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Scrotal pain in a young man...

Medical Student Case-based Learning

A 26 year-old gentleman presents to clinic, reporting new onset of right scrotal pain over the last 4-5 days.

What is your differential diagnosis?

Differential Diagnosis

- Differential diagnosis: torsion, trauma, testicular mass, Fournier's gangrene, scrotal abscess, scrotal cellulitis, epididymo-orchitis.
 - Torsion is not likely considering onset is over 4-5 days.
 - A testicular mass is usually not tender to palpation.
 - Fournier's gangrene is typically associated with fever and lethargy; in addition, on exam, there can be a dusky appearance of the overlying skin and subcutaneous crepitus. It is a surgical emergency, but very unlikely in this situation.
 - We will know after further interviewing and examination.

What else do you want ask him?

HPI

- Determine if he has urinary urgency/frequency, hematuria, dysuria, penile discharge, constitutional symptoms (fatigue, weight loss, fevers, chills), cough.
- Ask him about position change (pain better/worse with standing, lifting, raising the scrotum, etc).
- Ask him if he has engaged in any recent foreign travel.
- Ask about comorbidities (type 1 DM, immune status, history of malignancies).
- Ask him about his recent sexual activity.

HPI

- An effective strategy for obtaining a sexual activity history are the “five Ps:” **P**artners, **P**regnancy prevention, **P**rotection from STI, sexual **P**ractices, and **P**ast history of STIs.

Three weeks ago, he went on a business trip to Brazil where he had unprotected intercourse with a female colleague he thought he knew well. She currently has no symptoms. No GU trauma. He reports yellow/gray penile discharge, occasional dysuria, and right-sided scrotal pain. He has no history of prior STIs.

- Which STIs are associated with rashes, ulcers, exudates, and raised lesions?
- What are the signs/symptoms associated with syphilis?
- What are aids-associated lesions (i.e., Kaposi's sarcoma)?

How do you perform a genitourinary physical exam?

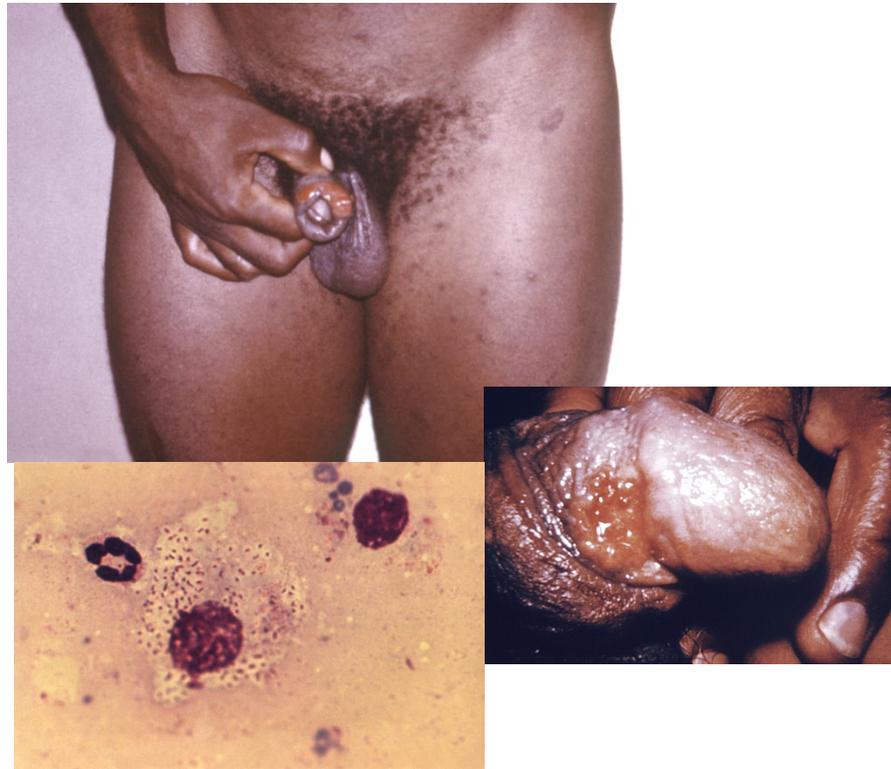
AUA National Medical Student Modules demonstrating the Male GU Exam:

[Male GU Exam](#)

Cutaneous Lesions of STIs

- Painless, beefy red ulcer that bleeds easily (vascular).
- More common in tropics.
- Caused by *Klebsiella granulomatis* (previously known as *Calymmatobacterium granulomatis*), an intracellular gram-negative bacterium.
- Presence of Donovan bodies (rod-shaped, oval organisms in the cytoplasm of monocytes) confirms diagnosis.

Granuloma inguinale



Cutaneous Lesions of STIs

- One or more painful genital ulcers.
- Women often have four or more ulcers.
- 1/3 of those infected have tender or suppurative nodes.
- The most common location for ulcers in women is the labia majora, sometimes resulting in bilateral “kissing ulcers.”
- Caused by the *Haemophilus ducreyi*.

Chancroid



Cutaneous Lesions of STIs

Lymphogranuloma venereum

- Small genital ulcer may resolve before patient presents.
- Usually presents as inguinal adenopathy; large, suppurative lymph nodes.
- Enlarged nodes are known as buboes and are usually painful.
- Uncommon in USA.
- If acquired rectally, can cause proctocolitis and colorectal fistulas/strictures.
- Caused by *C. trachomatis* L1-L3.

Cutaneous Lesions of STIs

- Primary syphilis is characterized by a painless *chancre* (firm skin ulceration), unless superinfected.
- Secondary syphilis is characterized by nongenital skin lesions (diffuse rash frequently involving the palms of the hands and soles of the feet), adenopathy.
- Latent syphilis has no symptoms.
- Tertiary syphilis is characterized by gummas (soft, granuloma-like lesions), which can be found in the liver, brain, heart, bone, testis, and other tissues, with associated neurologic and cardiac symptoms.
- Caused by a spirochete, *Treponema pallidum*.

Syphilis



Cutaneous Lesions of STIs

- A group of vesicles on an erythematous base that does not follow a neural distribution.
- Painful.

Genital herpes



Cutaneous Lesions of STIs

- Causes genital warts.
- Over 40 serotypes.
- HPV 16 and 18 with oncogenic potential (cervical, penile, vaginal, oropharyngeal, and anal).
- HPV 6 and 11 cause 90% of warts, lower cancer risk.
- Quadrivalent vaccine (Gardasil) immunizes against 6, 11, 16, and 18 (70% of cancer, 90% of warts); must be started before sexually active.

HPV



FIG. 4. Large penile condyloma accuminata. (Courtesy of Drs. C. Mackley and B. Anderson, Department of Dermatology, The Pennsylvania State University College of Medicine)

Image from, Reese, CT and Kaag, MG, *AUA Update Series, Lesson 40: Sexually Transmitted Disease in Urology*, Vol. 23, 2004.

Cutaneous Lesions of STIs

- Not all genital lesions are STIs.
- Consider carcinoma, erythema multiforme, fixed drug eruption, Bechet's disease, and lichen planus.

AIDS-Associated Lesions

- Severe infections (abscess, Fournier's).
- Increased incidence of malignancies: Kaposi's sarcoma (possibly involving the genitalia), squamous malignancies of the genitalia, testis malignancy (germ cell tumors and lymphomas), and renal malignancy.

A comprehensive GU exam finds tenderness to palpation is at the posterolateral aspect of the right scrotum, with an indurated epididymis. No cutaneous lesions visualized on exam; no hernia or testicular mass palpated on exam.

What additional diagnostics would you like to confirm the diagnosis?

Would Imaging be informative in this particular setting?

Diagnostics

- This is likely epididymitis in the setting of an STI, considering he is a young sexually active male, with urethral discharge, dysuria, and right epididymal pain.
 - No findings of a distinct testicular mass or scrotal wall changes are noted on exam.
 - Scrotal cellulitis would usually include warmth/erythema at the overlying skin on exam.
 - Scrotal abscess usually includes fluctuance on exam.
- Additional diagnostics: urine analysis with bacterial urine culture and susceptibility; nucleic acid amplification testing (NAAT) of urine/fluid sample.

Imaging

- Considering the likely diagnosis of epididymitis, in the setting of STI, it would be reasonable to provide empiric treatment, withholding imaging as long as he responds.
- If imaging was pursued, a scrotal ultrasound be appropriate.
- It would demonstrate increased blood flow to the epididymis and testis, consistent with inflammation/infection.

He expresses disbelief that he has an STI, as his partner had “no symptoms” and “looks healthy.”

Approximately how many new sexually transmitted infections (STIs) are diagnosed each year?

STIs affect people of all ages, ethnicities, and sexual orientations. (true or false?)

What segments of the population are at high risk for STIs?

STI Epidemiology

- Nearly 20 million new STIs are diagnosed in the U.S. annually.
- True: STIs impact people of all ethnicities, ages, and backgrounds.
- Those populations at highest risk for STIs include:
 - Adolescents and young adults (those aged 15-24 years old account for almost half of all incident STIs).
 - Racial and ethnic minorities.
 - Men who have sex with men (MSM) account for approximately 70% of reported cases of primary and secondary syphilis, along with more than 50% of HIV-positive individuals.

What are typical presentations of STI?

- What are **female-specific** presentations of STI?
- What are **male-specific** presentations of STI?
- What are **gender-neutral** presentations of STI?

Female STI Presentations

- Cervicitis/vaginitis: purulent endocervical exudate and sustained endocervical bleeding induced by passage of a cotton swab through the cervical os.
 - Common organisms include *Chlamydia trachomatis* and *Neisseria gonorrhoeae*.
 - Others include organisms responsible for bacterial vaginosis (BV, *Gardnerella vaginalis*), herpes-simplex virus (HSV), trichomoniasis (*Trichomonas vaginalis*), and *Mycoplasma genitalium*.
 - BV is not really considered an STI, but having a new or multiple sexual partners can cause imbalance in the bacterial milieu of the vagina, increasing the risk of BV.
 - Secondary to the capillary dilation, in the setting of the inflammatory response, 2% of woman with trichomoniasis will have a “strawberry cervix,” (*colpitis macularis*, an erythematous cervix with pinpoint areas of exudation) or vagina on examination
 - Testing includes microscopic evaluation of an endocervical specimen (for BV and trichomoniasis) and NAAT of urine/fluid for *C. trachomatis* and *N. gonorrhoeae*.

Female STI Presentations

- Pelvic Inflammatory Disease (PID) symptoms include lower abdominal and pelvic pain, heavy vaginal discharge with odor, dyspareunia, dysuria, and systemic symptoms.
 - Diagnostic criteria include one of the following: pain on cervical motion, uterine or adnexal tenderness.
 - High rate of infertility, especially if not treated early.
 - Treat all sex partners in the preceding sixty days.

Male STI Presentations

- Epididymitis/Orchitis: pain and swelling of the testicles, usually unilateral.
 - In young men, common organisms consist of *C. trachomatis* (70%) and *N. gonorrhoeae* (30%); in older men, *E. coli* (not an STI) is the cause of the majority of cases.
 - Chronic infectious epididymitis can be seen in granulomatous disease, often *Mycobacterium tuberculosis*.
- Proctitis/Proctocolitis:
 - Symptoms include tenesmus, rectal bleeding, abdominal pain, diarrhea, rectal mucus, and pain bowel movements.
 - Common organisms: *N. gonorrhoeae*, *C. trachomatis D-K*, *C. trachomatis L1-L3* (lymphogranuloma venereum), *Treponema pallidum* (syphilis), and HSV (especially among those with HIV).
 - Additional etiologies: *Campylobacter*, *Shigella*, *Endamoeba*, CMV, and *Giardia lamblia*.

Gender-neutral STI Presentation

- Urethritis: symptoms include dysuria, discharge, and pruritis, however, patients may be asymptomatic as well.
 - Commonly divided into 1) gonococcal and 2) non-gonoccal urethritis.
 - *N. gonorrhoeae* is the most common gonococcal organism.
 - Non-gonococcal organisms include: *C. trachomatis*, *M. genitalium*, *T. vaginalis*, and *Ureaplasma urealyticum*.
 - Urethral discharge could be examined with microscopy. With a swab, one would look at a gram stain: intracellular gram negative diplococci is consistent with gonorrhea. A gram stain with WBCs and no bacteria is consistent with non-gonoccal urethritis.
 - Culture in Thayer-Martin medium inhibits growth of other microbes and allows growth of *N. gonorrhoeae*.
 - Testing for *N. gonorrhoeae* or *C. trachomatis* using nucleic acid amplification testing (NAAT) of urine/body fluid has become prevalent in use.

What are treatment options?

Treatment

- Standard treatment for a young man (<35 yro) with epididymo-orchitis includes a course of a fluoroquinolone.
 - However, ciprofloxacin does not reliably cover chlamydia.
- Chlamydial infection is a concern considering his recent sexual activity.
 - Thus, would treat him with either azithromycin 1 gm PO once OR doxycycline 100 mg PO twice daily x7 days.
- Dual therapy for empiric treatment of common co-infection with *N. gonorrhoeae* should be considered as well.
 - Secondary to *N. gonorrhoeae* resistance, quinolones are not an effective option.
 - Administer a third generation cephalosporin (i.e., ceftriaxone 250 mg), as a single IM dose, for empiric treatment.
- NSAIDS are prescribed for analgesic control; the pain may persist longer than infection, secondary to resolving inflammation.

He agrees to the doxycycline course and ceftriaxone IM injection. Diagnostics return in 24 hours; what does he have?

His diagnosis...

- NAAT of urine returns with a positive result for *C. trachomatis*, thus chlamydia.
- Men with chlamydia can present with symptoms including dysuria, urethral discharge, and epididymitis.
- *C. trachomatis* is the most common cause of epididymitis in young men.
- Most women with chlamydia are asymptomatic or have minimal symptoms.
- In men, diagnosis is often made with NAAT on urogenital or rectal samples.
- In women, diagnosis is most often made using NAAT on endocervical or urine samples.
 - NAAT is not a culture so sensitivities to antibiotics are not obtained with this test.
 - Pharyngeal infections can occur in men and women; these can be diagnosed with NAAT, as long as the test has been validated.
- NAAT was negative for gonorrhoeae; still though, not unreasonable to have treated him for co-infection, especially if compliance with follow up was a concern.

What are adverse sequelae of
untreated infections?

Adverse Sequelae

- Untreated infection can lead to PID (the effects of which were previously discussed).
- A rare complication of untreated chlamydial infection in men and women: Reactive Arthritis Syndrome
 - Triad of urethritis, conjunctivitis, and painless mucocutaneous lesions.

Additional Counseling

- If he engages in unprotected intercourse, he should also consider undergo testing for HIV and syphilis.
- He should contact his co-worker with which he had recent intercourse, to give her the opportunity to also receive evaluation and treatment.
 - All sexual partners exposed within 60 days should be evaluated/treated; if none, evaluate and treat the most recent partner.
 - Some states allow expedited partner therapy, where the patient is given medication to take to his/her partner. Check <http://www.cdc.gov/std/ept/legal/default.htm> for information.
 - The CDC recommends annual screening for chlamydial infection in all sexually active women 24 years and younger and in women older than 24 years old who are at risk of STI.

Additional Counseling

- Engage in prevention counseling: the importance of using male/female condoms, spermicides, vaccination for hepatitis A/B and HPV, pre-exposure prophylaxis (PrEP), and post-exposure prophylaxis (PEP).

Which STIs are reported to the appropriate health department agencies?

Reportable STIs

- Syphilis
- Gonorrhea
- Chlamydia
- Chancroid
- HIV infection and AIDS
- Other STIs: reporting requirements vary by state.

In a pre-pubertal boy with epididymo-orchitis, what else should be considered in the evaluation?

Evaluation in a pre-pubertal boy?

- An ectopic ureter from a duplicated system can drain into the vas deferens or seminal vesicle and predispose to epididymo-orchitis.
- While not common, it has been reported and should be considered in this population.

If this were an older patient (>35 yro) with epididymo-orchitis, what else should be considered in the evaluation?

Evaluation in an older man (>35 yro)?

- One should consider obtaining a post-void residual (with bedside ultrasound), to ensure bladder outlet obstruction/urinary retention, is not contributory.

Why would a urologist be
involved in the care of a STI?

Urologist involvement in treatment of STI...

- Urologists care for the genitoruinary system, including the external genitalia and perineal region.
 - Thus, a patient may present as a self-referral, with symptoms.
- STI may be discovered as a secondary issue, while evaluating him/her for an unrelated issue (i.e., hematuria).
- Urologist care may be needed for excision of genital warts (HPV).
- Urologist may be caring for patients with existing short/long term STIs (i.e., HIV), which may have medication side effects, or additional sequelae, that need to be monitored.
 - Protease inhibitors can have booster action (inhibit Cyt P450), can form stones (especially indinavir), and be nephrotoxic (indinavir).

Summary

- The differential diagnosis for scrotal pain should include torsion, trauma, testicular mass, Fournier's gangrene, scrotal abscess, scrotal cellulitis, epididymo-orchitis.
- Obtain a sexual history using the “five Ps.”
- Age should certainly impact your pretest probability of a etiology for particular diagnosis (i.e., ectopic ureter vs STI vs urinary retention).
- An excellent website for additional STI information: <http://www.cdc.gov/STD/>

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