BURNS 10.7.14

Learning Objectives

- Describe the pathophysiology of salpingitis/pelvic inflammatory disease
- Describe the evaluation, diagnostic criteria and initial management of salpingitis/PID
- Identify the possible long-term sequelae of salpingitis/PID
- Prerequisites:
  - None
- See also – for closely related topics
  - SEXUALLY TRANSMITTED INFECTIONS AND PUBLIC HEALTH

Pathophysiology of PID

- Acute infection of female upper genital tract with potential to spread to neighboring pelvic organs
- Normally, the uterus and fallopian tubes are barred from vaginal flora by endocervical mucous
- Vaginal flora contains mainly *Lactobacillus acidophilus* plus smaller numbers of gram positives, negatives and anaerobes
  - Disruption of the balance of vaginal flora (↓ *Lactobacillus* or ↑ anaerobes) = Bacterial Vaginosis
  - Disruption of endocervical barrier allows both normal and pathologic vaginal and cervical bacteria to contaminate upper genital tract = **PID**
- PID can include and progress to endometritis, salpingitis, oopheritis, peritonitis, perihepatitis, and tubo-ovarian abscesses

Overview
- Pathophysiology
- Clinical Features
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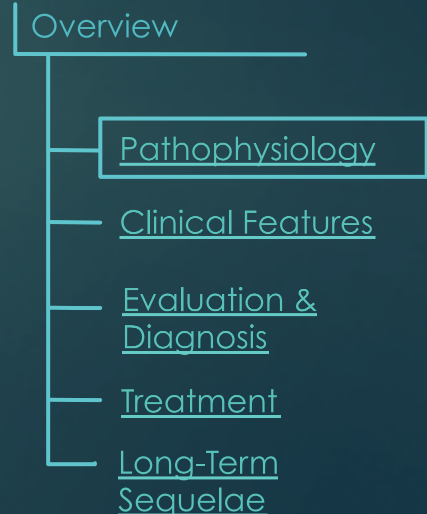
Pathophysiology – Microbiotic Makeup

Most cases are polymicrobial

- **N. Gonorrhea**
  - Accounts for 15% of cases
- **Chlamydia trachomatis**
  - Accounts for 15% of cases
- **Non-BVAB**
  - *Enterococcus* spp.
  - Enterobacteriaceae
  - Gram positive cocci
- **Bacterial vaginosis-associated bacteria (BVAB)**
  - Predispose to acquiring both STI and PID
  - *G. vaginalis*
  - *A. vaginae*
  - *Mycoplasma*
  - Other anaerobes



Risk factors

- Age: 15-25 most common
- Multiple sexual partners
- Partner is symptomatic for gonococcal/chlamydial infection
- Cervical ectopy
- Previous PID
- Bacterial vaginosis (BV)
- Intercourse during menses
- Vaginal douching (inc. risk of BV)
- Contraceptive method:
  - Barrier methods most protective
  - IUD does NOT increase risk (though insertion may increase risk)
  - OCPs don't reduce frequency but do reduce severity

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Clinical Features - Symptoms

- Lower abdominal pain
  - Pain began/worse after menses
  - Pain is bilateral & diffuse
  - Acute onset (Pain < 3wks)
  - Peritoneal signs present
  - Typically aggravated by intercourse
- Abnormal uterine bleeding (~1/3 of PID cases)
- Fever (~1/2 of PID cases)
- Nausea & Vomiting (may indicate peritonitis)
- Not common during pregnancy but if it does occur, usually presents in first trimester

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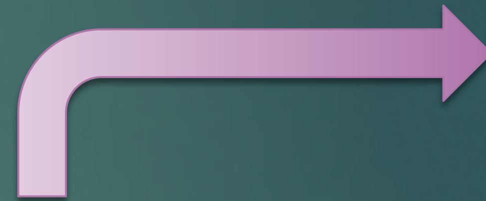
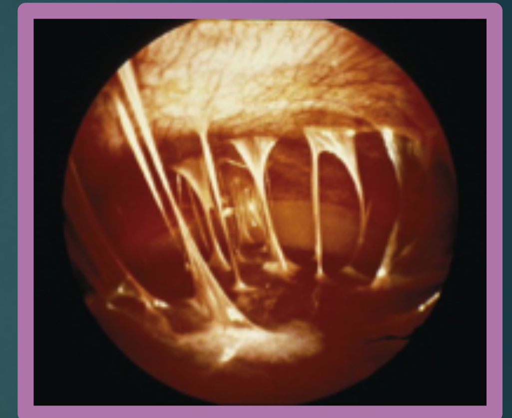
Clinical Features – Physical Exam

- Vaginal exam:
  - Purulent vaginal discharge
  - **Cervical motion tenderness**
  - **Adnexal tenderness**
- RUQ tenderness
  - Suggests perihepatitis (Fitz-Hugh Curtis Syndrome)
  - PID infection has spread to liver capsule and RUQ peritoneum
  - Forms "violin string" adhesions of peritoneum to liver
  - Liver enzymes abnormal in ½ of cases





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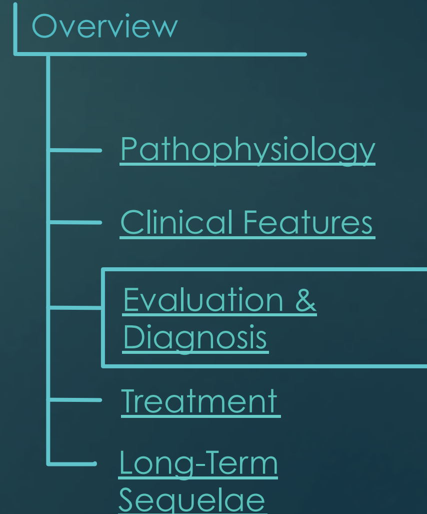
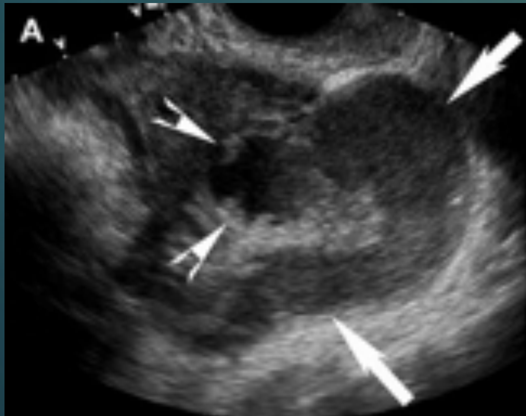
Evaluation & Diagnosis

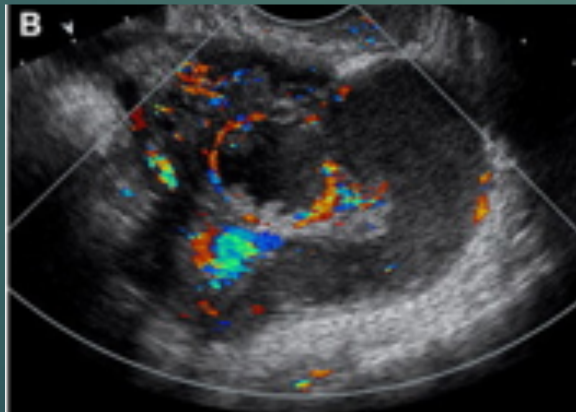
- Lab tests:
  - Vaginal Wet Mount: examine for WBC's in smear
    - Most sensitive lab test – high negative predictive value
  - NAAT tests for chlamydia/gonorrhea
  - Elevated serum WBC and CRP common but not always present
  - Urine pregnancy test and Urinalysis
- Transvaginal US to evaluate for hydrosalpinx or TOA
- Consider Endometrial Biopsy (rarely done)
- Laparoscopy: Definitive, but reserved for patients who:
  - Other process can't be excluded (e.g. appendicitis)
  - Are acutely ill and outpatient tx for PID has failed
  - Condition does not improve after 72hrs of tx



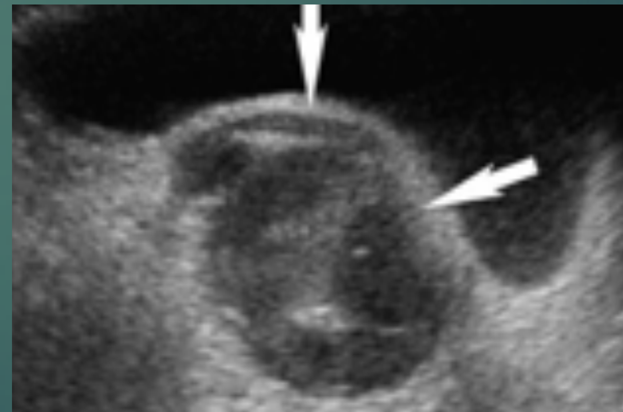
Evaluation

- Transvaginal Ultrasound
  - Fluid-filled oviducts
  - Swollen, tortuous fallopian tube
  - Free pelvic fluid / Fluid in cul-de-sac
  - Thickened tube walls and cogwheel appearance of cross section
  - TOA - Multi-cystic, contains fluid, debris, and septations





(A) thick-walled tubular mass filled with internal echoes c/w pyosalpinx (arrows). Cogwheel appearance of thickened folds seen in cross section (arrowhead) and the echogenic fat around the pyosalpinx. (B) Color Doppler shows hyperemia within the wall of the pyosalpinx



Complex left adnexal mass with thick walls and internal echoes c/w TOA (arrow)

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Diagnosis

- No single set of diagnostic criteria can achieve an acceptable balance between sensitivity and specificity
- Due to the potentially severe sequelae of missing the diagnosis, providers should have a HIGH index of suspicion and LOW threshold to empirically treat.
- CDC recommends treatment for PID if EITHER of these signs is present without an alternative explanation:
  - Uterine or adnexal tenderness (unilateral or bilateral)
  - Cervical motion tenderness
- Criteria which may increase the specificity/certainty of the diagnosis (but with an unacceptable loss of sensitivity)
  - Temp > 38.3
  - Mucopurulent discharge
  - WBCs on saline wet mount
  - Elevated ESR
  - Elevated CRP
  - + GC/CT test

Differential Diagnosis

Differential	Clinical Differences
Appendicitis	RLQ-specific tenderness but still can be diffuse abdominal pain
Cholecystitis	RUQ-specific pain, colicky in nature, exacerbated by food or stress
Gastroenteritis	Generalized abd pain; assoc diarrhea
Hepatitis	RUQ-specific pain
Inflammatory Bowel Disease or Constipation	Generalized abd pain, colicky in nature, exacerbated by food or stress; intermittent constipation and diarrhea
Pyelonephritis	CVA tenderness, dysuria, increased urinary frequency, abnormal UA
Endometriosis	Chronic pelvic pain, Dysmenorrhea
Ectopic Pregnancy	Elevated bHCG, may be visible on TVUS
Ovarian Torsion	May be visible on TVUS; may find dec. blood flow to ovary
Ovarian Tumor	May be visible on TVUS; Elevated tumor markers (Note: CA-125 maybe be slightly elevated in PID)

Indications for Inpatient Management

- If surgical emergencies cannot be excluded (e.g., appendicitis)
- The patient is pregnant
- The patient does not respond clinically to oral antimicrobial therapy
- The patient is unable to follow or tolerate an outpatient oral regimen
- The patient has severe illness, nausea and vomiting, or high fever
- The patient has a tubo-ovarian abscess

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Inpatient Treatment

Parenteral Regimen A

Cefotetan - 2g q 12h

or

Cefoxitin - 2g IV q 6h

+

Doxycyline*

100mg PO or IV q 12h

*Substitute azithromycin 1g PO if pt is pregnant

Considerations with TOA

- Abscess Drainage via IR-assisted percutaneous drainage
  - Aspirated fluid should be cultured
- If ruptured, it must be resolved surgically

Parenteral Regimen B

Clindamycin- 900mg IV q 8h

+

Gentamicin

Loading dose IV or IM 2mg/kg body weight

+ maintenance dose 1.5mg/kg q 8h

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Outpatient Treatment

Cefoxitin – 2g IM / single dose
+ Probenecid - 1g PO concurrently single dose

or

Ceftriaxone – 250mg IM / single dose

or

Other parenteral 3rd gen cephalosporin

+

Doxycyline
- 100mg PO bid x 14 days

±

Metronidazole
- 500mg PO bid x 14 days for **bacterial vaginosis**

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Long-term Complications / Sequelae

- Ruptured Tubo-ovarian abscess (5-10% mortality)
- Recurrent PID occurs in 25% of cases
- Untreated PID can lead to scarring & adhesion formation leading to
  - Hydrosalpinx – fallopian tube blocked, fills with sterile fluid
  - Chronic pelvic pain
  - Increased risk of ectopic pregnancy
  - Tubal-factor Infertility
- Best prevention:
  - Early recognition and treatment
  - Ensuring treatment of partner

IMPORTANT LINKS / REFERENCES

- Livengood & Chako: Clinical features and diagnosis of PID
- Livengood: Pathogenesis and risk factors for PID
- Wiesenfeld: Treatment of PID
- Peipert & Madden: Long-term complications of PID
- CDC Self-Study STD Modules for Clinicians – Pelvic Inflammatory Disease