Urinary Tract Infection
• Challenges in Cystitis
• Complicated UTI
• Asymptomatic Bacteriuria
• Recurrent UTI’s
• Pre-operative urine screening
Complicated UTI

• UTI that has possibly extended beyond the bladder i.e. UTI with fever or other systemic symptoms, suspected or documented pyelonephritis, and UTI with sepsis or bacteremia
When should you get a urine culture for uncomplicated cystitis?

• Uncomplicated UTI: culture not needed – Will likely be susceptible E coli

• Culture if…
  – Complicated UTIs (pyelonephritis)
  – Recurrent UTIs
  – High local rates of resistance
Updated guidelines for uncomplicated UTI

• Goal: resistance prevalence, low “collateral damage”
• Nitrofurantoin 100 mg PO BID x 5 days
• TMP-SMX DS PO BID x 3 days – avoid if resistance >20%, recent usage
• Fosfomycin 3 gm PO x 1
Safety of nitrofurantoin in elderly?

- Age > 65 years with Dx cystitis
- N=13,421 (2007-12)
- Evaluated for nitrofurantoin use ≈ lung injury
- Nitrofurantoin exposure ≠ lung injury
- Chronic use ≈ lung injury (aRR 1.53 [1.04-2.24])
Take home on nitrofurantoin and elderly?

- May be less efficacious
- Unlikely dangerous for Rx
- Danger increase for chronic suppression
Treatment of complicated UTI

• Empiric therapy (7-14 days): – Non-pregnant: ciprofloxacin/levofloxacin – Pregnant women: Nitrofurantoin or cephalexin
Treatment of UTI in Men

• Diagnosis:
  – Obtain culture
  – Assess for STDs (urethritits)

• Treatment:
  – Quinolone, TMP-SMX favored
  – Duration 7-14 days
  – If recurrent consider prostatitis
Shorter course of antibiotics may be OK in men with UTI?

- 39,149 Veterans with UTI
- Antibiotic duration ≤ 7 days: 35% (median 7 days) > 7 days: 65% (median 10 days)
- Veterans who received > 7 days:
  - No reduction in recurrences, more C. difficile
Catheter-associated UTI

• Hard to Dx:
  – Bacteriuria common
  – Often unable to give symptoms

• Pathogens
  – More resistant GNRs
  – Candiduria common, most cases don’t treat

• Treatment
  – Change Foley – Antibiotics 7-14d
Empiric treatment of pyelonephritis

- **Recommended**
  - Cipro 500 mg PO/IV q12 (Levo ok, not Moxi)
  - Ceftriaxone 1 gm IV q24

- **Not recommended**
  - TMP-SMX
  - Nitrofurantoin
  - Cefpodoxime

- **Health-care associated: B-lactam**
Definition: Asymptomatic Bacteriuria

- Bacteriuria without symptoms
  - Midstream: ≥10^5 CFU/ml
  - Cath: ≥10^2 CFU/ml
- Pyuria is present > 50% of patients
<table>
<thead>
<tr>
<th>Population</th>
<th>Prevalence, %</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy, premenopausal women</td>
<td>1.0–5.0</td>
<td>[31]</td>
</tr>
<tr>
<td>Pregnant women</td>
<td>1.9–9.5</td>
<td>[31]</td>
</tr>
<tr>
<td>Postmenopausal women aged 50–70 years</td>
<td>2.8–8.6</td>
<td>[31]</td>
</tr>
<tr>
<td>Diabetic patients</td>
<td></td>
<td></td>
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<tr>
<td>Women</td>
<td>9.0–27</td>
<td>[32]</td>
</tr>
<tr>
<td>Men</td>
<td>0.7–11</td>
<td>[32]</td>
</tr>
<tr>
<td>Elderly persons in the community&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>10.8–16</td>
<td>[31]</td>
</tr>
<tr>
<td>Men</td>
<td>3.6–19</td>
<td>[31]</td>
</tr>
<tr>
<td>Elderly persons in a long-term care facility</td>
<td></td>
<td></td>
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<tr>
<td>Women</td>
<td>25–50</td>
<td>[27]</td>
</tr>
<tr>
<td>Men</td>
<td>15–40</td>
<td>[27]</td>
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<tr>
<td>Patients with spinal cord injuries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermittent catheter use</td>
<td>23–89</td>
<td>[33]</td>
</tr>
<tr>
<td>Sphincterotomy and condom catheter in place</td>
<td>57</td>
<td>[34]</td>
</tr>
<tr>
<td>Patients undergoing hemodialysis</td>
<td>28</td>
<td>[28]</td>
</tr>
<tr>
<td>Patients with indwelling catheter use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short-term</td>
<td>9–23</td>
<td>[35]</td>
</tr>
<tr>
<td>Long-term</td>
<td>100</td>
<td>[22]</td>
</tr>
</tbody>
</table>

<sup>a</sup> Age, ≥70 years.
Who should you treat with asymptomatic bacteriuria?

• Clear benefit
  – Pregnant women
  – Patients undergoing traumatic urologic interventions with mucosal bleeding (TURP)

• Possible benefit
  – Neutropenic
Who does not benefit from Rx of asymptomatic bacteriuria?

- Premenopausal (non-pregnant) women
- Postmenopausal women
- Institutionalized men and women
- Patients with spinal cord injuries
- Patients with urinary catheters
- Patients > 3 months post renal transplant
- Diabetics
The patient with bacteriuria unable to tell you if they have symptoms?

- No concern for infection = no treatment
- Concern for infection exists
  - 1. Always look for other sources (blood, lungs, etc.)
  - 2. If no pyuria, do not treat
  - 3. If candiduria, most cases don’t treat
  - 4. If other source identified, stop UTI treatment
Recurrent UTIs in women

• 20-30% will have a recurrent UTI in 6 mo
• Risk factors:
  – Frequent sex, spermicide, new partner
  – Genetic: Age of 1st UTI ≤ 15 yrs; Mother h/o UTIs
  – Urinary incontinence
• When to evaluate for anatomic abnormalities in women with recurrent UTIs?
• Radiology and cystoscopy unrevealing in most cases
• Red flags suggesting that a urologist is needed
  – Hematuria w/o dysuria
  – Incontinence
  – Elevated creatinine
  – Recurrent Proteus infections (struvite stones)
Summary

• Nitrofurantoin is 1st choice for uncomplicated cystitis, TMP-SMX ok too

• Asymptomatic bacteriuria should be treated in select patients only
CLOSTRIDIUM DIFFICILE COLITIS
CLOSTRIUM DIFFICILE- one of CDC’s three Urgent Threats

Urgent Threats

HAZARD LEVEL URGENT

These are high-consequence antibiotic-resistant threats because of significant risks identified across several criteria. These threats may not be currently widespread but have the potential to become so and require urgent public health attention to identify infections and to limit transmission.

*Clostridium difficile (C. difficile), Carbapenem-resistant Enterobacteriaceae (CRE), Drug-resistant *Neisseria gonorrhoeae* (cephalosporin resistance)
Risk Factors

• Antibiotics
• Age >65 years
• Hospitalization
• Acid suppression
• IBD
• Tube feeds
• Chemotherapy
• Continued high-risk antibiotics
• Clindamycin
• Fluoroquinolones (ciprofloxacin, moxifloxacin, levofloxacin)
• Cephalosporins
Diagnosis

• Should be based on combination of clinical and laboratory findings:
  • Acute onset of diarrhea (≥ 3 unformed or watery stools occurring in ≤ 24 hours) **AND**
  • Positive test for toxigenic *C. difficile* or Pseudomembranous colitis on endoscopy OR high clinical suspicion
Diagnostic testing

- **Glutamate dehydrogenase Ag (GDH)**
  - Bacterial detection
  - Sensitive but not specific

- **Polymerase chain reaction (PCR):**
  - Toxin-producing gene
  - ↑Sensitivity

- **Enzyme immunoassay (EIA)**
  - Protein detection
  - ↓Sensitivity
  - ↑Specificity for disease
Other Things to Consider

• Stop unnecessary antibiotics
• Shorten antibiotic courses
• Narrow antibiotic spectrum
• Stop acid-suppressive medications when possible • Esp PPI
• Do not use anti-peristaltic agents until acute symptoms of CDI improve
Treatment

• Initial Episode Non Severe: VAN po or fidaxomicin for 10 days
• Initial Episode Severe: same
• Initial Episode, Fulminant: VAN 500 mg QID, rectal VAN with iv metronidazole
<table>
<thead>
<tr>
<th></th>
<th>Fidaxomicin</th>
<th>Vancomycin</th>
<th>Metronidazole</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>$2800</td>
<td>$250-680</td>
<td>$22</td>
</tr>
</tbody>
</table>
Risk of CDI Recurrence

[Bar chart showing the risk of CDI recurrence for different episodes, with percentages indicated for each episode.]
• 1\textsuperscript{st} Recurrence:
  VAN for 10 days
  OR
  VAN taper
  OR
  fidaxomicin
• **2^{nd} Recurrence:**
  
  VAN taper
  OR
  VAN taper followed by rifaximin
  OR
  Fidaxomicin
  OR
  Fecal microbiota transplantation
Vancomycin Taper

- 125 mg po 4x daily x 14 days
- 125 mg po 2x daily x 7 days
- 125 mg po 1x daily x 7 days
- 125 mg po every other day x 8 days (4 doses)
- 125 mg po every 3 days x 15 days (5 doses)
Fecal Microbiota Transplant (FMT)

- Promising
- Needs more data
- Multiple FMT’s may be needed
- Make sure medical treatment has been optimized prior to use
# Probiotics

<table>
<thead>
<tr>
<th>Diarrhea class</th>
<th>Probiotic</th>
<th>Placebo</th>
<th>OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAD</td>
<td>159/1470 (11%)</td>
<td>153/1471 (10%)</td>
<td>1.04 (0.83–1.32)</td>
</tr>
<tr>
<td>CDI</td>
<td>12/1470 (0.9%)</td>
<td>17/1471 (1.2%)</td>
<td>0.70 (0.34–1.48)</td>
</tr>
</tbody>
</table>

- No benefit for probiotic
- Very low rates of CDI in this population
- Majority of patients were receiving amoxicillin/ampicillin or second-generation cephalosporins (UK study)
- Likely underpowered for the CDI outcome
Infection Control

- Gloves + gowns for duration of diarrhea
- Wash with soap and water
- Private rooms
- Dedicated commode
- Bleach cleaning
- Repeat testing NOT necessary after end of treatment.
- Test can not be repeated within a 7 day time frame.
- Antimicrobial stewardship
Take-home Points

• For mild-moderate disease, more movement towards PO vancomycin For severe disease, choose vancomycin
  
  Higher cure, but same relapse

• Role of fidaxomicin is now more clear
  
  Consider if high risk of relapse or need CA
  
  Use in multiple recurrent disease

Role in severe disease