Current Approaches to Urogenital Infections

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PRIMARY CARE MEDICINE: UPDATE 2013
11 April 2013

Outline

• UTIs
• Vaginitis
• Cervicitis/PID

Disclosure

• Dr Gonzales serves as a scientific and clinical advisor to Phreesia, Inc., a computerized check-in company

Urinary Tract Infections in Adults

• Forty percent of women report having a UTI at some point in their lives
• UTIs are the leading cause of gram-negative bacteremia in the US
• Approximately 7 million office visits and more than 1 million hospitalizations in the US
• Overall annual cost in excess of $1 billion
Clinical syndromes or “groups”

- Asymptomatic bacteruria
- Acute uncomplicated cystitis
  - Recurrent cystitis
- Acute uncomplicated pyelonephritis
- Complicated UTI and its subcategories
- UTI in men

Complicated UTI

- Polycystic kidney disease; structural abnls
- Nephrolithiasis
- Voiding abnormalities
  - Neurogenic bladder, spinal cord injury, pregnancy, BPH, instrumentation, indwelling catheter
- Diabetes
- Immunosuppression

Microbiology of UTIs

**Uncomplicated UTI**. At least 10^2 with symptoms

- E. coli: >90% of isolates
- Other coliforms, Klebsiella, Proteus: uncommon
- Enterococcus: uncommon
- Staphylococcus saprophyticus: 5-10%

**Complicated UTI**. Can be any organism…

- E. coli: most common
- Other coliforms > enterococci: common
- Catheter-associated, long term: polymicrobial

Asymptomatic Bacteruria

- In Pregnancy
  - Meta-analysis of 14 trials with 2302 women (Smaill F et al)
  - Antibiotic treatment effective at eradication of bacteruria and preventing pyelonephritis
  - NNT = 7 (CI, 6.8)
  - Recommendation: screen with UCx early in pregnancy x 1.
- Prior to TURP or other urological procedures inducing mucosal bleeding (IDSA)
  - Screen with urine culture
- ADDED: Evidence shows no benefit in women with diabetes, spinal cord injury, institutionalized elderly
Acute Uncomplicated Cystitis

Risk Factors for UTI

- Anatomy
- Sexual activity
  - Premenopausal = 0.5-0.7 UTIs per person-yr
- Voiding abnormalities
  - Diabetes, neurogenic bladder, spinal cord injury, pregnancy, BPH, instrumentation
- Use of diaphragms and spermicides
- Family history

Clinical Features

- Irritable voiding symptoms
  - Presence of > 1 Sx = 50% probability UTI
  - Absence of vaginitis = 70% probability UTI
- To diagnose cystitis/uncomplicated UTI
  - Absence of flank pain/CVAT, N/V, fever
  - Absence of structural abnormalities, immunosuppression, pregnancy, comorbidities (e.g. diabetes)

How Good is History for the Diagnosis of Cystitis (vs. vaginitis)?

<table>
<thead>
<tr>
<th>Feature</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>LR +</th>
<th>LR -</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dysuria</td>
<td>89%</td>
<td>72%</td>
<td>3.2</td>
<td>0.16</td>
</tr>
<tr>
<td>Frequency</td>
<td>92%</td>
<td>91%</td>
<td>10.2</td>
<td>0.08</td>
</tr>
<tr>
<td>Absence of Vaginal Discharge</td>
<td>89%</td>
<td>92%</td>
<td>12</td>
<td>0.11</td>
</tr>
</tbody>
</table>

(Komaroff et al Arch Intern Med 1978)
**Positive Predictive Values for Combinations of Symptoms**

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Prob UTI %</th>
<th>Summary LR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dysuria Present</td>
<td>77%</td>
<td>24.6</td>
</tr>
<tr>
<td>Frequency Present</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaginal Discharge Absent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaginal Irritation Absent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dysuria Absent</td>
<td>4%</td>
<td>0.3</td>
</tr>
<tr>
<td>Vag D/C or Irritation Present</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dysuria or Frequency Present</td>
<td>9%</td>
<td>0.7</td>
</tr>
<tr>
<td>Vag D/C or Irritation PRESENT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Bent et al, JAMA 2002

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**How Good are Lab Tests for the Diagnosis of Cystitis (vs. vaginitis)?**

<table>
<thead>
<tr>
<th>Test</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>LR +</th>
<th>LR -</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;2 Bacteria/HPF</td>
<td>58%</td>
<td>93%</td>
<td>8.6</td>
<td>0.45</td>
</tr>
<tr>
<td>&gt;10 WBC/HPF</td>
<td>81%</td>
<td>79%</td>
<td>3.9</td>
<td>0.24</td>
</tr>
<tr>
<td>LE or Nitrite positive</td>
<td>75%</td>
<td>82%</td>
<td>4.2</td>
<td>0.30</td>
</tr>
</tbody>
</table>

(Komaroff et al Arch Intern Med 1978) (Hurtbut, J Clin Pathol 1991)

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**Audience Response?**

35 yo woman c/o 2-3 d painful urination, increased frequency, urgency. Denies fever, back pain, vaginal discharge.

**Question #1:** How often do you perform Urine DipStick Test?

**Response Options**

A. Rarely  
B. Sometimes  
C. Usually

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**UTI Post-Test Probabilities**

*In women with irritable voiding symptoms

Bent et al.
Suspected UTI Algorithm

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Risk Factors for Complicated UTI?
- Fever, Back Pain, N/V?
- Vaginitis Sx?
- Multiple UTI Sx Present

*In women with risk factors for STIs, consider testing for chlamydia

Perform Urinalysis

- Consider UCx, Empirical Rx
- About 20% UTI
- High Prob UTI, Rx w/o Testing

Adapted from Bent et al

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Treatment Regimens for Uncomplicated Acute Cystitis

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose/Duration</th>
<th>Common Side Effects</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrofurantoin</td>
<td>100 mg bid x 5 days</td>
<td>Nausea, headache</td>
<td>Resistance rare; safe in pregnancy; not effective for upper tract disease</td>
</tr>
<tr>
<td>Trimethoprim-sulfamethoxazole</td>
<td>160/800 mg (DS) bid x 3 days</td>
<td>Rash, urticaria, N/V, hematologic</td>
<td>Resistance increasing; use if local resistance rate &lt; 20%; avoid during pregnancy</td>
</tr>
<tr>
<td>Fluoroquinolones</td>
<td>3 days</td>
<td>N/V/D, headache, drowsiness, insomnia</td>
<td>Resistance low but increasing; reserve for serious conditions; avoid in pregnancy; tendon rupture</td>
</tr>
<tr>
<td>Beta-lactams</td>
<td>5-7 days</td>
<td>N/V/D, rash, urticaria</td>
<td>Resistance varies by agent; increased adverse effects; safe during pregnancy</td>
</tr>
</tbody>
</table>

Adapted from Gupta K et al, CID 2011;52:e103-20.

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When to Refer?

- Complicated UTI e.g. with indwelling catheter
- Hospitalized with upper tract disease requiring drainage or intervention
- Men with UTI
- Complex antibiotic resistant infections
- Pyelonephritis not responding to outpatient treatment after 72 hours
- Men with acute urinary retention, or persistent microscopic hematuria
  - E.g. due to stones, strictures, cancer

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Recurrent Cystitis/UTI

- 20 percent of young women with acute cystitis develop “recurrent” UTIs
- Defined as multiple infections with different organisms (but may be same species)
  - the causative organism should be identified by urine culture
  - not associated with underlying anatomic abnormalities
  - do not require further work-up of the genitourinary tract
Recurrent UTI Prevention

2-4 UTI recurrences in 1 year
- Post-coital antibiotic prophylaxis
  - ½ tablet of single-strength TMP-SMX (40mg/200mg)
  - Double-strength tablet (160/800 mg) if the UTIs have been clearly related to intercourse

> 4 UTI recurrences, or unrelated to coitus
- Daily, 3x/week or weekly prophylaxis
- Patient-initiated therapy (for uncomplicated UTI)

Post-menopausal women
- Intra-vaginal estrogen cream (no effect of oral estrogen)

Preventative strategies cont.

- Continuous daily prophylaxis with one of these regimens for a period of six months:
  - trimethoprim-sulfamethoxazole, one-half tablet per day (40/200 mg);
  - nitrofurantoin, 50 to 100 mg per day
  - norfloxacin, 200 mg per day
  - cephalaxin, 250 mg per day
  - trimethoprim, 100 mg per day

Prevention Alternatives to Abx

- Cranberry Juice. No benefit
- Lactobacillus preparations.
  - Premenopausal with recurrent UTI
    - Intra-vaginal suppository probiotic (L. crispatus) (Lactin-V; Osel) vs. placebo. Promising. 15% vs. 27% recurrent UTI at 8 weeks.
    - Stapleton AE et al. CID 2011;52:1212-7
  - Postmenopausal with recurrent UTI
    - Oral L. acidophilus and reuteri vs. TMP-Sulf. Not different from TMP-Sulf. 3.3 vs. 2.9 clinical recurrences (p=0.42), but more microbial recurrences in lactobacillus group.

Prevention Alternatives to Abx

- Vaccines. Not yet. Require multiple treatments. And E. coli keeps changing.
- Biologics. Take advantage of role of avirulent E. coli and other bacteria play on interfering with colonization of virulent strains.
  - Argues for LESS aggressive treatment of UTIs... to allow avirulent strains to persist, and for virulent strains to evolve...
- Consider Symptomatic (non-Abx) treatment of uncomplicated UTIs first, then abx after 3 days... Trials ongoing.
Uncomplicated Pyelonephritis

- A more severe illness with fever, chills, nausea, vomiting, leukocytosis and abdominal pain
- A serious gram-negative bacteremia
  Or
- Mild cystitis-like illness and +/- flank pain

Oral therapy?

- Mild to moderate symptoms
- Compliant with therapy
- Can tolerate oral antibiotics (not vomiting)

(No clear evidence that hospitalization is beneficial)

Decision to Hospitalize

- Serious comorbidities, including pregnancy
- Evidence of sepsis syndrome
- Unable to take oral therapy
- Upper tract condition requiring drainage or surgical intervention
  - Abscesses, emphysematous pyelonephritis, papillary necrosis or xanthogranulomatous pyelonephritis

Treatment Regimens for Uncomplicated Acute Pyelonephritis

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose/Duration</th>
<th>Comments</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluoroquinolones</td>
<td></td>
<td></td>
<td>Consider initial 1-time IV dose of long-acting Abx (e.g. 2 g of ceftriaxone or single 24-h dose of aminoglycoside) if patient is borderline oral Rx but not meeting admission criteria.</td>
</tr>
<tr>
<td>- ciprofloxacin</td>
<td>500 mg bid x 7 d</td>
<td>If local resistance rates &lt; 10%</td>
<td></td>
</tr>
<tr>
<td>- ciprofloxacin XR</td>
<td>1000 mg qd x 7 d</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- levofloxacin</td>
<td>750 mg qd x 3 d</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trimethoprim-sulfamethoxazole</td>
<td>160/800 mg (one DS) bid x 14 d</td>
<td>If pathogen known to be susceptible; otherwise give initial IV agent. Same as above</td>
<td></td>
</tr>
<tr>
<td>Beta-lactams</td>
<td>10-14 day regimens</td>
<td>Oral beta-lactams less effective and should be used cautiously only when other agents cannot be used.</td>
<td>Give an initial IV dose of a long-acting Abx when using oral beta-lactams.</td>
</tr>
</tbody>
</table>

IDSA Guidelines; Gupta K et al, CID 2011;52:e103-20.
Complicated UTI

- Anatomic, immunologic, functional or pharmacologic factors that predispose the patient to persistent infection, relapsing, (recurrent?) infection or treatment failure

Complicated UTI: Initial empiric therapy

- Fluoroquinolone (orally if possible)
- Parenteral administration of a third-generation cephalosporin
  - Switch to oral therapy within 72 hours with clinical improvement, ability to tolerate, etc.
- An oral agent, susceptible bacteria proved by culture
- Anti-pseudomonal penicillin with an aminoglycoside
- Vancomycin for enterococci

  **Duration of Therapy:** 10-14 days with f/u test of cure

Complicated UTI

**Common Causes**

- Blockages and other problems necessitating the placement of indwelling urinary devices
- Multi-drug resistant bacteria
- Primary or secondary immunosuppression
- Enlargement of the prostate gland

UTI in Men

**Older Men**

- Prostatic disease
- Outlet obstruction
- Urinary tract instrumentation

**Other Groups at Risk**

- Insertive anal sex (exposure to *E. coli* in the rectum)
- Uncircumcised (increased *E. coli* colonization of the glans and prepuce)
- Sexual partner colonized with uropathogens
Urologic Work-Up

- Consensus is lacking.
  - in young men with acute cystitis who respond to seven days of treatment, diagnostic work-ups beyond cultures are generally unrewarding
  - urologic evaluation should be performed routinely in adolescents and men with pyelonephritis or recurrent infections

Normal Vaginal Discharge

Discharge Components
- Vaginal secretions
- Exfoliated cells
- Cervical mucus

Normal Discharge Varies…
- Age
- Menstrual cycle
- Pregnancy
- Use of oral contraceptives

Major health promoting factor

- Lactobacillus
  - produces hydrogen peroxide, which is toxic to pathogens and keeps the healthy vaginal pH between 3.8 and 4.2
Pathology...

- Event $\rightarrow$ decrease in *Lactobacillus* organisms
- Antibiotics
- Contraceptives (altered estrogen/progesterone levels)
- Douching
- Stress
- Hormones
- Pregnancy (altered estrogen and progesterone levels)

Change in pH leads to proliferation

Decrease *L. acidophilus* $\rightarrow$ increase pH and proliferation of bacteria...
- *G. vaginalis*
- *M. hominis*
- Mobiluncus species

...that produce amines.
- Increase the vaginal pH
- Increase the exfoliation of vaginal epithelial cells
- Cause the characteristic malodorous discharge in bacterial vaginosis

Evaluation

**History**
- Abdominal or pelvic pain
- Fever
- Urinary symptoms
- Menstrual history
- Pregnancy

**Nature of Discharge**
- Amount
- Consistency
- Color
- Odor
- Accompanying pruritus
- External dysuria

Physical Examination

**Localize the anatomic site**
- Vulva
- Vagina
- Cervix

**External genitalia**
- Inflammation
- Lesions
- Masses
- Atrophic tissue
- Enlarged lymph nodes

**Speculum examination**
- Assess cervix and take samples from os
- Vaginal wall lesions
- Assess vaginal discharge:
  - Color; consistency;
  - volume; adherence to vaginal walls

**Cervical motion tenderness**
Diagnostic Evaluation

1. A wet-mount preparation using saline (BV, Trich)
2. 10 percent potassium hydroxide (KOH) to assess for Candida
3. A "whiff" test to detect amines (BV)
4. A litmus test of the pH level of vaginal fluid

Saline Wet-Mount

- Dilute the vaginal discharge with one or two drops of 0.9 percent normal saline solution and placing it on a slide with a coverslip, OR
- Test tube w/ 2-mL saline, and THEN place on a slide

- Look for "Clue Cells"- vaginal epithelial cells that are coated with adherent coccobacilli
  - sensitivity of 60%, and a specificity of up to 98%
- Look for motile trichomonads
  - sensitivity of 60% and a specificity of up to 99%

"Clue Cells"

Trichomonads
KOH preparation

- Place a second specimen of the vaginal discharge on slide with 10% KOH solution
  - a coverslip is placed on the slide and air- or flame-dried before examination

- Look for Candidal hyphae and Mycelial tangles and spores
  - positive in 50 to 70% of women with candidal infection

Candida

Litmus Testing for pH

- Place litmus paper in the pooled vaginal secretions or against the lateral vaginal wall.
- A normal vaginal pH is between 3.8 and 4.2
- If pH > 4.5, suspect BV, trichomoniasis, atrophic vaginitis

Etiology of Vaginitis in PC

- 40% Bacterial Vaginosis
- 30% Unknown
- 20% Candida
- 10% Trichomonas

Other Causes
- GC/chlamydia?... investigate when fever/lower abd pain
- HSV
- allergic reaction (chemical, latex, semen)
- atrophic vaginitis
Challenges in History

- Women buying OTC yeast preps
  - candida=33%; BV=19%; mixed=21%; normal exam=12%; trichomonas=2%
- Patients and physicians disagree on key findings
  - clear d/c: patient 21%; physician 13%
  - yellow d/c: patient 15%; physician 6%
  - white/gray d/c: patient 42%; physician 71%
- Poor agreement between call center nurse diagnosis and physician

CDC Guidelines 2010

“Medical history alone insufficient for accurate diagnosis of vaginitis…”

But

“Sensitivity of microscopy for Trichomonads or Yeast is only 50%”

Vaginitis

-Likelihood Ratios for Hx/PEx (Anderson et al)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Likelihood Ratios</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>positive</td>
</tr>
<tr>
<td>YEAST</td>
<td></td>
</tr>
<tr>
<td>Cheesy Discharge</td>
<td>2.4 (1.4-4.2)</td>
</tr>
<tr>
<td>Watery Discharge</td>
<td>0.1 (0.02-0.8)</td>
</tr>
<tr>
<td>Itching</td>
<td>1.7 (1.3-2.4)</td>
</tr>
<tr>
<td>Chief Complaint</td>
<td>3.3 (2.4-4.8)</td>
</tr>
<tr>
<td>Malodor</td>
<td>0.5 (0.3-0.9)</td>
</tr>
<tr>
<td>Curdy D/C or Vulvar Inflamm.</td>
<td>17 (8.8-32)</td>
</tr>
<tr>
<td>Curdy D/C + Itching</td>
<td>150 (20-100)</td>
</tr>
<tr>
<td>Fishy Odor (PEx)</td>
<td>0.03 (0.0-0.5)</td>
</tr>
</tbody>
</table>

BACTERIAL VAGINOSIS

<table>
<thead>
<tr>
<th>Condition</th>
<th>Likelihood Ratios</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malodor (Hx)</td>
<td>1.6 (1.3-2.0)</td>
</tr>
<tr>
<td><em>High Cheese</em> Odor (PEx)</td>
<td>3.2 (2.1-4.7)</td>
</tr>
</tbody>
</table>

Candida Vaginitis Post-Test Probabilities
Complicated Candidiasis
CDC Guidelines: MMWR 2010;59:RR-12 (www.cdc.gov/mmwr)

Recurrent vulvovaginal candidiasis (> 4 episodes in 1 year)
- Send vaginal cultures to confirm Dx and identify unusual spp.
  - C. glabrata in 10-20%, and tough to see on microscopy.
- treatment: topical therapy x 7-14 d; or fluconazole 200 mg, po, days 1, 4 and 7.
- Maintenance
  - First line: fluconazole 100, 150 or 200 mg q week x 6 mo;
    - If not fluconazole not available, clotrimazole 500 mg vag supp q week;
Severe vulvovaginitis (i.e. extensive erythema, edema, excoriation and fissure formation)
- treatment: topical therapy x 7-14 d; or fluconazole 150 mg, po, repeated in 3 d
Non-albicans vulvovaginitis
- treatment: 7-14 d non-fluconazole azole drug; if recurs, 600 mg boric acid in gelatin capsule qd x 2 wks

Bacterial Vaginosis
CDC Guidelines: MMWR 2010;59:RR-12 (www.cdc.gov/mmwr)

Criteria 3 of 4 present:
- vaginal discharge
- clue cells
- vaginal pH > 4.5
- whiff test (fishy odor after 10% KOH

Management of Sex Partners
- response to Rx and relapse are not affected by Rx of sex partner

Recommended Regimen*
- metronidazole 500 mg bid x 7 d, OR
- metronidazole gel 0.75%, one full applicator (5 g) lv x 5 d, OR
- clindamycin cream 2%, one full applicator (5 g) ivx 7d

Alternative Regimens
- Tinidazole 2 g po qd x 2 d, OR
- Tinidazole 1 g po qd x 5 d, OR
- clindamycin 300 mg po bid x 7 d, OR
- clindamycin ovals 100 mg iv qhs x 3 d

Adverse outcomes of untreated BV
- Most proven- In pregnancy
  - premature rupture of membranes
  - preterm labor (unclear that treatment affects the incidence)
- Increased risk of
  - Acquisition of STDs
  - Complications of gynecologic surgery
  - Recurrence of BV

Trichomoniasis
CDC Guidelines: MMWR 2010;59:RR-12 (www.cdc.gov/mmwr)

Microscopy, Rapid Tests or Cx
- Microscopy 50
- POC Tests 80+
- Urine PCR 90

Recommended Regimen*
- metronidazole 2 g po x 1
- Tinidazole 2g po x 1

Alternative Regimens
- metronidazole 500 mg bid x 7 d
- Tinidazole 2g po x 1

Management of Sex Partners
- treat sex partners

**In HIV, treat x 7 days, screen at 3 months post-treatment, and annually.
If typical symptoms and **NEGATIVE** wet-mount exam:

- Culture using Diamond's medium (sensitivity of 95 percent for the diagnosis of trichomoniasis)
- DNA probes
- Polymerase chain reaction tests
- Sometimes appears in the Pap smear report

Don’t Miss PID

**Empirical Rx Guidelines**

**Recommended Regimen**
- Azithromycin, 1 g orally x 1, or
- Doxycycline, 100 mg bid x 7 days

**Alternative Regimens**
- Erythromycin, 500 mg qid for 7 days, or
- Erythromycin (EE), 500 mg qid x 7 days, or
- Levofloxacin, 500 mg qd x 7 days, or
- Ofloxacin, 350 mg bid x 7 days

**Recommended Regimen in Pregnancy†**
- Azithromycin, 1 g orally x 1, or
- Amoxicillin, 500 mg orally qid daily for 7 days

**Increasing Cefixime Resistance**

**Treatment for Uncomplicated Gonococcal Infection**

**Cervix, Urethra, and Rectum**

**Recommended**
- Ceftriaxone, 250 mg IM x 1, plus chlamydia Rx

**Alternative Regimens only if Ceftriaxone not available**
- Cefixime 400 mg x 1, plus chlamydia Rx, plus test of cure in 1 week

If patient with severe cephalosporin allergy:
- Azithromycin, 2 g x 1, plus test of cure in 1 week

**Pharynx**

**Recommended**
- Ceftriaxone, 250 mg IM x 1 plus chlamydia Rx

**Increasing Cefixime Resistance**

<table>
<thead>
<tr>
<th>Region</th>
<th>DNA</th>
<th>DOX</th>
<th>ATO</th>
<th>EUR</th>
<th>MIN</th>
<th>MDA</th>
<th>PAL</th>
<th>RIC</th>
<th>SXT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Male</td>
<td>0.3</td>
<td>0.0</td>
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<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Female</td>
<td>0.3</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
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<td>0.0</td>
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<tr>
<td>Northeast</td>
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<td>0.0</td>
<td>0.0</td>
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<tr>
<td>Midwest</td>
<td>0.3</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
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<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>South Atlantic</td>
<td>0.3</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>South Central</td>
<td>0.3</td>
<td>0.0</td>
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| Antimicrobials: 0 = confirmed resistance; 1 = intermediate resistance; Rx = agent that must be part of Rx; Rx Rx = from one herb and antibiotic combination; Rx Rx Rx = from one herb and antibiotic combination with other Rx. |
Summary

- Vaginitis etiology evades telephone diagnosis...
  Inter-rater reliability low
  - Curdy vaginal d/c + excoriations/itching

- Accurate diagnosis aided by physical exam, microscopy and vaginal pH
  - Absence of positive findings lead toward consideration of trichomonas and STIs
  - Don’t forget atrophic vaginitis in post-menopausal women

Summary

- Increasing cefixime resistance
  - 2nd line, and require test of cure backup

- Respect the lactobacillus!