`Week 7
iHUman Heather
Miller
25 yo F 5'5 #135
Cc: pain with urination

Good Questions: 100% with these

1. how can i help you today

- **"I have been burning when I pee. I was worried that I had another bladder infection, but these symptoms are a little different than the symptoms I had with my last UTI."**

2. do you have any other symptoms we should discuss

- **"Yes. I also have a vaginal discharge.**

3. has there been a change in your urinary frequency

- **Well, yeah. Seems like I feel I have to go every 10 to 15 or 20 minutes, but I resist due to the pain.**

4. when did the pain with urination start

- **About 3 days ago.**

5. is the pain better or worse at the start or end of urination

- **Worse when starting, but it doesn't really let up.**

6. what is the appearance, smell texture and quantity of the vaginal discharge

- **Oh boy…I hate having to answer these questions. Yellow, kind of mucousy, kind of creamy. Not really too smelly.**

7. do you have vaginal discomfort or itching
- **no**

8. how severe is your pain/discomfort with urination

- **Makes me not want to go, even though I have to!**

9. is your urine pink or red in color

- **Haven't seen any.**

10. does anything make you pain/discomfort with urination better or worse

- **Soaking in a warm bath helps.**

11. have you had problems or discomfort with urination like this before

- **Yes, with my bladder infection last year. But this seems different.**

12. are you sexually active

- **Yes, I am.**

13. do you have pain with intercourse

- **No, but I haven't had sex since this all started.**

14. are you having or have you had unprotected sex

- **I'm on the pill, so I guess I'm protected in that way. For STD's, not so much.**

15. do you use precautions to prevent the transmission of sexual infections
- **Nothing other than the pill.**

16. do you have more than one sexual partner
- **Yes.**

17. do you have new or multiple sexual partners with similar symptoms
- **Well, no one has told me he has any problem.**

18. have you had any sexually transmitted infections
- **Not that I know of.**

19. do you feel that when you urinate that you need to urgently
- **Urgent. Oh, I know what that's like! I remember when I had that bladder infection, when I had to go I literally had to RUN to the bathroom. I haven't noticed that so much with this.**

20. when did your last period begin
- **About two-and-a-half weeks ago.**

21. are your immunizations up to date
- **I think so.**

22. are you taking any over the counter medications
- **Yeah, sometimes I take ibuprofen with my period, You know, like for cramps and headaches.**

23. any new or recent change in medications
- **No changes.**

24. do you have any allergies
- **Not that I know of.**

25. Do you have any problems with itchy scalp, skin changes, moles, thinning hair, or brittle nails.
- **None of any of that.**

26. Do you have any problems with fatigue, difficulty sleeping, unintentional weight loss or gain, fevers, or night sweats?
- **Well I'm a bit worn out from having to get up and pee all the time. It's hard to get a good night's sleep. What else was it that you asked?**

27. Do you have any problems with nausea, vomiting, constipation, diarrhea, coffee grounds in your vomit, dark tarry stool, bright red blood in your bowel movements, early satiety, or bloating?
- **Whoa. Blood in my stools or vomiting nasty stuff? No. None of that.**

28. DO you have any problems with heat or cold intolerance, increased thirst, increased swelling, frequent urination, or change in appetite?
- **Well, I'm here because of my peeing problems.**

29. Do you have any problems with muscle or joint pain, redness, swelling, muscle cramps, joint stiffness, joint swelling, joint redness, back pain, neck or shoulder pain, or hip pain?
- **Uh…no.**

30. Do you experience any SOB, wheezing, difficulty catching you breath, chronic cough, or sputum production?
- **No.**

31. Do you experience any chest pain, discomfort, or pressure; pain, pressure, or dizziness with exertion or getting angry; palpitations, decreased exercise intolerance, or cold/blue fingers and toes?
- **That's quite a long list, but no, none of that.**

32. Do you have genital sores or discharge?
- **No sores, but we were talking about the other.**

33. Have you had vaginal discharge discomfort like this before
- **I have had yeast infections before, but this is different.**

34. Have you been having fevers
- **No, not really.**

35. Do you have bleeding between your menstrual
- **No.**

Exercise One is True

Physical Exam: 100% with these

1. Look at EHR for Vitals
2. Inspect eyes - *Eyelids: no ptosis erythema or swelling,*
Conjunctivae: pink, no discharge Sclerae: anicteric. Orbital area: no edema, redness, tenderness or lesions noted
3. Inspect mouth/pharynx - *Oropharynx not injected, clear mucosa, tonsils without exudate.*

Tongue pink, symmetrical. No swelling or ulcerations.
4. Inspect skin overall - *Skin is pink, warm, and slightly moist with no lesions seen. Normal skin turgor.*
5. Palpate all lymph nodes - *No pathologically enlarged lymph nodes in the cervical, supraclavicular, axillary, or inguinal chains.*
6. Auscultate lungs - *Clear and equal t/o.*

B/L +2 edema of feet and ankles. Prominent varicose veins to the knees bilaterally. Normal stability, strength normal

7. Auscultate heart - *normal*
8. Inspect abdomen - *abdomen is flat, nondistended, and symmetric. No scars, deformities, striae, or lesions.*
9. Auscultate abdomen - *normoactive*
10. Palpate abdomen - *Abdomen soft, non-tender to palpation; no guarding or rebound. No hepatosplenomegaly; liver span normal; spleen is not palpable. No masses or abnormal pulsations. No inguinal lymphadenopathy. No suprapubic tenderness.*
11. Percuss back and spine - *No costovertebral angle tenderness (CVA) tenderness.*
12. GU female exam - d
13. Visual inspection rectal area - No visible fissures, induration or lesions.

Key findings:
Dysuria x 3 days
Mucopurulent Vaginal discharge
Urinary frequency
Intercourse without condom
use Friable cervix
Hx of bladder infection 1 yr
ago Multiple sexual partners
MSAP: severe dysuria x 3 days
PMH: None
Hospitalizations/Surgeries: None
Medications: Oral contraceptive pills (OCP): ethinyl estradiol/drospirenone and ibuprofen for menstrual cramps
Allergies: NKDA
Preventative Health: Last pap smear 1 year ago: no Hx of abnormal results. Previous screening for STDS.
Immunizations:
No previous HPV vaccination. General immunization status: Patient states she thinks she is up to date.
Family Hx: Mother: DM Father: HTN, CAD, hyperlipidemia Older sister: alive and well
Social Hx: Works as a consultant; travels frequently. Alcohol: 1 to 2 times per week; 4 to 5 drinks per occasion. No substance use. former smoker status; approximately 2-pack-year Hx.

Dx tests: I got 100% with these

1. Chlamydia- (swab/PCR)
2. Herpes simplex culture & typing
3. Neisseria gonorrhoeae, (+) (swab/PCR)
4. HIV 1 and/or 2 antibody, blood
5. HcG (urine),
6. Potassium hydroxide preparation test KOH,

7. Urinalysis,
8. Urine Culture,
9. Vaginal wet mount/vaginal smear "saline wet mount"

Not recommended at this time- Vaginal PH, STI screen, pap smear, amine/whiff test

Diagnosis: cervicitis

This got me DDX100%, DDX Ranking 100%, MNM 100%
I did this as well and got 100 across the board

Your Differential Ranking

Differential Diagnosis	Your Lead	Your Alt	Your MNM
bacterial vaginosis	○	◉	☐
candida vaginitis	○	◉	☐
cervicitis	◉	○	☐
herpes, genital	○	◉	☐
pelvic inflammatory disease (PID)	○	◉	☑
urinary tract infection (UTI)	○	◉	☑

Exercise 1 of 4 : cervical swab pcr
2 of 4: BV
3 of 4: trichomonas vaginalis
4 of 4: candida
Exercise 7 of 9 - all of the above
8 of 9 - all of the above
9 of 9 - trichomoniasis, gonorrhea & chlamydia

Plan:

Expert's Feedback (FROM IHUMAN FOUND ONLINE)
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Cervicitis: Culture-proven, uncomplicated gonorrhea
Patients with vaginitis and cervicitis often present with similar symptoms. It is important to characterize the vaginal discharge: Evaluation of odor, color, and quality of discharge can help to narrow your differential diagnosis. Further, it

will help you determine if the discharge is related to bacterial vaginosis and/or trichomoniasis (both usually associated with increased odor); or, related to candida, gonorrhea, or chlamydia, any of which may be odorless, and often have minimal associated symptoms. It is difficult to differentiate between cervicitis and vaginitis based on symptoms and history alone.

Ceftriaxone

250 mg IM × 1 dose:
Gonorrhea has shown increasing resistance to antibiotics. Over the past 5 years, fluoroquinolone resistance has emerged, and this class of antibiotics is no longer recommended for treatment of gonorrheal infection. Oral third- generation cephalosporins, such as cefixime, also are no longer recommended due to increasing resistance.
Ceftriaxone remains the recommended treatment for gonorrhea; the one-time dosage has increased to 250 mg IM.

Azithromycin 1000 mg orally × 1 dose:
Azithromycin is used for empirical treatment of presumed concurrent chlamydia infection. It is also used to treat ceftriaxone-resistant gonorrhea; but, resistance to azithromycin is also on the increase.
Doxycycline can be used as an alternative in women who are not pregnant or breast feeding.

Other actions and recommendations include:

- Contact and treatment of recent sexual partners
- Counseling regarding use of barrier protection and risk of STIs
- Recommend pap smears per current guidelines
- Recommend HIV, HepB, and syphilis screening
- Recommend HPV vaccination, as this patient is less than 26 years old

HPV vaccinations were introduced several years ago, based on 2 large randomized control clinical trials of more than 17,000 sexually active, HPV-naive females. Those trials showed a vaccination efficacy of 97-100% in preventing CIN2/3 or more severe diseases (adenocarcinoma in situ or adenocarcinoma) in these patients. After 4 years of follow-up, the efficacy of the vaccine fell to 44%. As many of these patients were sexually active, it is not clear how many may have already acquired the disease before HPV vaccination. Even though we do not know if this particular patient is an HPV carrier, or if she has been exposed, this efficacy rate is high enough to recommend vaccination for this patient to prevent CIN 2/3, adenocarcinoma in situ, or adenocarcinoma.
All patients seeking treatment for STIs should be screened routinely for HIV, regardless of whether the patient has suspected risk behaviors for HIV infection.

Case Summary

Learning objectives

At the conclusion of this case, you should be able to do the following:

- Identify the risk factors for acquiring a sexually transmitted infection (STI).
- Describe the key elements for evaluating a patient with vaginal discharge, including microscopic evaluation, and laboratory evaluation.
- Identify possible organisms/infections that can cause vaginal discharge, including gonorrhea, chlamydia, bacterial vaginosis, trichomoniasis, and candida vaginitis.
- Describe the microbiology of the various organisms that cause vaginal discharge.
- Describe definitive treatment of gonorrhea and empiric treatment of chlamydia.
- List the common infections that can cause urethritis.
- Explain the pharmacology of the various antibiotics used to treat STIs.

Clinical pearls

Chlamydia is a very common infection with 1.2 million cases reported to the CDC each year, and an estimated actual incidence of 2 to 3 million new cases per year. Screenings of females less than 25 years of age have shown that 5% of asymptomatic sexually active females are infected with chlamydia. Studies have also shown that up to 90% of all infected females are asymptomatic. Chlamydia can carry serious long-term consequences, including infertility due to involvement of the uterus or fallopian tubes. In addition, such infections can cause a locally and/or systemically disseminated disease that can cause intra-abdominal abscesses (tubo-ovarian abscesses), perihepatitis, inflammatory arthritis, or other systemic infections.

Gonorrhea, though still a common STI, has been decreasing in incidence over the past several decades. Currently, gonorrhea predominantly affects young, nonwhite, unmarried, less educated members of urban populations. There were estimated to be 300,000 new cases in 2008. Gonorrhea transmission from men to women is disproportionately high, with an average transmission risk of 40-60% per 1 unprotected

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Complications related to gonorrhea include endometritis/salpingitis (10-15% of untreated cases), tubo-ovarian abscess, bartholinitis, perihepatitis (though this is more common with chlamydia), disseminated gonococcemia with skin lesions, tenosynovitis, arthritis, and endocarditis.

Cervical discharge *without* evidence of vaginitis is likely due to chlamydia or gonorrhea. Organisms responsible for cervical discharge *with* vaginitis can include trichomonas vaginalis and those bacteria (poorly defined) associated with bacterial vaginosis. Simple gram-stain or wet-mount lab tests can help differentiate between these bacterial organisms.

	Gonorrhea	Chlamydia	BV	Trichomonads	Candida
pH (4.0-4.5)	Normal	Normal	> 4.5	> 4.5	Normal
Amine test	Negative	Negative	Positive	Positive	Negative
Wet mount	Increased PMNs	Increased PMNs	Clue cells > 20%	PMNs with motile trichomonads (60%)	Negative

KOH Micro	Negative	Negative	Negative	Negative	Pseudohyphea (70%)
Gram stain	Gram negative diplococci	Intracytoplasmic GNR	Gram negative rods	Trichomonads	Negative

BV, trichomoniasis, chlamydia, and gonorrhea increase a patient's chance of contracting HIV.

Basic-science pearls

Gonorrhea is caused by the bacterium *Neisseria gonorrhoeae*, a gram-negative diplococcus with several outer surface proteins that allow the bacteria to attach to and invade columnar epithelial cells; such attachment initiates phagocytosis. This protein is also responsible genetic competence. The opacity (outer) protein allows gonorrhea adherence to PMNs, while the porin protein comprises > 50% of the outer surface proteins and is responsible for the gonorrhea serotype.

Gonorrhea's antibiotic resistance is due to a single-step mutation that leads to a high level of resistance. This is why gonorrhea has become resistant to multiple classes of medication so quickly.

Chlamydia is seen as an intracytoplasmic inclusion by direct fluorescent antibody testing. It is a non-motile, gram-negative, obligate intracellular bacterium that survives in 2 morphologic forms. One is the elementary body, which is the infectious form and able to survive extracellularly; the second, the reticulate body, is noninfectious but provides replication within cells.

Bacterial vaginosis is thought to be related to changes in the vaginal flora caused by a decrease in the normally dominant hydroxide-producing lactobacilli. Various "environmental factors" decrease lactobacilli in the vaginal flora; this allows for a predominance of gram-negative rods that create local conditions leading to vaginitis. Causative organisms are thought to include *Gardnerella vaginalis*, *Prevotella species*, *Porphyromonasspecies,* Bacteroides *species*, *Peptostreptococcus* species, *Mycoplasma hominis*, *Ureaplasma urealyticum*, and

Patient disposition

The patient received ceftriaxone and azithromycin in the medical office. She returned for follow-up in 1 week with complete resolution of symptoms. At that visit, she had an annual pap smear and completed STI screening. Tests for syphilis and HIV were both negative. The patient had received HepB immunization as a child with evidence of current active titers. She received an HPV vaccination at follow-up, as she is still less than 26 years of age. The patient required assistance contacting all previous partners to notify them of recommended screening and treatment. Her case was reported to the Chicago Department of Public Health.