

Facilitator Preparation: Facilitators should thoroughly review this module. They should also prepare or photocopy handouts to distribute during the course of the case presentation and the “Materials for Learners” packet.

Open the Discussion: Introduce the case title and the objectives of the session. Explain that this will be an interactive case discussion prompted by a series of multiple choice questions and not a lecture. Distribute Part I of the case and ask one or more of the participants to read it aloud.

The Burning Issue

Sexually Transmitted Diseases

Case Author:

Areej Hassan MD MPH
*Harvard Medical School
Boston Children’s Hospital*

Expert Content Reviewer:

Elizabeth R. Woods MD MPH
*Harvard Medical School
Boston Children’s Hospital*

Objectives:

- Review the differential diagnosis for dysuria
- Take a sexual history from an adolescent
- List common sexually transmitted diseases (STDs) in adolescents
- Review STD treatment guidelines
- Discuss diagnosis and management options for pelvic inflammatory disease (PID)

Part I:

Introduction:

A 17 year old girl in the twelfth grade at the local high school presents to your office for an urgent care visit. From the outset, Anna appears uncomfortable, not making eye contact and shifting around in her chair. She is complaining of five days of burning with urination. She has never had these symptoms previously.

Past Medical History:

Anna has been in the office several times in the past two years for urgent care (gastroenteritis, viral pharyngitis and respiratory infections) but has not had a recent annual physical examination; no previous health problems. Her last annual visit notes no sexual activity. No history of prior urinary tract infections (UTIs).

Anna does not take any medications regularly.

Following this reading, ask all participants “So what do you think about this case? What would you like to focus on during our discussion today?” List agenda items on a blackboard or flipchart. Then use the questions below to start the discussion. Remember that the key to successfully leading a small group is facilitation of the discussion rather than lecture. Draw as many participants as possible into the

discussion. Allow silences while group members think about questions.

Potential Discussion Questions:

What is Anna's main complaint today? Define dysuria.

- Dysuria is defined as pain and/or burning sensation associated with urination
- Location and timing of dysuria may be helpful information to elicit. Cystitis is often described as internal pain (bladder spasms from starting and stopping) and worse at the end of voiding; external pain is usually associated with vaginitis or vulvar irritation.
- Adolescents with no history of UTIs may have difficulty differentiating location of pain.

What other history would be important to obtain from Anna?

In addition to determining if previous history of UTIs, clinicians should ask specific questions regarding the appearance of urine and timing of dysuria, a menstrual history, a comprehensive review of systems, and a detailed sexual history:

- Urinary history: change in appearance (color, turbidity) and smell to urine, presence of blood, presence of end-voiding pain or bladder spasm/pain
- Comprehensive review of systems including presence of genital ulcers, pruritus, vaginal discharge, fever, nausea, abdominal pain, back pain, flank pain, urinary hesitancy or frequency, joint pain or swelling, rash, and oral lesions
- Menstrual history: last menstrual period, irregular bleeding or spotting
- History of sexual activity including vaginal, oral, and anal sex
 - To understand your risks for infections, I need to understand the kind of sex you have had recently...have you ever had vaginal sex (meaning penis in vagina sex)? Have you ever had anal sex (meaning penis in rectum)? Have you ever had oral sex (meaning mouth on penis or vagina)?
- Age at first intercourse
- Contraceptive history, use of condoms
 - What are you doing to prevent or prepare for pregnancy?
 - What do you do to protect yourself from STDs?
 - Do you use condoms some of the time? Most of the time? Always? What percent of the time do you use condoms?
- Pregnancy history
 - Have you ever been pregnant?
- Previous screening for STDs
 - Have you ever been tested for an STD? Have you ever been told you had an infection?
- Number of lifetime sexual partners, including same-sex encounters
 - How many partners have you had sex with?
 - Do you have sex with guys, girls, or both?
- History of survival sex, sexual victimization, unwanted or coerced sex
 - Have you ever been forced to have sex? Have you ever done anything sexual that made you uncomfortable?

Facilitators should ask participants about specific wording of questions they have found to be most helpful.

What is the differential diagnosis of dysuria?

The most common disorders are listed below:

- Cystitis or pyelonephritis: E.coli, staphylococcus saprophyticus, proteus, klebsiella sp
- Urethritis/cervicitis/vulvovaginitis:
 - Chlamydia trachomatis
 - Neisseria gonorrhoea
 - Ureaplasma
 - Herpes simplex virus
 - Candida sp
 - Group A streptococcus
 - Trichomonas vaginalis
 - Mycoplasma

Less common diagnoses, but should still be considered in the differential:

- Trauma: minor injury can cause urethral irritation
- Local dermatitis secondary to irritants: Sprays, detergents, perfumed body wash
- Lichen sclerosis
- Vaginal ulcers: EBV, CMV, Behcet's syndrome, chancroid
- Urinary stones
- Skene gland abscess
- Endometriosis
- Interstitial cystitis

Should you talk to this teenager alone?

- Teens need to be seen alone, even if only briefly to ask sensitive questions, including a sexual history. Explaining this to the parent is important.
- Confidentiality should be protected for teens related to STD diagnosis and treatment unless a clinician identifies a serious risk
- An adolescent girl should be offered the choice of having her mother (or female guardian) in or out of the room during the external examination. Chaperones (e.g., a nurse or medical assistant) are recommended for all adolescents needing exam of breast, ano-rectal or genital areas and should be offered as an option to both male and female patients by all providers. Per AAP guidelines, situations in which providers should use chaperones regardless of patient preference include: evidence of mental health issues in the patient or parent, developmental issues, or presence of significant anxiety or tension regarding the examination.

Distribute Part II of the case (including Figure 1) and have participant(s) read it aloud.

Part II:

Next Steps:

Anna denies urinary urgency, frequency, or hesitation. She thinks her urine appears the same – she has not noted any blood in the urine, no foul smell, and no cloudiness. Comprehensive review of symptoms is negative for fever, chills, nausea, vomiting, abdominal pain, flank pain, and vaginal discharge. Her last menstrual period was three weeks ago. Menses are usually regular and she describes no intermenstrual spotting.

Anna informs you that she became sexually active over a year ago. Through your questioning, you find out that she has had vaginal intercourse with three male partners. Last intercourse was over two weeks ago. She informs you that she has neglected to use condoms on several occasions. Anna has not been using any form of birth control other than condoms. She is worried because she thinks that her last partner was cheating on her. After a long pause, she admits that she had received a message from this partner blaming her for giving him a sexually transmitted infection. She has no other information and does not know the name of the infection.

Physical Exam:

Distribute Figure 1

Anna appears anxious but is otherwise comfortable, and in no acute distress. She is afebrile with a normal heart rate and blood pressure. Her abdomen is soft with normal bowel sounds and no suprapubic tenderness; there is no costovertebral angle (CVA) tenderness. She has Tanner V pubic hair distribution, external genitalia appear normal with no lesions or ulcerations. On speculum exam, mucopurulent vaginal discharge seen in vaginal vault (distribute figure 1). Shotty, nontender inguinal lymphadenopathy bilaterally. On bimanual exam, there is no significant cervical motion tenderness, no adnexal or uterine tenderness. She ambulates without difficulty. The remainder of the exam is within normal limits.

Figure 1: Muculopurulent vaginal discharge



Image: Mucopurulent vaginal discharge, CDC STD Prevention Module (PID)
Retrieved from <http://www2a.cdc.gov/stdtraining/self-study/pid/pid-sb5.asp> 10/31/13

Pause and begin next set of discussion questions.

Potential discussion questions:

Identify and discuss “red flag” risk factors of an STD?

- Multiple sexual partners
- Incorrect, inconsistent, or lack of condom use
- Previous STD infection
- Early coitarche
- High risk sexual behavior (e.g. rectal intercourse)
- Youth (adolescents and young adults)

Should a pelvic exam always be completed on adolescents who present with dysuria?

- In all sexually active adolescent females presenting with urinary symptoms, a careful gynecologic examination is strongly recommended unless the patient has a well documented history of recurrent UTIs
- Adolescent females reporting urinary symptoms are equally likely to have a UTI or an STD; symptoms do not reliably differentiate between the two.
- At minimum, an external genital exam should be completed to evaluate for urethral or vulvar pathology (e.g., HSV). A complete pelvic exam with speculum is recommended for sexually active girls presenting with vaginal discharge, dyspareunia, abdominal, and/or pelvic pain to further evaluate for cervicitis or pelvic inflammatory disease.

What further workup would you consider?

- Urine dipstick and/or formal UA.
- In confirmed or suspected sexually active patients, Nucleic Acid Amplification Tests (NAATs) for GC and Chlamydia: NAATs can be performed on urine, vaginal, or endocervical specimens. If sending a urine specimen, a first-catch urine specimen should be obtained at least one hour after the last void (initial 10-20 cc of urine will include urethra organisms, and female patients should not cleanse labial area prior to providing urine sample). NAATs are more sensitive and specific than cultures.
- Urine culture: clean catch midstream collection of urine.
- If there are symptoms or signs of vaginal discharge, assessment is needed with wet preps (saline, 10% KOH), whiff test (positive if fishy/amine odor noted when several drops of KOH are added to discharge), pH test (normal pH < 4.5), or NAAT testing.
- Urine HCG.

Distribute urine dipstick result, urine gram stain, and evaluation of vaginal discharge results and have participants evaluate for abnormalities.

Leukocyte Esterase 1+	Ketones -----
Nitrite -----	Urobilinogen -----
pH 5	Bilirubin -----
Protein trace	Blood -----
Glucose -----	Specific gravity 1.025

Urine gram stain negative for organisms.

Urine HCG: negative

Vaginal discharge:

- pH 4.5
- Negative whiff test
- NS slide: Squamous epithelial cells with no adherent coccobacilli (clue cells); >10 WBCs per high-power field; no motile trichomonads noted
- KOH slide: no pseudohyphae or spores present

What do the initial laboratory results tell you?

- LE is produced by WBC and may be a marker of their presence in urine. In males, positive finding of LE on dipstick has both high sensitivity (75-96%) and specificity (94-98%) in detecting pyuria associated with infection. However, in females, the urine sample often has vaginal contamination and is not as sensitive or specific. Both STDs as well as bacterial UTIs can yield positive LE results.
- Negative nitrates. A large number of bacteria causing UTIs are capable of converting urine nitrates to nitrites (e.g., E.coli). A positive result strongly

- suggests presence of significant numbers of gram negative pathogen. However, a negative result does not rule out a UTI.
- Trace protein can be a common finding in concentrated urine. If concern due to persistent finding or > 1+ protein, have patient return for testing on first morning void and/or measure total protein to creatinine ratio on a random urine sample.
 - Normal pH of discharge and negative whiff test makes bacterial vaginosis and trichomonas unlikely. There is also an absence of clue cells on wet preps of vaginal discharge. With BV, >= 20% of epithelial cells are typically clue cells.
 - Finding of increased number of WBCs may be seen with cervicitis. Other signs of cervicitis include purulent or mucopurulent exudate visible in the canal and/or sustained bleeding of cervical os with gentle pressure of swab. Trichomonas as well as GC often have numerous WBCs on wet preps.

What would be your next step? Do you recommend treatment? Why or why not?

An adolescent presenting with dysuria usually has a UTI and/or a gynecologic infection. The CDC recommends treatment for patients when a diagnosis of a treatable STD is considered likely. Anna presents with dysuria, cervicitis, and is at risk for having contracted an STD with concern for a partner recently testing positive. Cystitis is less likely given no urgency, no voiding pain, no hematuria, no suprapubic pain, and no nitrites on dipstick; a urine culture can be sent for further evaluation. A NAAT should also be sent to evaluate for GC/Chlamydia.

- PROS for STD treatment in office today:
 - Anna has a partner who has tested positive for a sexually transmitted infection.
 - She is physically in your presence; you may have difficulty having her return.
 - She is symptomatic with mucopurulent discharge on exam and increased number of WBCs on NS wet prep.
 - You can observe Anna taking the medication and assure compliance.
 - You may lessen the spread of STD to other partners while waiting for test results.
 - By treating now, you lessen the risk of future complications, including PID.
- CONS:
 - You may be treating for an infection that the patient does not have.
 - You are risking side effects to antibiotics that the patient may not need.

Facilitators may wish to list Pros and Cons as learners make suggestions.

What are your treatment options for Anna?

Treatment should be aimed at the most probable etiology, in this case high suspicion for an STD. Adolescent girls and young women have the highest number of reported infections of both Chlamydia and gonorrhea in comparison to all other age and gender groups (**have learners refer to Figures 2 and 3 in their packet**). Other common STDs in this population include human papillomavirus (HPV) infection, herpes-simplex virus type 2 (HSV2), and Trichomonas vaginalis..

Figure 2:

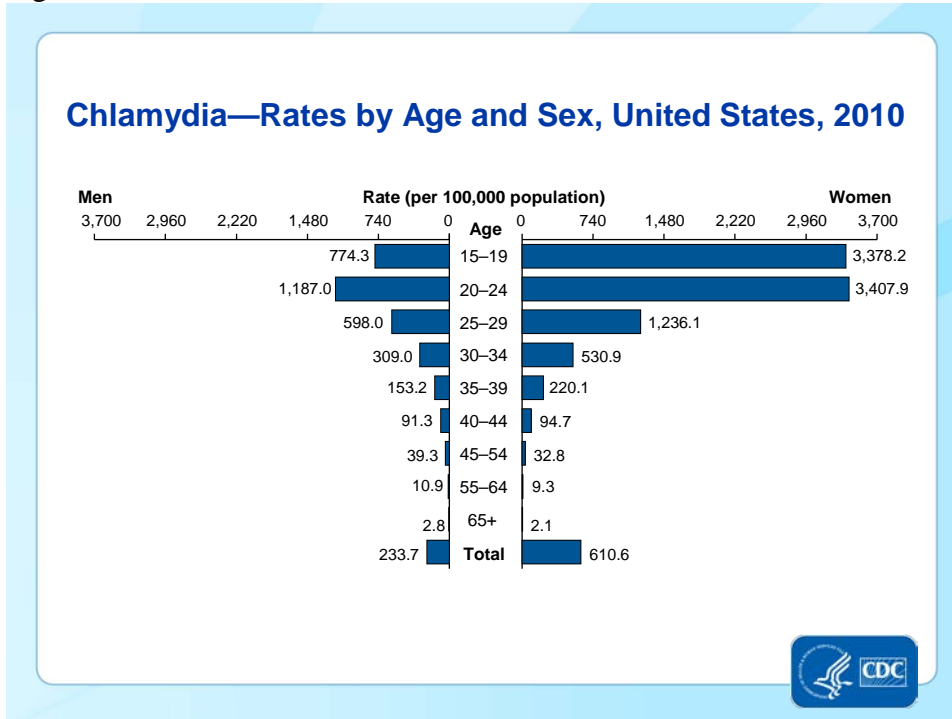


Image: Chlamydia – Rates by Age and Sex, US 2010, CDC STD Prevention Module
Retrieved from <http://www.cdc.gov/std/stats10/slides.htm> on 10/31/13

Figure 3:

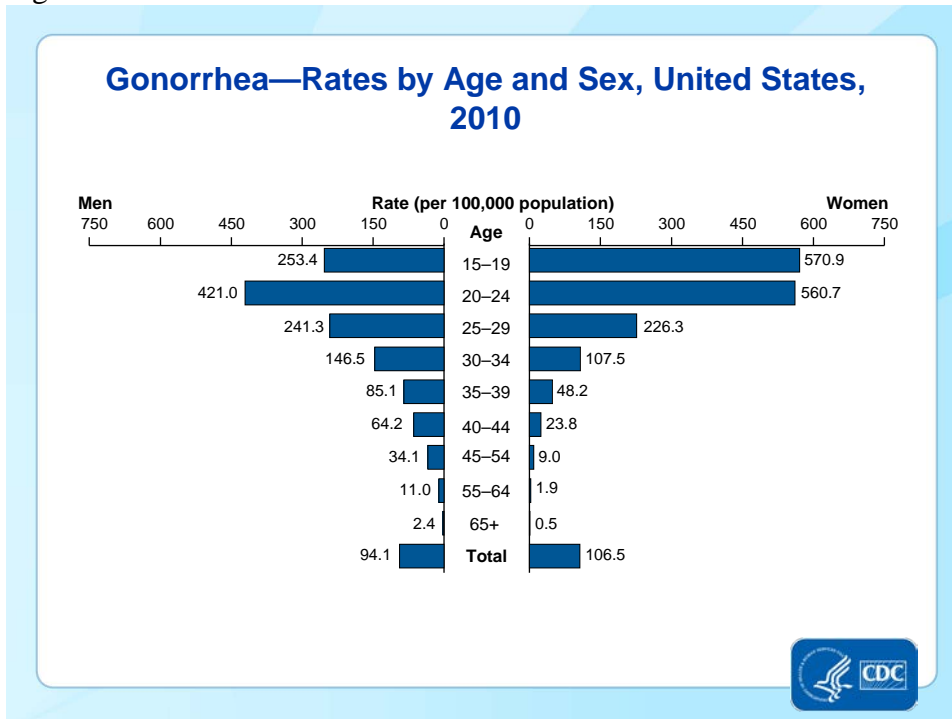


Image: Gonorrhea – Rates by Age and Sex, US 2010, CDC STD Prevention Module
Retrieved from <http://www.cdc.gov/std/stats10/slides.htm> on 10/31/13

Females presenting with cervicitis and at increased risk for STD should be presumptively treated for Chlamydia. Presumptive therapy for GC should also be considered especially if high risk (e.g., prior history of sexually transmitted infections and high prevalence in community). In Anna's case, recommended treatment for presenting with high suspicion for an uncomplicated STI infection includes dual treatment for both Chlamydia and GC **(Ask learners to refer to Table 1 in their packet):**

Table 1: Treatment for uncomplicated STD – GC/Chlamydia

Ceftriaxone 250 mg IM in a single dose

PLUS

Azithromycin 1 g orally in a single dose OR Doxycycline 100 mg orally twice a day for 7 days

The CDC no longer recommends cefixime for treatment of gonorrhea due to declining susceptibility. Doxycycline is cheaper but requires adherence for 7 days. Azithromycin can be observed and taken as a one time dose. A single dose of metronidazole (2 g PO) may also be considered if high suspicion for trichomonas. If ceftriaxone cannot be given because of severe allergy, a single dose of azithromycin 2 g orally can be used, but patient should have sensitivity testing done and if positive for gonorrhea, should return after treatment for a test-of-cure (TOC). If TOC is positive, a confirmatory culture should be performed and undergo phenotypic antimicrobial susceptibility testing.

What are you legally bound to do regarding notification and treatment of Anna's partners?

Timely reporting of STDs is critical in assuring rapid evaluation and treatment of sexual partners, both preventing and controlling further infection. Syphilis, gonorrhea, Chlamydia, chancroid, HIV and AIDS are reportable diseases in every state. Reports can be made by either provider or laboratory. Requirements for reporting other STIs (such as HSV) vary by state (the facilitator can contact the department of public health or a local STD clinic in advance to become knowledgeable about local resources). State and local health departments are required to keep reports confidential and should verify diagnosis and treatment by the patient's health care provider. They can also assist the patient in confidential notification and treatment of previous partners.

Patients are asked to refer sex partners from the previous 60 days preceding either onset of symptoms or diagnosis. If there is significant concern that identified male partner(s) will not receive services, then expedited partner therapy (EPT) for chlamydia may be considered. EPT allows for health care providers to provide medication or prescriptions to patients for their sex partners without clinically assessing them; it is currently permissible in 32 states (facilitator should check www.cdc.gov/std/ept to confirm legal status of EPT in their area and to obtain handouts for partners).

Distribute Part III of the case the case and have participant(s) read it aloud.

Part III:

You obtain NAAT testing (vaginal swabs) for Chlamydia and gonorrhea, as well as send a clean catch urine specimen. You decide to treat Anna with ceftriaxone and azithromycin at the visit and obtain a confidential contact number to notify her of results. Anna's NAAT testing eventually returns positive for Chlamydia, negative for GC. Her urine culture shows no growth. You inform her of results and let her know that previous partners should be informed and treated, and that she should not have intercourse for at least seven days after treatment. You ask her to follow-up in 3 months for re-screening, or sooner if she develops abdominal pain, fever, nausea, or vomiting.

Two months later, you receive notice that Anna was seen in the local emergency department (ED) for abdominal pain and admitted to the hospital. Per the ED note, Anna presented with several days of nausea, fever, decreased PO intake, and intense right upper quadrant abdominal pain with 1 week of diffuse abdominal "discomfort." Review of systems was otherwise negative. She denied being in a current relationship; ED note documents recent "breakup" with partner. Her exam was significant for marked RUQ pain with positive Murphy's sign, no lower abdominal tenderness. A pelvic exam was not performed. Additional workup in the ED included:

- HCG negative
- WBC 11.6
- ESR 30, CRP 1.5
- Liver function tests normal
- CXR normal
- Transabdominal US pelvis normal, no free fluid in cul-de-sac, appendix not visualized
- RUQ ultrasound 4 echogenic shadowing gallstones with sonographic Murphy's sign, no gallbladder wall thickening

Anna was admitted to the surgery service, started on Piperacillin/Tazobactam (Zosyn), and eventually taken to the operating room for planned laparoscopic cholecystectomy when she failed to improve.

Pause and begin next set of discussion questions.

Potential discussion questions:

What do you think about Anna's clinical presentation in the ER? What would you have done differently with her history, physical exam, and workup?

- Unfortunately emergency department physicians do not always have access to patient's records from outside the hospital system and must rely on obtaining reliable history from the patient and family. A sexual history should be taken from all adolescent females presenting with abdominal pain, including last testing for STDs. Anna may not have felt comfortable volunteering information about the Chlamydia infection if she was not directly asked alone without parent(s). If there

is concern for STD in the setting of abdominal pain, a pelvic exam should be completed to assess for pelvic pathology.

- Acute cholecystitis is a common cause of RUQ pain, with US the preferred initial imaging modality. Although US did show the presence of stones in combination with the sonographic Murphy sign (maximum tenderness during compression with the transducer directly over the gallbladder), there was no gallbladder wall thickening, no gallbladder distension, and no obstructing stone visible in the gallbladder neck or cystic duct.

Distribute photo (figure 4) taken during laparoscopic procedure and have participants describe what they are seeing.

What does this picture tell you about Anna's diagnosis?

Figure 4:

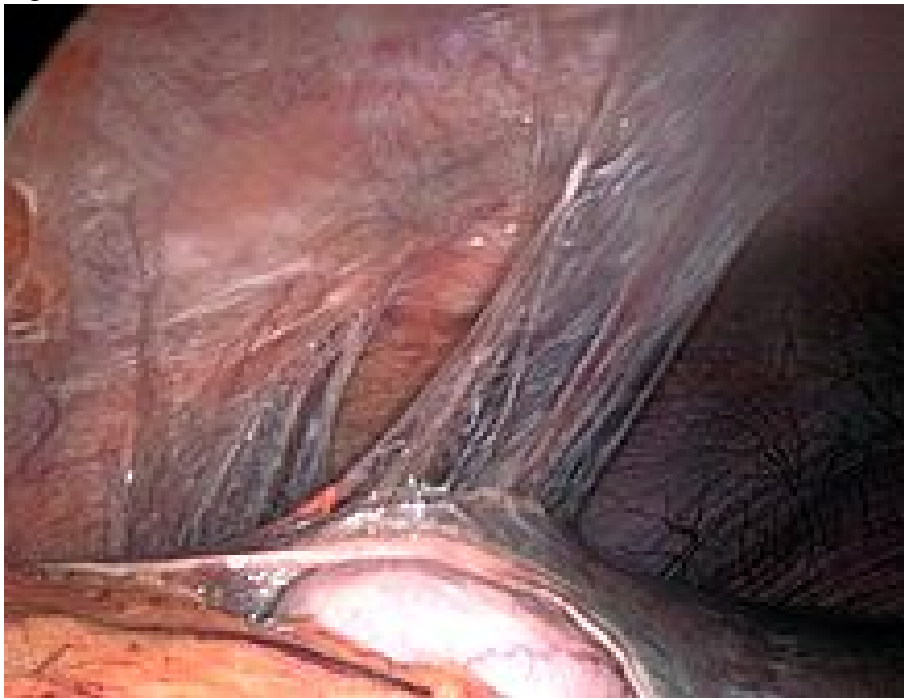


Image: Peri-hepatic adhesions

Retrieved from http://commons.wikimedia.org/wiki/File:Perihepatic_adhesions.jpg on 10/31/13

Photo demonstrates “violin string” adhesions between anterior liver surface and peritoneum and patchy, fibrinous exudate; rare complication of PID known as Fitz-Hugh-Curtis Syndrome (FHC).

- 5-10% of women with acute PID develop perihepatic inflammation (FHC)
- Often mistaken for pneumonia or acute cholecystitis.
- Clues to diagnosis include recent onset RUQ pain that is pleuritic in nature, radiating to shoulder or back.

- RUQ pain can be present before, during or after the classic pelvic pain of PID
- “Violin string” adhesions are pathognomonic for FHC.
- LFTs can be abnormal in some cases.

Define PID:

- PID is characterized by inflammation of the upper female genital tract (cervicitis, endometritis, salpingitis, oophoritis, peritonitis) secondary to ascending spread of microorganisms. (**Ask learners to refer to figure 5 in their packet**)
- Common symptoms include abdominal pain, abnormal discharge, irregular bleeding or spotting, fever, dysuria, urinary frequency, nausea/vomiting, and fever.
- It is important to note that abdominal pain may not be present in women with PID especially in the absence of peritonitis or salpingitis. A bimanual exam should be completed to evaluate for cervical motion, uterine, and/or adnexal tenderness. Mucopurulent discharge may be visible on speculum exam.

Figure 5: PID Pathway

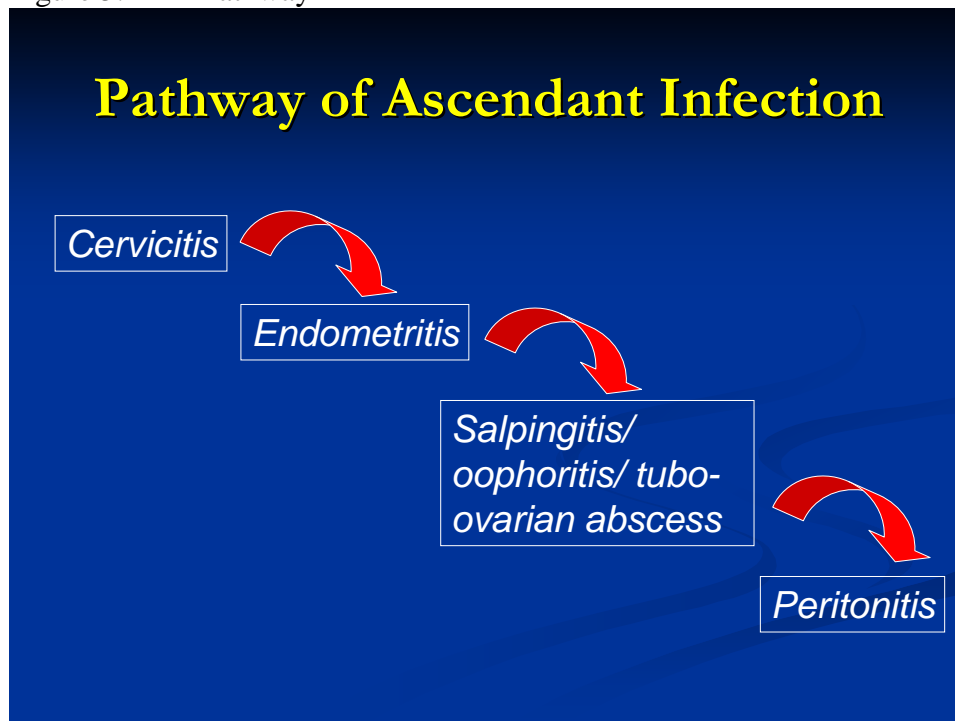


Image: Pathway of Ascendant Infection, CDC STD Prevention Module

Retrieved from <http://www2a.cdc.gov/stdtraining/self-study/pid/pid-sb3.asp> on 10/31/13

What criteria are needed to diagnose PID?

The diagnosis of PID is based on clinical criteria. There are additional supportive criteria that may be helpful but are not required for diagnosis (**Ask learners to refer to Table 2 in their packet**).

Table 2: Criteria for PID

Minimum Diagnostic criteria	Supportive criteria	Definitive criteria
<p>Empiric treatment should begin in sexually active women at risk for STDs if one of the following criteria are present and no other cause identified:</p> <ul style="list-style-type: none"> – Uterine tenderness or – Adnexal tenderness or – Cervical motion tenderness 	<ul style="list-style-type: none"> • Temperature > 101 F (38.3C) • Abnormal cervical or vaginal mucopurulent discharge • WBCs on saline microscopy • Elevated ESR and/or C reactive protein • Documentation of GC or Chlamydia infection 	<ul style="list-style-type: none"> • Histopathology of endometrial biopsy consistent with endometritis • Laparoscopic abnormalities consistent with PID (e.g. violin string adhesions, visualization of peritoneal exudate) • Transvaginal US or MRI findings suggestive of pelvic infection (e.g. tubal hyperemia, TOA abscess)

What organisms have been implicated in PID?

Laparoscopic procedures have provided data about the etiologic agents of PID.

- PID is usually secondary to multiple (polymicrobial) organisms
- GC (recovered from cervix in 30-80% of women with PID) and Chlamydia (recovered in 20-40%) are the two most common pathogens
- Anaerobes
- Mycoplasma genitalium, ureaplasmas (U. urealyticum).
- Other organisms that have been isolated include: G. vaginalis, H. Influenzae, Enteric Gram-negative rods (E.coli), Streptococcus agalactiae, M.hominis, Trichomonas vaginalis, Herpes simplex virus 2 (HSV-2), Peptococcus species

Once diagnosis is made, how do you treat PID? Inpatient or outpatient? Follow-up?

Management of PID has transitioned over the years from an inpatient to an outpatient basis given there is no evidence that parenteral therapy is superior to outpatient oral treatment with the exception of acutely ill patients unable to tolerate oral medication secondary to nausea and vomiting or those with a tubo-ovarian abscess (TOA).

Ask learners to refer to Table 3 in their packet.

Table 3: PID Treatment

<p>Oral Outpatient Treatment</p> <ul style="list-style-type: none"> – Ceftriaxone 250 mg IM OR Cefoxitin 2g IM + Probenicid 1g x 1 PLUS Doxycycline 100 mg PO BID x 14 days – +/- Metronidazole 500 mg PO BID x 14 days* <p>Parenteral Inpatient Treatment</p> <ul style="list-style-type: none"> – Cefotetan 2g IV q12 OR Cefoxitin 2g IV q 6 hours PLUS Doxycycline 100 mg PO/IV q 12 h (14 days) <p style="text-align: center;">OR</p>
--

– Clindamycin 900 mg IV q 8 hours PLUS
Gentamycin loading dose IV/IM 2mg/kg followed by 1.5 mg/kg q 8 h
(in patients with normal renal function)
**Upon discharge, patients should continue doxycycline 100 mg q12 hours
with or without metronidazole to complete 14 days of treatment. Clindamycin or
doxycycline plus metronidazole are the preferred regimens to complete 14 days of
treatment for TOAs*

- All patients being treated on an outpatient basis for PID should follow-up in 48 to 72 hours to assess for clinical improvement; if no improvement or compliance concerns, strongly consider medical admission, further diagnostic testing, and gynecologic surgical consultation.
- Criteria for inpatient hospitalization include:
 - Abortion or other gynecologic surgery in the previous 14 days
 - Surgical emergencies cannot be excluded
 - Severe clinical illness (fever, nausea/vomiting, significant abdominal pain)
 - Pregnancy
 - Failure of outpatient treatment
 - Inability to tolerate outpatient treatment
 - Tubo-ovarian abscess
 - Immune status compromised

Distribute Part IV of the case the case and have participant(s) read it aloud.

Part IV

Epilogue:

Anna is started on parenteral antibiotics during her inpatient stay. Over the next 48 hours, her pain and nausea improve and she is able to transition to oral doxycycline. A repeat NAAT test shows Chlamydia. Although Anna was observed taking treatment during the office visit two months ago, she admits that she is not sure that her partner was ever treated and she continued to have intercourse with him using condoms about 75% of the time. She follows up several days after discharge and has resolution of symptoms.

What would be your recommendations for further tests and follow-up?

- Counseling regarding prevention of future infections including the need to ALWAYS use condoms to prevent STD transmission. There is an increased risk of infertility with each episode of PID.
- Assist in making sure partner receives treatment.
- Retest for Chlamydia and/or GC about 3 months after treatment, regardless of whether partner received treatment. High reinfection rates have been found among adolescents secondary to resuming sex with untreated partner or initiating sexual activity with a new partner. Of note, retesting should not be performed less than three weeks after treatment since residual nucleic acid from nonviable

organisms may persist in the weeks following treatment and result in a false positive test.

Refer back to group's learning agenda and summarize the key teaching points that were made. This will give the group a sense of accomplishment, and emphasize the important messages. Suggest further sources of reading or other information if there are agenda items that were not covered in the discussion.

Clinical Pearls:

- The most concerning causes of dysuria with symptomatic voiding in an adolescent female are bacterial cystitis or an STD.
- Always ask about sexual history and last testing for STDs when evaluating adolescent patients presenting with gastro-intestinal or genito-urinary symptoms.
- Common STD infections among adolescents include HPV, Chlamydia, gonorrhea, HSV, and trichomoniasis.
- A single dose of azithromycin (1 gram) can be used to treat patients who are Chlamydia positive, GC negative. All patients testing positive for gonorrhea should have dual therapy because of concerns regarding co-infections with chlamydia and resistant gonorrhea which includes a single dose of IM ceftriaxone (250 mg IM) in addition to 1 gram of azithromycin. A 7 day course of doxycycline (100 mg PO BID) can be used as an alternative to azithromycin.
- Most cases of PID can be treated outpatient with a two week course of antibiotics and close follow-up within 72 hours. Criteria exist for those needing parenteral therapy and admission.

Knowledge questions:

Ask learners to complete the knowledge questions in their packet. If time allows, questions and answers can be discussed as a group, or learners can complete and review answers on their own.

1. *Which of the following sex partners of a woman who has just tested positive for Chlamydia do NOT need treatment?*
 - a. A partner from last month who reports he is asymptomatic.
 - b. A long-term partner who the patient broke up with about six months ago.
 - c. A current partner who received treatment about a week ago but has continued to have penile-vaginal intercourse with the woman.
 - d. None of the above need treatment

2. *Which of the following are long-term sequelae to untreated PID?*
 - a. Infertility
 - b. Ectopic pregnancy
 - c. Chronic pelvic pain.
 - d. All of the above.

3. *You are treating a patient for uncomplicated Chlamydia (no concerns regarding PID) who reports an allergy to azithromycin. Which of the following regimens can be used as an alternative treatment?*

- a. Metronidazole 500 mg PO BID for seven days
- b. Doxycycline 100 mg PO BID for seven days
- c. Doxycycline 100 mg PO BID for fourteen days
- d. Cefixime 400 mg PO x 1 dose

4. *You are seeing an 18 year old patient for pelvic pain who has both cervical motion and uterine tenderness on pelvic exam. A recent routine screening NAAT is positive for both GC/Chlamydia but patient had not yet returned for treatment. She had an IUD placed several months ago and no longer has regular periods. She denies previous history of STIs or PID. Comprehensive ROS is otherwise negative (no fever, no nausea or vomiting). Which of the following is the most appropriate next step?*

- a. Admit to the hospital for further workup including urine HCG, and to start parenteral antibiotics.
- b. Order urine HCG, and if negative, treat with IM ceftriaxone and start 2 week PO course of doxycycline.
- c. Call GYN consult to have IUD removed immediately.
- d. Order an abdominal CT to evaluate pelvic pain further.

5. *You are seeing a 17 year old female patient for routine health care maintenance. You note that she has recently become sexually active with two male partners, reports condom use “most of the time,” has a negative review of symptoms and no significant past medical history. Which of the following should be completed as part of her visit today?*

- a. PAP smear
- b. HSV titers
- c. GC and chlamydia screening
- d. None of the above

Answers to Knowledge Questions

1. *Which of the following sex partners of a woman who has just tested positive for Chlamydia does NOT need to be treated?*

Preferred response: b “A long-term partner who patient broke up about six months ago”

Sex partners of patients treated for Chlamydia should be treated (and preferentially examined before treatment) if they had sexual contact within sixty days preceding onset of symptoms or diagnosis regardless of whether they are asymptomatic. A partner who was recently treated but continued to have intercourse with the same (untreated) partner has high risk for re-infection and should also be re-treated. Of note, women who have sex with women are still at risk for STDs from current or previous partners (male or female) and should not be presumed to be at lower risk based on their sexual orientation.

2. *Which of the following are long-term sequelae to acute PID?*

Preferred response: d “All of the above”

Over 800,000 women in the United States are diagnosed with PID each year, with about 20% in the adolescent age group. Long-term sequelae include infertility, ectopic pregnancy, chronic pelvic pain, and increased risk for recurrent PID.

3. *You are treating a patient for uncomplicated Chlamydia (no concerns regarding PID) who reports an allergy to azithromycin. Which of the following regimens can be used as an alternative treatment?*

Preferred response: b “doxycycline 100 mg PO BID for seven days”

The fourteen day oral regimen of doxycycline is indicated for those diagnosed with PID. For an uncomplicated Chlamydia infection, a seven day course can be used instead of azithromycin.

4. *You are seeing an 18 year old patient for pelvic pain who has both cervical motion and uterine tenderness on pelvic exam. A recent routine screening NAAT is positive for both GC/Chlamydia but patient had not yet returned for treatment. She had an IUD placed several months ago and no longer has regular periods. She denies previous history of STIs or PID. Comprehensive ROS is otherwise negative (no fever, no nausea or vomiting). Which of the following is the most appropriate next step?*

Preferred response: b “Order urine HCG, and if negative, treat with IM ceftriaxone and start 2 week PO course of doxycycline.”

A pregnancy test should be obtained in all adolescents presenting with abdominal or pelvic pain to rule out ectopic pregnancy. If negative, this patient does meet clinical criteria for PID and has a recent documentation of positive STI. There are no indications at this time for hospitalization (able to tolerate PO, not pregnant, etc). She can be started on outpatient regimen for PID with planned follow-up in 72 hours.

IUDs have become a popular method of long-acting contraception. Although the risk of PID is slightly increased in the first three weeks after insertion, the risk thereafter is similar to the baseline population. The CDC recommends the same screening and treatment guidelines for adolescents both with and without IUDs. There is insufficient evidence to support removal of IUD during treatment of acute PID.

Imaging is recommended in patients with acute PID if difficulty assessing adnexa on pelvic exam, concern for ectopic pregnancy (positive HCG), or possible tubo-ovarian abscess. Ultrasonography, preferentially transvaginal, is considered the first line imaging modality for ectopic pregnancy. Sexually active teens can usually tolerate a transvaginal exam.

5. *You are seeing a 17 year old female patient for routine health care maintenance. You note that she has recently become sexually active with two male partners, reports condom use “most of the time,” has a negative review of symptoms and no significant past medical history. Which of the following should be completed as part of her visit today?*

Preferred response c: “GC and Chlamydia screening”

The US Preventive Services Task Force (USPSTF), as well as the CDC, recommends at minimum annual screening for chlamydia in all sexually active adolescent females and

young women. Gonorrhea screening is recommended in these same age groups if concern for increased risk of GC infection (high community prevalence, inconsistent condom use, multiple partners, previous history of STDs, etc)

Guidelines for cervical cancer screening recommend PAP smears beginning at age 21 for all adolescents with or without history of sexual activity. Routine screening for herpes is not recommended in asymptomatic patients. In those presenting with active genital ulcers, a viral culture can be sent. Titers can be used to further evaluate patients with a history of ulcers who did not have a diagnostic workup completed while symptomatic.

References:

1. Shrier LA. Sexually transmitted infections: Chlamydia, gonorrhea, pelvic inflammatory disease, and syphilis. Emans SJ and Laufer MR (eds). *Emans, Laufer and Goldstein's Pediatric and Adolescent Gynecology*, sixth ed. Philadelphia: Lippincott, Williams and Wilkins; 2012.
2. Sweet RL, Gibbs RS. *Atlas of Infectious Diseases of the Female Genital Tract*. Phila: Lippincott, Williams & Wilkins; 2005.
3. Haggerty CL, et al. Mycoplasma genitalium among women with nongonococcal, nonchlamydial pelvic inflammatory disease. *Infect Dis Obstet Gynecol*. 2006; 30184.
4. Centers for Disease Control and Prevention. *Sexually Transmitted Diseases (STDs). 2010 STD Treatment Guidelines*. Atlanta, GA: U.S. Dept. of Health and Human Services. <http://www.cdc.gov/std/treatment/2010/default.htm>. Accessed 28 Aug. 2012.
5. Neinstein LS, et al. *Adolescent Health Care: A Practical Guide*, fifth ed. Phila: Lippincott Williams & Wilkins; 2007.
6. Centers for Disease Control and Prevention. *Sexually transmitted disease surveillance, 2008*. Atlanta, GA: U.S. Dept. of Health and Human Services, 2009.
7. Centers for Disease Control and Prevention. *Prevalence of sexually transmitted infections and bacterial vaginosis among female adolescents in the United States: data from the National Health and Nutritional Examination Survey (NHANES), 2003*. 2010 National STD Prevention Conference. Summaries of highlighted research, March 11, 2008.
8. Eng T, Butler W, eds. *The hidden epidemic: confronting sexually transmitted diseases*. Washington, DC: National Academy Press, 1997.
9. Workowski KA, Berman S. Sexually Transmitted Diseases Treatment Guidelines, 2010. *MMWR Recomm Rep* 2010;59:1-110.
10. Wang SP, et al. Chlamydia trachomatis infection in Fitz-Hugh-Curtis syndrome. *Am J Obstet Gynecol* 1980;138:1034.
11. Katzman DK, et al. Chlamydia trachomatis Fitz-Hugh-Curtis syndrome without salpingitis in female adolescents. *Am J Dis Child* 1988;142:996.
12. Oh MK, et al. Risk for gonococcal and chlamydial cervicitis in adolescent females: Incidence and recurrence in a prospective cohort study. *J Adolesc Health* 1996;18:270.
13. Lee HH, et al. Diagnosis of Chlamydia trachomatis genitourinary infection in women by ligase chain reaction assay of urine. *Lancet* 1995;345:213.

14. Westrom L, Eschenbach D. Pelvic inflammatory disease. In: Holmes K, Sparling P, Mardh P-A, et al, eds. *Sexually transmitted disease*. New York: McGraw-Hill, 1999:783.
15. Burstein GR, Eliscu A, Ford K, et al. Expedited partner therapy for adolescents diagnosed with chlamydia or gonorrhea: a position paper of the Society for Adolescent Medicine. *J Adolesc Health* 2009; 45:303

Materials for Learners:

Packet should include the following:

- Handout #1: Chlamydia – Rates by Age and Sex (Figure 2)
Gonorrhea – Rates by Age and Sex (Figure 3)
- Handout #2: PID Pathway (Figure 5)
Treatment for uncomplicated STI (Table 1)
- Handout #3: Criteria for PID (Table 2)
PID treatment (Table 3)
- Clinical pearls
- Knowledge questions and answers
- References.

The Burning Issue

Sexually Transmitted Diseases

Part I:

Introduction:

A 17 year old girl in the twelfth grade at the local high school presents to your office for an urgent care visit. From the outset, Anna appears uncomfortable, not making eye contact and shifting around in her chair. She is complaining of five days of burning with urination. She has never had these symptoms previously.

Past Medical History:

Anna has been in the office several times in the past two years for urgent care (gastroenteritis, viral pharyngitis and respiratory infections) but has not had a recent annual physical examination; no previous health problems. Her last annual visit notes no sexual activity. No history of prior urinary tract infections (UTIs).

Anna does not take any medications regularly.

The Burning Issue

Sexually Transmitted Diseases

Part II:

Next Steps:

Anna denies urinary urgency, frequency, or hesitation. She thinks her urine appears the same – she has not noted any blood in the urine, no foul smell, and no cloudiness. Comprehensive review of symptoms is negative for fever, chills, nausea, vomiting, abdominal pain, flank pain, and vaginal discharge. Her last menstrual period was three weeks ago. Menses are usually regular and she describes no intermenstrual spotting.

Anna informs you that she became sexually active over a year ago. Through your questioning, you find out that she has had vaginal intercourse with three male partners. Last intercourse was over two weeks ago. She informs you that she has neglected to use condoms on several occasions. Anna has not been using any form of birth control other than condoms. She is worried because she thinks that her last partner was cheating on her. After a long pause, she admits that she had received a message from this partner blaming her for giving him a sexually transmitted infection. She has no other information and does not know the name of the infection.

Physical Exam:

Anna appears anxious but is otherwise comfortable, and in no acute distress. She is afebrile with a normal heart rate and blood pressure. Her abdomen is soft with normal bowel sounds and no suprapubic tenderness; there is no costovertebral angle (CVA) tenderness. She has Tanner V pubic hair distribution, external genitalia appear normal with no lesions or ulcerations. On speculum exam, mucopurulent vaginal discharge is seen in vaginal vault (see figure 1). Shotty, nontender inguinal lymphadenopathy bilaterally. On bimanual exam, there is no significant cervical motion tenderness, no adnexal or uterine tenderness. She ambulates without difficulty. The remainder of the exam is within normal limits.

The Burning Issue

Sexually Transmitted Diseases

Figure 1: Image: Mucopurulent vaginal discharge, CDC STD Prevention Module (PID)
Retrieved from <http://www2a.cdc.gov/stdtraining/self-study/pid/pid-sb5.asp> 10/31/13



The Burning Issue

Sexually Transmitted Diseases

Laboratory results:

Urine Dipstick

Leukocyte Esterase 1+	Ketones -----
Nitrite -----	Urobilinogen -----
pH 5	Bilirubin -----
Protein trace	Blood -----
Glucose -----	Specific gravity 1.025

Urine gram stain negative for organisms.

Urine HCG: negative

Vaginal discharge:

- ph 4.5
- Negative whiff test
- NS slide: Squamous epithelial cells with no adherent coccobacilli (clue cells); >10 WBCs per high-power field; no motile trichomonads noted
- KOH slide: no pseudohyphae or spores present

The Burning Issue

Sexually Transmitted Diseases

Part III:

You obtain NAAT testing (vaginal swabs) for Chlamydia and gonorrhea, as well as send a clean catch urine specimen. You decide to treat Anna with ceftriaxone and azithromycin at the visit and obtain a confidential contact number to notify her of results. Anna's NAAT testing eventually returns positive for Chlamydia, negative for GC. Her urine culture shows no growth. You inform her of results and let her know that previous partners should be informed and treated, and that she should not have intercourse for at least seven days after treatment. You ask her to follow-up in 3 months for re-screening, or sooner if she develops abdominal pain, fever, nausea, or vomiting.

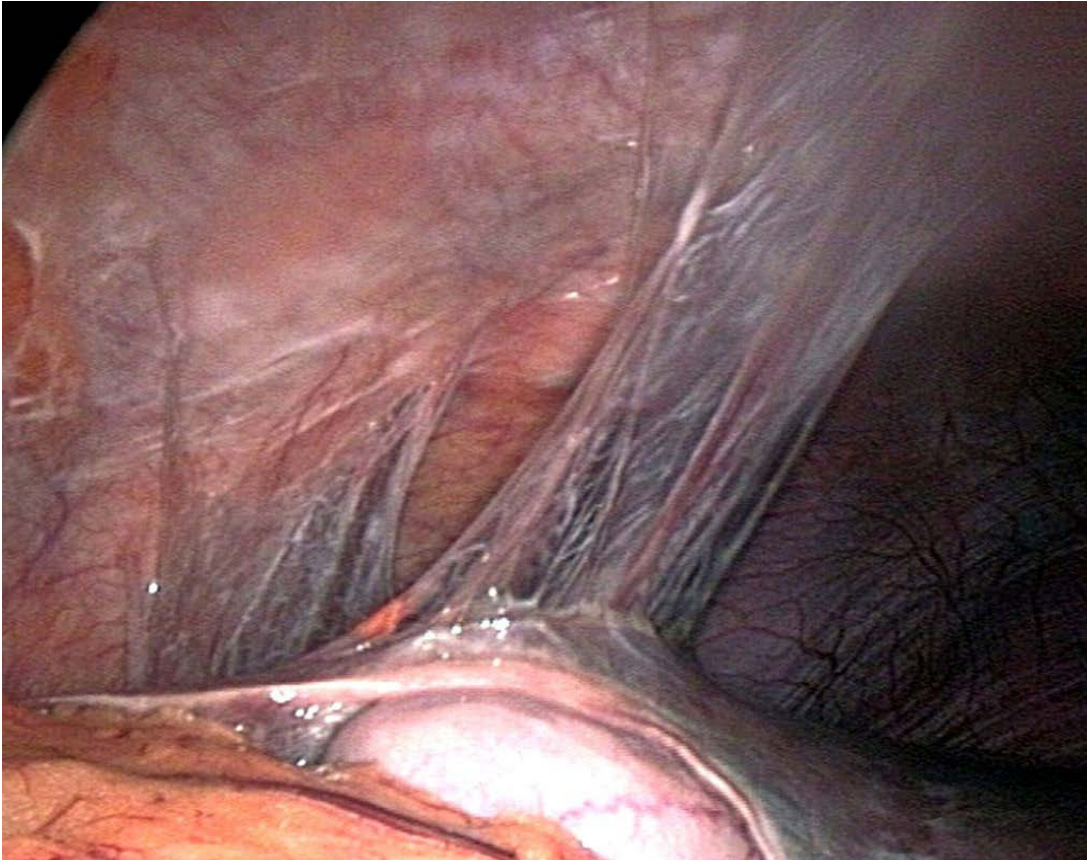
Two months later, you receive notice that Anna was seen in the local emergency department (ED) for abdominal pain and admitted to the hospital. Per the ED note, Anna presented with several days of nausea, fever, decreased PO intake, and intense right upper quadrant abdominal pain with 1 week of diffuse abdominal "discomfort." Review of systems was otherwise negative. She denied being in a current relationship; ED note documents recent "breakup" with partner. Her exam was significant for marked RUQ pain with positive Murphy's sign, no lower abdominal tenderness. A pelvic exam was not performed. Additional workup in the ED included:

- HCG negative
- WBC 11.6
- ESR 30, CRP 1.5
- Liver function tests normal
- CXR normal
- Transabdominal US pelvis normal, no free fluid in cul-de-sac, appendix not visualized
- RUQ ultrasound 4 echogenic shadowing gallstones with sonographic Murphy's sign, no gallbladder wall thickening

Anna was admitted to the surgery service, started on Piperacillin/Tazobactam (Zosyn), and eventually taken to the operating room for planned laparoscopic cholecystectomy when she failed to improve.

The Burning Issue
Sexually Transmitted Diseases

Figure 4:



Retrieved from http://commons.wikimedia.org/wiki/File:Perihepatic_adhesions.jpg on 10/31/13

The Burning Issue

Sexually Transmitted Diseases

Part IV

Epilogue:

Anna is started on parenteral antibiotics during her inpatient stay. Over the next 48 hours, her pain and nausea improve and she is able to transition to oral doxycycline. A repeat NAAT test shows Chlamydia. Although Anna was observed taking treatment during the office visit two months ago, she admits that she is not sure that her partner was ever treated and she continued to have intercourse with him using condoms about 75% of the time. She follows up several days after discharge and has resolution of symptoms.