Recurrent Urinary Tract Infections in Women
Fact or Fiction

Kristy M. Borawski, MD
Disclosures / Disclaimers

- Nothing to disclose
- Non FDA regulated / approved treatment options for managing recurrent urinary tract infections (UTI)
• 50-70% of women will have a urinary tract infections (UTI) during their lifetime
  – 20-30% of these women will recur
    • Rate of 0.13 – 0.22 UTIs/month
    • 1.6 – 2.6 per year

• 7 million visits to health care providers
  – 1.2% of all office visits by women

• Uncomplicated, non catheter related, non hospital acquired infections
• 1995: $1 billion in indirect costs
  – $600 million indirect costs

Have we caused the problem??
Have we caused the problem??

• 1800s: women with UTI were bedridden for many weeks while the physician attempted to “assist” mother nature
  – Bedrest, warm herbal compresses, opiate based enemas
    • Aggressive: mustard or ammonia-based plasters, oral alkali, bleeding
  – Late 1800s, William Osler’s treatment algorithm
    • Bedrest, cold compress to loins, dry cups to lumbar region and amyl nitrate & quinine in large doses
      – Aggressive: acetates of lead and opium
Have we caused the problem??

• Felix Guyon (1831-1920) noted that many patients with cystitis did not experience recurrences after recovery
  – ? Autovaccination from absorption of toxins in a state of modified virulence

• Has early intervention with antimicrobials created the scenario of recurrent UTIs?
  – Results are mixed in limited studies

Defining the Problem
• **Uncomplicated UTIs**: sporadic, community-acquired episodes of cystitis & pyelonephritis in otherwise healthy individuals

• **Complicated UTIs**: UTI associated with a structural or functional urinary tract abnormality or an underlying pathology, both of which can increase the risks of acquiring an infection or failure of therapy

Table 1. Host factors that classify a urinary tract infection as complicated

<table>
<thead>
<tr>
<th>Complication</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatomic abnormality</td>
<td>Cystocele, diverticulum, fistula</td>
</tr>
<tr>
<td>Iatrogenic</td>
<td>Indwelling catheter, nosocomial infection, surgery</td>
</tr>
<tr>
<td>Voiding dysfunction</td>
<td>Vesicoureteric reflux, neurologic disease, pelvic floor dysfunction, high post void residual, incontinence</td>
</tr>
<tr>
<td>Urinary tract obstruction</td>
<td>Bladder outlet obstruction, ureteral stricture, ureteropelvic junction obstruction</td>
</tr>
<tr>
<td>Other</td>
<td>Pregnancy, urolithiasis, diabetes or other immunosuppression</td>
</tr>
</tbody>
</table>
Recurrent UTI

- Recurrent UTI: documented by culture
  - More than 2 episodes in the previous 6 months
  - More than 3 infections in the last 12 months

• 4 main patterns of bacteriuria response to therapy
  – Cure
  – Bacteriologic persistence*
    • Persistence of same microorganism after 48 hours of treatment
  – Bacteriologic relapse*
    • Reinfection with the same microorganism that caused the initial infection usually within 1-2 weeks after cessation of treatment
  – Reinfection
    • Infection after sterilization of the urine
    • Most common cause of recurrent UTIs

* May be due to inadequate initial treatment

Risk Factors for Recurrent UTIs

Pre-menopausal
- Sexual intercourse recent/new sexual partner
- Use of contraception (spermicide, diaphragm)
- Antimicrobial use
- Genetics & Family hx
- Previous UTI
- Childhood UTI
- Distance of urethral from anus

Post-Menopausal
- Healthy 50-70 y/o Not catheterized Not institutionalized
- Lack of estrogen
- Urogenital surgery
- Incontinence
- Cystocele
- Post void residual
- Previous UTI

Elderly, frail, >70
- Catheterization
- Incontinence
- Urogenital surgery
- Diminished mental status
- Antimicrobial use

Int Urogynecol J 2015; 26: 795-804.
US Guidelines for treating recurrent UTIs
International Clinical Practice Guidelines for the Treatment of Acute Uncomplicated Cystitis and Pyelonephritis in Women: A 2010 Update by the Infectious Diseases Society of America and the European Society for Microbiology and Infectious Diseases

Clinical Practice Guidelines for the Diagnosis and Management of Intravascular Catheter-Related Infection: 2009 Update by the Infectious Diseases Society of America

Infectious Diseases Society of America Guidelines for the Diagnosis and Treatment of Asymptomatic Bacteriuria in Adults
Guidelines for the diagnosis and management of recurrent urinary tract infection in women

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Guidelines on Urological Infections

Diagnosis

• Urinalysis
• Urine Culture
  – Standard $10^5$ colony count
    • EAU $10^3$ plus symptoms

• Post void residual, esp in post menopausal women
  – Higher PVR associated with increased rUTI risk
    • 23% recurrent UTI in higher PVR vs. 2% in age matched controls with normal PVR
  – Slower uroflow associated with increased rUTI risk
    • 45% recurrent UTI in slower flow vs. 23%
  – Similar study in non pregnant women age 18-30
    • No difference in PVR & uroflow rates between women with recurrent UTI and controls

Imaging in Recurrent UTIs
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• No clear guidelines for imaging studies in women w/ uncomplicated recurrent UTIs

• Consider if:
  – High clinical degree of suspicion for abnormality
  – Atypical symptom presentation
  – Failure to respond to appropriate antimicrobial treatment

Can Urol Assoc J 2011; 5(5) 316-322.
Indications for further evaluation

- Prior urinary tract surgery or trauma
- Gross/microscopic hematuria after resolution of infection
- Previous bladder or renal calculi
- Obstructive symptoms, low uroflowmetry, high PVR
- Urea-splitting bacteria on culture
  - *Proteus, Pseudomonas, Klebsiella, Staphlococcus, Yersinia, Mycoplasma*
- Bacterial persistance after sensitivity-based therapy
- Prior abdominopelvic malignancy
- Diabetes or otherwise immunocompromised
- Pneumaturia, fecaluria, anaerobic bacteria or h/o diverticulitis
- Repeated pyelonephritis

*Can Urol Assoc J 2011; 5(5) 316-322.*
Imaging Modality

- CT A/P w/wo
- Ultrasound +/- KUB

Can Urol Assoc J 2011; 5(5) 316-322.
Cystoscopy in Recurrent UTIs
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<table>
<thead>
<tr>
<th>Study</th>
<th>Patient</th>
<th>Abnormalities† at cystoscopy</th>
<th>Imaging modality</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engel et al. (1980) J. Urol.</td>
<td>153</td>
<td>1 (1%)</td>
<td>IVU</td>
<td>Cystoscopy</td>
</tr>
<tr>
<td>Fowler et al. (1981) NEJM</td>
<td>74</td>
<td>3 (4%)</td>
<td>IVU</td>
<td>No cystoscopy</td>
</tr>
<tr>
<td>Mogensen et al. (1983) Brit. J. Urol.</td>
<td>93</td>
<td>11 (12%)</td>
<td>IVU</td>
<td>Cystoscopy</td>
</tr>
<tr>
<td>Van Haarst et al. (2000) Urology</td>
<td>100‡</td>
<td>0 (0%)</td>
<td>US KUB IVU US CT KUB</td>
<td>No cystoscopy</td>
</tr>
<tr>
<td>This study</td>
<td>118</td>
<td>9 (7.6%)</td>
<td></td>
<td>Cystoscopy in selected patients</td>
</tr>
</tbody>
</table>

†Non-specific and insignificant abnormalities such as inflammation were excluded in all reported results. ‡Only women 20–40 years of age. CT, computed tomography; IVU, intravenous urography; KUB, plain X-ray urinary tract (kidney, ureters, bladder); US, ultrasound.
Cystoscopy in Recurrent UTIs

• Retrospective review of 118 patients
  – All had imaging
    • 81% ultrasound, 45% IVP, 22% CT, 15% plain Xray

• Recommendations
  – Consider cystoscopy in setting of clinical risk factors and/or abnormal imaging

<table>
<thead>
<tr>
<th>Imaging results</th>
<th>Abnormal</th>
<th>Cystoscopy Normal</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td>Abnormal</td>
<td>8</td>
<td>23</td>
<td>31</td>
</tr>
<tr>
<td>Normal</td>
<td>1</td>
<td>86</td>
<td>87</td>
</tr>
<tr>
<td>Total</td>
<td>9</td>
<td>109</td>
<td>118</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Risk factors †</th>
<th>Present</th>
<th>Absent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abnormal</td>
<td>4</td>
<td>40</td>
<td>44</td>
</tr>
<tr>
<td>Normal</td>
<td>5</td>
<td>69</td>
<td>74</td>
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PPV: 8/8 + 23 = 26%  
NPV: 86/1 + 86 = 99%

NPV: 69/5 + 69 = 93%

Treatment Options for Recurrent UTIs

Lifestyle
Antimicrobial
Nonantimicrobial
Behavioral / Lifestyle modifications

- Avoid spermicides or vaginal diaphragms
- Pre & post coital voiding habits*
- Frequency of voiding*
- Delayed voiding habits*
- Wiping patterns*
- Douching*
- Hot tubs / bubble baths*
- Body mass index*
- Use of tight clothing*
- Type of clothing*
- Bicycle riding*
- Volume of fluid consumed*

* NO DATA THAT CONFIRMS RELATIONSHIP WITH RECURRENT UTIs
Antimicrobial Treatment for Recurrent UTIs
Nonantimicrobial Treatment for Recurrent UTIs
Estrogren
Cranberry
Methenamine Salts
Vitamin C
D-Mannose
Lactobacillus
Other Food/Vitamin Based treatments
Colloidal Silver
Vaccination