

# INTRA-ABDOMINAL INFECTIONS

## OVERVIEW

- Peritoneal cavity is sterile
- Inside peritoneal cavity are many organs → each organ can be infected → intra-abdominal infections are diverse
- Normal flora: as you go down further in the gut, ↑anaerobic flora
- Intra-abdominal infections are almost always polymicrobial
  - The most likely pathogens: *E. coli*, *Bacteroides spp.* (anaerobic), *Streptococci* (*E. faecalis*, *E. faecium*)

## ANTIBIOGRAM

- Cephalosporins: no activity against *Enterococci*
  - Cefoxitin: anti-anaerobic activity
- β-lactam combos (e.g. piperacillin-tazobactam), carbapenems, & tigecycline: cover *all* species
- Fluoroquinolones: best against gram negatives; moxifloxacin covers anaerobes
- Aminoglycosides: only activity against gram negatives
- Metronidazole: anaerobic work horse (clindamycin too, but faces too much resistance)

## SEVERITY

- *Community acquired*
  - Mild-moderate APACHE II <15
  - Severe: APACHE II ≥15
- *Hospital acquired*
  - Recent hospitalization/surgery/dialysis, long term care facility, MRSA history, acquired intra-abdominal infection ≥48 hours after hospital admission

## PATHOGENS BASED ON SEVERITY

- *Mild-moderate*: enteric gram neg (*P. mirabilis*, *E. coli*, *K. pneumoniae*), anaerobes (*Bacteroides*)
- *Severe/hospital acquired*: enteric gram neg, anaerobes, *P. aeruginosa* (main difference!), [maybe enterococci, candida]

## ANTIBIOTICS: MONOTHERAPY

- *Mild-moderate*: β-lactam combos, cefoxitin (2<sup>nd</sup> gen), ertapenem, moxifloxacin (FQ)
- *Severe*: piperacillin-tazobactam (Zosyn), all carbapenems except ertapenem (all have anti-pseudomonal activity)

## ANTIBIOTICS: COMBINATION (\_\_\_ + metronidazole)

- *Mild-moderate*: cephalosporins, ciprofloxacin, levofloxacin
  - *Severe*: ceftazadime, cefepime, ciprofloxacin, levofloxacin
- } Cephalosporin +  
fluoroquinolone

TYPES OF INTRA-ABDOMINAL INFECTIONS >>

## PERITONITIS

- **Primary peritonitis**
  - Infection of ascitic fluid: ↓albumin = ↑fluid spilling into gut
  - Source: usually outside, or through the blood (hematological)
  - Mostly monomicrobial (different than other intra-abdominal infections)
  - Risk factors: peritoneal dialysis & cirrhotic ascites
- **Secondary peritonitis**
  - What we usually think about for intra-abdominal infections
  - Caused by penetration of barrier between GI tract and peritoneal cavity (poop gets in)
    - Trauma/perforation, iatrogenic perforation (e.g. colonoscopy), necrosis (obstruction or malignancy → ↓O<sub>2</sub> supply → tissues dies)
  - Symptoms: ab pain, N/V, hypoactive bowel sounds, ↑WBCs, localized pain, dx=radiographic methods

## APPENDICITIS

- Most common intra-abdominal infection
- Lumen obstructed by fecalith → mucus accumulates → blockage → tissue ischemia → gangrenous/perforation
- Treat: surgery ± antibiotics (only needed if messy), sometimes antibiotics only

## ABSCESS

- Localized infection: body builds fibrinous capsule around fluid sac/necrotic tissue/bacteria/WBCs
- Difficult to access via blood supply → difficult for antibiotics to reach infection
- 2° peritonitis → abscess → 3° peritonitis (form, break down, form again, etc., chronic/recurrent)
- Polymicrobial: anaerobes especially
- Treat: incision & drainage ± antibiotics

## TREATMENT OVERVIEW FOR INTRA-ABDOMINAL INFECTIONS

- Goal: control infection at its source!
- Surgical: drain abscess, repair trauma, remove necrotic tissue
- Supportive care: BP/fluid replacement, monitor HR
- If surgery not an option: treat with antibiotics for 5-7 days

### GENITORURINARY INFECTION

## PELVIC INFLAMMATORY DISEASE (PID)

- Infection/inflammation of reproductive organs & pelvic structures
  - Vaginitis & cervicitis: infection originates in vagina or cervix
  - Endometritis: uterus mucosal lining
  - Salpingitis: fallopian tubes
  - Tubo ovarian abscess: fallopian tube and/or ovary
  - Peritonitis: spreads from fallopian tubes to cavity, or rupture of tubo ovarian abscess
- Complications: infertility, ectopic pregnancy, chronic pelvic pain, dyspareunia
- Most common pathogens: *Chlamydia*, *gonorrhea* (also anaerobes, gram neg rods, streptococci)
- Antibiogram
  - Azithromycin: *Chlamydia*
  - Doxycycline: decent coverage throughout
  - β-lactams: no *Chlamydia* (atypical organism)
  - Clindamycin, metronidazole: anaerobic work horses
- Symptoms: fever, ab pain, vaginal discharge, post-coital bleeding, etc. (none very specific)
- Who to treat: sexually active young women or at risk for STD
  - + Pelvic pain/lower abdominal pain (no known cause)
  - + Cervical motion tenderness or uterine tenderness
- Conditions for hospitalization: pregnancy, severe illness, cannot tolerate outpatient regimen
- Outpatient treatment (14 days): ceftriaxone IM (or cefoxitin + probenecid) + doxycycline ± metronidazole
- Inpatient treatment (14 days)
  - Cefoxitin or cefotetan IV + doxycycline PO/IV
  - Clindamycin IV + gentamicin IV
  - Ampicillin/sulbactam (Unasyn) IV + doxycycline PO or IV
- Treat partner too for both *Chlamydia* and *gonorrhea*
  - *Chlamydia*: azithromycin 1g PO x1 -or- doxycycline 100mg po bid x 7 days
  - *Gonorrhea*: ceftriaxone 250mg IM x1 -or- cefixime 400mg po x1
  - Expedited partner therapy: partner does not need to be seen by MD to get prescription
- Tubo-ovarian abscess (TOA): more serious form of PID, IV antibiotics preferred

} Know for exam