22-26, 2026

Disclosures of Financial Relationships with Relevant Commercial Interests

- None

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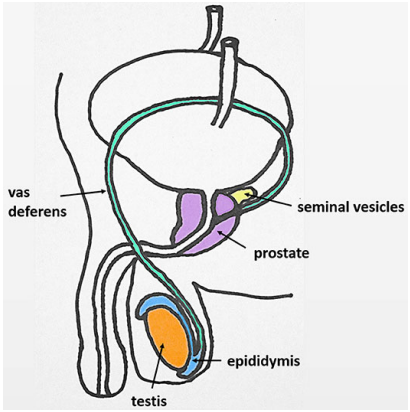
Overview

- Epididymitis
- Prostatitis
  - Acute
  - Chronic
- Prostate biopsy
- Orchitis



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Case #1

A 72 year-old man presented to the emergency room with fever, urinary retention. No culture sent. Sent home with transurethral catheter and ciprofloxacin. Walked into Infectious Diseases clinic one month later with the urinary catheter is still in place. Temp 102.5, costovertebral angle tenderness present on exam. Admitted and started on ciprofloxacin.

Blood cultures: *Serratia marcescens (sensitive to cipro)*

Urine cultures: *Serratia marcescens and Klebsiella pneumoniae (both sensitive to cipro)*

On hospital day 2, he is still febrile to 102.3, and he reports right testicular pain/swelling. He says this was present for the past 7 days but is more obvious now.

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Case #1 continued

Given his fevers on 2 days of ciprofloxacin, and the new awareness of right testicular pain and swelling, your next step is to:

A. Add vancomycin to cover enterococci
B. Order a scrotal ultrasound
C. Add doxycycline for coverage of sexually transmitted infections
D. Consult urology emergently for testicular torsion

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Case #1 continued

Given his fevers on 2 days of ciprofloxacin, and the new awareness of right testicular pain and swelling, your next step is to:

A. Add vancomycin to cover enterococci--no, we already know the causative organisms, and both are covered by ciprofloxacin
B. Order a scrotal ultrasound—yes, let's see what's going on with that right testicle
C. Add doxycycline for coverage of sexually transmitted infections—no, we already know he has bacteremia from a urinary source, and persistent fever at 48 hours is normal for pyelonephritis and epididymitis
D. Consult urology emergently for testicular torsion—this is not a leading concern, and if he had torsion for 48 hours, you are already too late

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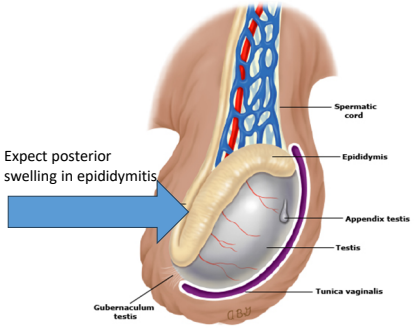
Normal testicular anatomy

Expect posterior swelling in epididymitis



The testicle is vertical and its anterior portion is surrounded by the tunica vaginalis.

UpToDate®

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Epididymitis: Clinical Presentation

- Testicular pain, swelling, and tenderness
- Scrotal erythema
- Fever
- Dysuria or other urinary irritative symptoms
- Urethral discharge
- Reactive hydrocele can occur
- Epididymo-orchitis if testes also inflamed
- Gradual onset (if sudden, consider testicular torsion)
- Cremasteric reflex is preserved

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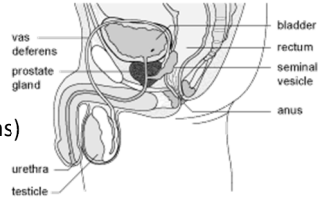
Risk factors for epididymitis

- Urinary outlet obstruction
- Prostate biopsy
- Urinary tract instrumentation
- Immunosuppression (atypical organisms)
- Insertive anal intercourse
- Sexually transmitted infection
- Any condition that facilitates retrograde flow of urinary bacteria



Workowski et al, Sexually Transmitted Infections Treatment Guidelines, 2021
Recommendations and Reports / Vol. 70 / No. 4
UpToDate Acute Scrotal Pain in Adults

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Etiologic agents of epididymitis

>14 and < 35 years of age: typically sexually transmitted

- *Neisseria gonorrheae*
- *Chlamydia trachomatis*
- *Mycoplasma genitalium*

Chronic or atypical

- *Mycobacterium tuberculosis*
- *Brucellosis*
- *Nocardia*
- *Blastomycosis*

> 35 years of age: enteric flora or spread from urine

- *Escherichia coli*
- *Klebsiella*
- *Proteus*
- *Pseudomonas*
- Enterococci

McGowan, Chapter 110, in Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, 9th edition

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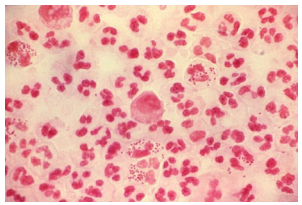
Workup of epididymitis

- Physical exam
  - Intact cremasteric reflex
  - Testes in normal location
  - No draining sinus
- Gram stain of urethral secretions
- Urinalysis and urine culture
- Nucleic acid amplification test (NAAT) of urine
  - *N. gonorrhoeae*
  - *C. trachomatis*
- Consider blood cultures
- If progression of soft tissue involvement
  - Consider necrotizing fasciitis
- Failure to improve within 48-72 hours
  - Scrotal ultrasound
- Call urology if concern for torsion



https://en.wikipedia.org/wiki/Neisseria_gonorrhoeae

Gram stain of urethral discharge

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Differentiating epididymitis from torsion

Table 1. Selected Differential Diagnosis of Acute Scrotum

Condition	*Typical presentation*	*Examination findings*	*Ultrasound findings*
Epididymitis	Gradual onset of pain that occasionally radiates to the lower abdomen; symptoms of lower urinary tract infection	Localized epididymal tenderness that progresses to testicular swelling and tenderness; normal cremasteric reflex; pain relief with testicular elevation (Prehn sign)	Enlarged, thickened epididymis with increased blood flow on color Doppler
Orchitis	Abrupt onset of testicular pain	Testicular swelling and tenderness; normal cremasteric reflex	Testicular masses or swollen testicles with hypoechoic and hypervascular areas
Testicular torsion	Acute onset of pain, usually severe	High-riding transversely oriented testis; abnormal cremasteric reflex; pain with testicular elevation	Normal-appearing testis with decreased blood flow on color Doppler

Trojian, American Family Physician, 2009

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Treatment of epididymitis

- If most likely STI (chlamydia or gonorrhea)
  - Ceftriaxone for *N. gonorrhea*
  - Doxycycline for chlamydia
- If risk for STI *and* enteric organisms
  - For example, insertive anal sex
  - Ceftriaxone for *N. gonorrhoeae*
  - Levofloxacin for chlamydia and enteric flora
- If most likely enteric organisms
  - For example, recent urologic procedure or catheterization or prior UTI
  - Levofloxacin, TMP/SMX
- For all: scrotal elevation and cold packs

UpToDate Acute Scrotal Pain in Adults
CDC https://www.cdc.gov/std/treatment-guidelines/epididymitis.htm
Trojian, American Family Physician, 2009

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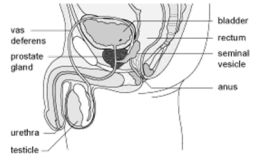
Epididymitis: Management and Complications

- Medical management
  - Antibiotics
  - NSAIDS
  - Scrotal elevation and ice packs
- Complications
  - Testicular infarction
  - Scrotal abscess
  - Epididymo-orchitis



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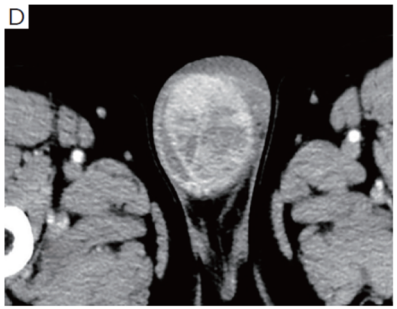
Case #2

- 63 year-old man currently living homeless in Houston presented with a gradually enlarging, painful right testicle over the past 4 months
- Afebrile and he has thickened right scrotal skin but no fistula on exam
- WBC 15,000; negative HIV, AFP, RPR, and beta-HCG
- CT with contrast shows uneven enhancement of right testes and epididymis; the left epididymis was also enlarged with diffuse enhancement
- What test would you NOT do next?
  - A. TB spot
  - B. Urine culture for AFB
  - C. Testicular biopsy
  - D. Urine PCR for TB



Li, Chen, Fang et al, Quant Imaging Med Surg 2021; 11(6)

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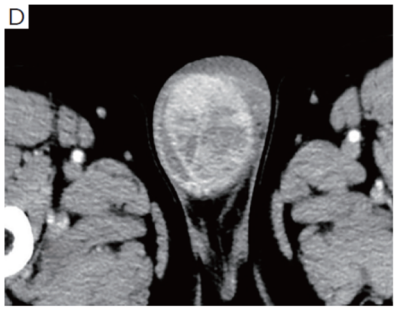
- What test would you NOT do next?
  - A. TB spot
  - B. Urine culture for AFB
  - **C. Testicular biopsy-contraindicated in germ cell tumor, also can be insensitive/false negative**
  - D. Urine PCR for TB



Li, Chen, Fang et al, Quant Imaging Med Surg 2021; 11(6)

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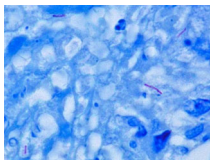
Tuberculous epididymo-orchitis

- Genitourinary TB typically starts in the epididymis
- Hematogenous or contiguous spread (direct from sexual contact)
- Presents as painful scrotal mass
- Imaging may reveal bilateral involvement
- TB testing often positive
- Diagnosis: AFB stain, culture, and PCR of urine
  - Consider also prostatic secretions
- Avoid fine needle biopsy if any concern for germ cell tumor
- Fistulas, abscesses, and infertility can result if untreated



Yadav et al, Transl Androl Urol 2017
Liu et al, Surgical Infections 2021
Li et al, Quant Imaging Med Surg 2021

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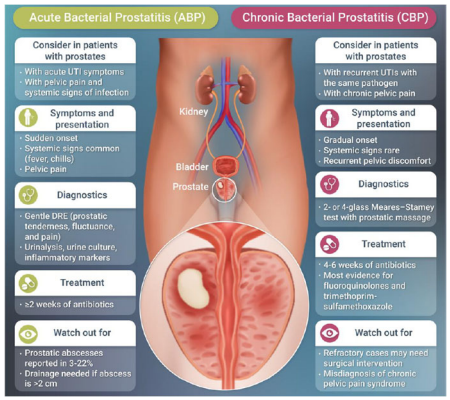
Acute and Chronic Bacterial Prostatitis



Kulkarni et. al, State of the Art Review of Prostatitis, CID 2025

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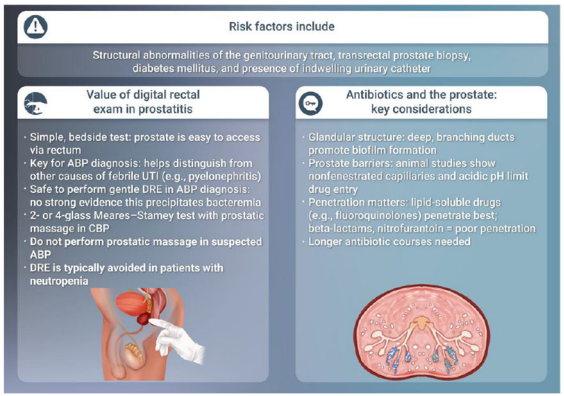
Acute and Chronic Bacterial Prostatitis



Kulkarni et. al, State of the Art Review of Prostatitis, CID 2025

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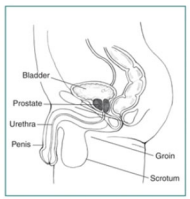
Prostatitis NIH Consensus Categories

- I Acute bacterial* prostatitis
- II Chronic bacterial* prostatitis
- III Chronic prostatitis/chronic pelvic pain syndrome
  - IIIA Inflammatory
  - IIIB non-inflammatory
- IV Asymptomatic inflammatory prostatitis
  - Incidental finding, no need to treat



*includes non-bacterial pathogens, such as fungal organisms

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Understanding the Prostatitis NIH Consensus Categories

Condition	Bacteriuria	Localized to Prostate	Abnormal Rectal Exam	Systemic Illness
I Acute Bacterial Prostatitis	+	+	+	+
II Chronic Bacterial Prostatitis	+	+	+/--	–
III Chronic Pelvic Pain Syndrome	–	–	–	–
IV Asymptomatic Inflammatory Prostatitis	–	–	+/--	–

McGowan, Chapter 110, in Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, 9th edition

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Understanding the Prostatitis NIH Consensus Categories

Condition	Bacteriuria	Localized to Prostate	Abnormal Rectal Exam	Systemic Illness
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McGowan, Chapter 110, in Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases, 9th edition

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Case #3

A 69 year-old man presents with pain in the lower abdomen, rectum, and perineum for the past 48 hours. He has chills and nausea in addition to urinary urgency, frequency, and dysuria. Gentle digital rectal examination finds a painful and swollen prostate. He has not been able to pass urine for the past 10 hours.

Management should include:

A. Nitrofurantoin
B. Urology consultation for catheterization
C. Culture of expressed prostatic secretions
D. PSA (prostate specific antigen) levels

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Case #3

A 69 year-old man presents with pain in the lower abdomen, rectum, and perineum for the past 48 hours. He also has chills in addition to urinary urgency, frequency, and dysuria. Gentle digital rectal examination finds a painful and swollen prostate. He has not been able to pass urine for the past 10 hours.

Management should include:

A. Nitrofurantoin-doesn't penetrate tissue or help with bacteremia
B. **Urology consultation for catheterization**—may need suprapubic, or transurethral placed with care
C. Culture of expressed prostatic secretions-do not massage the prostate firmly as this may cause bacteremia
D. PSA (prostate specific antigen) levels—will be elevated, non-specific

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Acute bacterial prostatitis: clinical presentation

- Acutely ill patient
- Prostatic tenderness is the distinguishing feature
- Fever, chills, irritative urinary symptoms
- Lower abdominal, rectal, or perineal pain
- Voiding difficulties
- Pathogenesis: from infection in the urinary tract, prostate biopsy, or hematogenous spread
- Risk factors: urinary catheters, urinary stasis, urinary instrumentation

UpToDate Acute Bacterial Prostatitis
Brede and Shoskes, Nat Rev Urol 2011

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Infectious prostatitis: Causative agents

Acute > 60% caused by

- *Escherichia coli*
- *Proteus*
- Other Enterobacterales
- *Pseudomonas*
- Staph, strep, enterococci
- *Salmonella typhi* (HIV)
- Burkholderia (traveler to SE Asia or N. Australia)
- STI: gonorrhea or chlamydia

Chronic or immunocompromised

- Same organisms as acute prostatitis
  - Enterococci more common
- Mycobacteria
- Fungal
  - Cryptococcus
  - Histoplasma
  - Aspergillus
  - Coccidioidomycosis
  - Candida
  - Blastomycosis
- Brucella

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Diagnostic workup of prostatitis

- Physical exam
  - Painful prostate
- Urinalysis and urine culture
- Consider blood cultures
- Failure to improve within 48-72 hours
  - Prostate ultrasound, computed tomography (CT) scan, MRI
- Call urology if unable to void

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Antibiotic treatment of acute bacterial prostatitis

- Most common pathogens are *E. coli* and other Enterobacterales
  - Microbiologic causes are very diverse
- Acute prostatitis, critically ill
  - Start broad—cephalosporins, pip/tazobactam, carbapenems, +/- aminoglycoside
  - Treatment duration 2-4 weeks
- Oral options: fluoroquinolones, sulfonamides, tetracyclines, macrolides, fosfomycin all penetrate the prostate
- Chronic prostatitis
  - Duration unclear—4, 6, 12 weeks all reported

Lipsky et al, Clinical Infect Dis 2010
Schaeffer and Nicolle, NEJM 2016
Chou et al, Drugs 2022
Brehm, ID Clin North America 2023
UpToDate Chronic Bacterial Prostatitis

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Case #4

A 72 year-old man presents with pain in the perineum, penile tip, and scrotum, which has been going on for the past three months. He had lower back pain a week ago, but the pain has since subsided. He has had two episodes of UTI with burning on urination in the past six months. On physical examination, his prostate is boggy and tender to palpation. What is the most common cause of a chronic form of this condition?

A. Herpes

B. Chlamydia

C. *E. coli*

D. Candida

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Case #4

A 72 year-old man presents with pain in the perineum, penile tip, and scrotum, which has been going on for the past three months. He had lower back pain a week ago, but the pain has since subsided. He has had two episodes of UTI with burning on urination in the past six months. On physical examination, his prostate is boggy and tender to palpation. What is the most common cause of a chronic form of this condition?

A. Herpes

B. Chlamydia

C. ***E. coli*** —most likely cause of chronic prostatitis especially given the history of recurrent urinary tract infection

D. Candida

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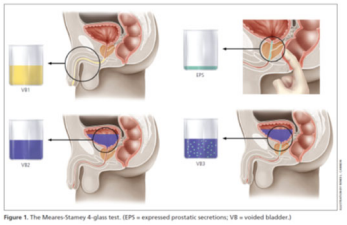
Chronic bacterial prostatitis

- Patients not acutely ill
- Recurrent UTI with same organism is common
- The four-glass Mears-Stamey test is cited often
- In practice urologists more often do the **two-glass test**
  - Urine samples pre/post prostatic massage
  - 10-fold higher bacterial counts post massage

Sharp et al, Am Fam Physician 2010



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Case #5

A 58-year-old man presents with fever and shaking chills the day after undergoing transrectal prostate biopsy for possible prostate cancer. Prior to the biopsy, he had received one dose of oral ciprofloxacin. He was treated with trimethoprim-sulfamethoxazole for a UTI 3 months prior.

In the emergency department, his temperature is 101.5, and he has rigors. He reports rectal pain and difficulty voiding. His creatinine is normal. Blood and urine cultures are sent. Which of the following antibiotics would be **the best empiric choice**?

A. Amikacin

B. Fosfomycin

C. Ciprofloxacin

D. Trimethoprim-sulfamethoxazole

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In the emergency department, his temperature is 101.5, and he has rigors. He reports rectal pain and difficulty voiding. His creatinine is normal. Blood and urine cultures are sent. Which of the following antibiotics would be **an appropriate choice**?

A. Amikacin- reasonable choice with normal renal function. Carbapenems and 3rd generation cephalosporins also reasonable.

B. Fosfomycin-does not reach adequate levels in bloodstream

C. Ciprofloxacin-the organism is presumably resistant

D. Trimethoprim-sulfamethoxazole—too risky in suspected bacteremia given widespread *E. coli* resistance, especially with recent exposure to TMP/SMX

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Antibiotic prophylaxis for transrectal prostate biopsy

- Strongly recommended
- Pre-procedure antibiotics reduce the risk of bacteriuria, symptomatic UTI, bacteremia, fever, acute prostatitis, hospitalization
- No one best choice
- Options include fluoroquinolones, TMP/SMX, aztreonam, fosfomycin, and ceftriaxone plus gentamicin
- One dose, one hour to the procedure
- No benefit seen for enemas prior to procedure
- Infection after biopsy often caused by fluoroquinolone-resistant *E. coli*

Zani et al, Cochrane Review, 2011

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Case #6

A 55 year-old man with HIV/AIDS (CD4 32) was referred to urology for obstructive voiding symptoms. Prostate exam revealed asymmetric enlargement. Urinalysis and urine culture unremarkable. Ultrasound showed bilateral nodules consistent with malignancy. Biopsy revealed:

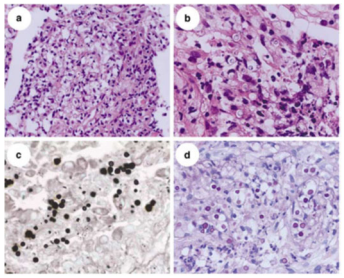
A. Candida

B. E. coli

C. Cryptococcus

D. Aspergillus

E. Nocardia



Wada et al, Prostate Cancer and Prostatic Dis 2008
Adams et al, Urology 1992
Wise and Shteynshlyuger, Curr Urology Rep 2006

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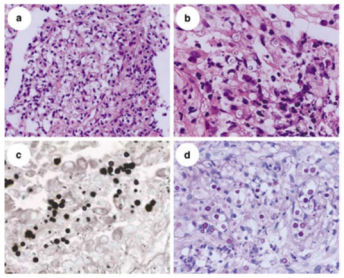

Granulomas with round organisms that are clearly yeast on silver stain and have visible capsules

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Case #7

A 35 year-old man who is a member of a religious group that does not support vaccination attended a wedding in Nebraska. Two days later he developed pain in his left ear and jaw tenderness. Eleven days later he had noticeable swelling under both sides of his jaw, fever, and painful swelling of his left testicle. The likely causative agent is:

A. Mumps
B. Measles
C. *Escherichia coli*
D. *Neisseria gonorrhea*

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A 35 year-old man who is a member of a religious group that does not support vaccination attended a wedding in Nebraska. Two days later he developed pain in his left ear and jaw tenderness. Eleven days later he had noticeable swelling under both sides of his jaw, fever, and painful swelling of his left testicle. The likely causative agent is:

A. Mumps-parotid swelling and orchitis
B. Measles
C. *Escherichia coli*
D. *Neisseria gonorrhea*

https://www.scientificamerican.com/article/a-mumps-outbreak-among-fully-vaccinated-people/

https://www.cdc.gov/mumps/about/photos.html

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Orchitis (isolated involvement of testes)

- Viral infections are common
  - Mumps
  - Coxsackie B
  - Lymphocytic choriomeningitis
- Bacterial
  - Contiguous spread from epididymis
  - Same organisms as epididymitis
    - *E. coli* and other enterics
    - Also same rare organisms (TB, fungal)

https://www.environmentandsociety.org/arcadia/mumps-post-secondary-environment-targeted-advertising-2007-2008-alberta-mumps-vaccination

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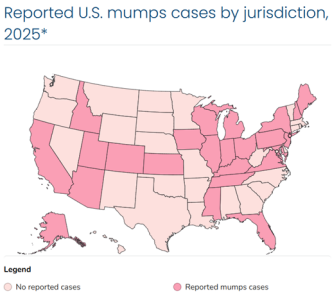
Mumps in the United States



https://www.cdc.gov/mumps/outbreaks/index.html

- Rising since 2006
- Outbreaks in communities with close contact
- Vaccine effectiveness 88% for 2 doses
- PCR testing more reliable than IgG and IgM

Lam, et al. Mumps, Clin Microbiol Rev 2020

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To Wrap Up:

- Epididymitis
  - Consider sexually transmitted infection versus *E. coli* and other enteric flora
- Prostatitis
  - Consider acute bacterial prostatitis in men with febrile UTI—detected by physical exam
  - Consider chronic bacterial prostatitis in men with recurrent or relapsing UTI
- Fungal, TB, and other indolent organisms (Brucella) can invade and infect the male genitourinary tract
- Isolated orchitis is rare in adults—consider viral etiology

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Is everything clear now?

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- @bwtrautner

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