

Urinary Tract Infections

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Infectious Disease Attending
BUMC-P

Clinical Scenario # 1

- A 22-yo woman evaluated for one day history of dysuria and urinary urgency and frequency. She had an episode of cystitis 2 years ago. The patient has a sulfa allergy.
- On PE : Afebrile , BP 110/60, HR 60 and RR 14 . Mild suprapubic tenderness but no flank tenderness.. The remainder of the examination is N.
- Urine dipstick analysis shows 3 +leukocyte esterase. A pregnancy test is negative.

Treatment with which of the following options is most appropriate?

- A) Amoxicillin
- B) Fosfomicin
- c) Levofloxacin
- d) Nitrofurantoin

Clinical scenario # 2

- A 32 yo woman is evaluated for 2 day history of dysuria and urinary urgency and frequency and a 1 day history of fever . She has no nausea or vomiting.
- PE : Temp 38.5 C (101.3 F), BP 120/70, HR 90/ min, RR 12 /min. R flank tenderness at palpation .
- A urinalysis shows more than 20 leukocytes /hpf and 4 + bacteria. A pregnancy test is negative.

In addition to obtaining a urine culture, which of the following is the most appropriate empiric treatment ?

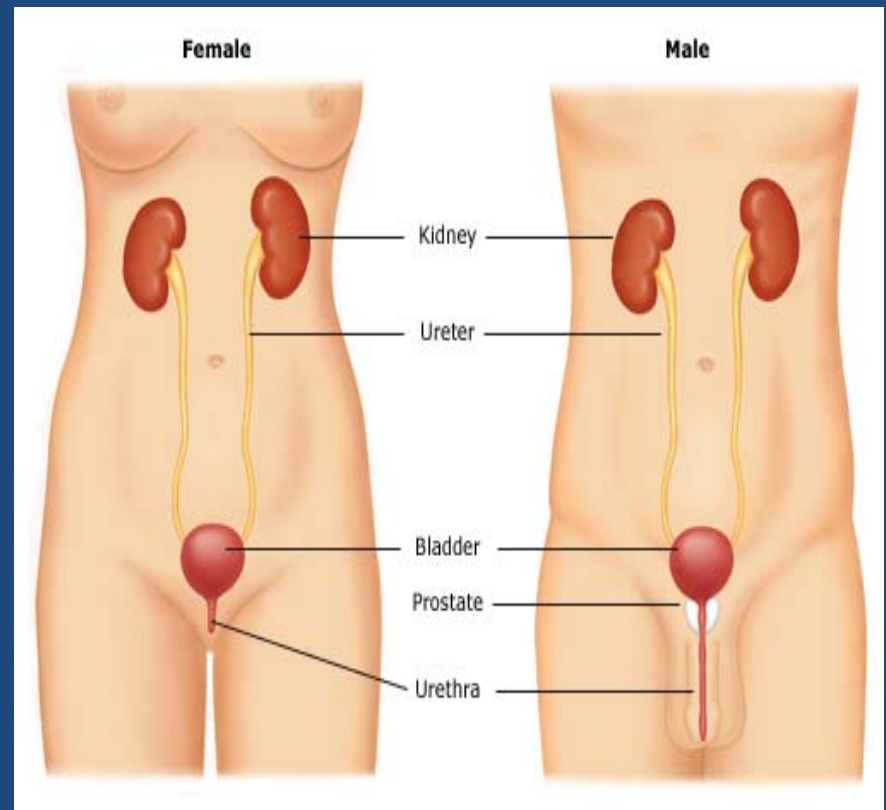
- A) Ampicillin
- B) Ciprofloxacin
- C) Nitrofurantoin
- D) TMP/SMX

Urinary Tract Infections Outline

- Definition
- Diagnosis
- Microbiology
- UTI (syndromes)
- Treatment

Urinary tract infection

- Uncomplicated UTI: infection in a premenopausal, non-pregnant woman with no urological abnormalities
- Complicated UTI: infection in a urinary tract with functional or structural abnormalities.



UTI : Clinical symptoms and presentation in adult

- Lower tract : cystitis
 - Dysuria urinary urgency and frequency suprapubic discomfort.
 - hemorrhagic cystitis bloody urine (10%)
- Upper tract: pyelonephritis
 - Fever, sweating
 - Nausea, vomiting, flank pain, dysuria
 - Dehydration, hypotension
- Vaginal discharge (ho STD)

Diagnosis of UTI

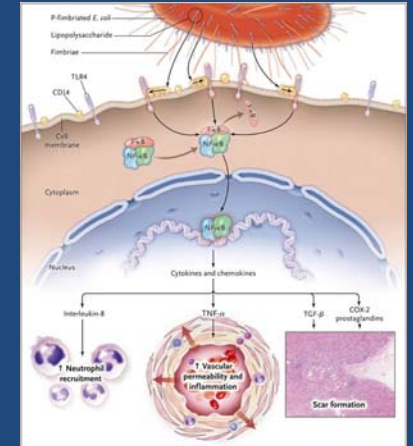
- Collection of specimens
- Urinalysis microscopic examination
 - WBC upper limit 5-10 leukocytes hpf.
 - presence of bacteria
- Urine dipstick test : rapid screening test
 - Leukocyte esterase test
 - Nitrate->Nitrite test positive in only 25%

Diagnosis of UTI

- Indications for urine culture
 - Pyelonephritis
 - complicated UTI
 - Recurrent UTI
 - Patients with multiple allergies
 - Suspect MDRO

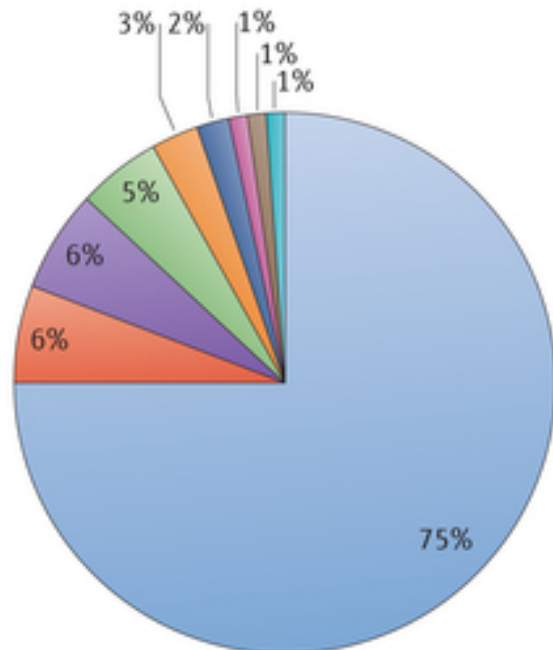
Microbiology of UTI

- *E. coli* 75-90%
- *S. saprophyticus* 5-15%
- Klebsiella, Proteus, Enterococcus, Pseudomonas small percentages
 - Hospital acquired : Enterobacter, Klebsiella, Acinetobacter, Serratia, Citrobacter, Providencia, Pseudomonas, Enterococcus
 - Anaerobes rarely cause UTI
 - Candida increasingly recognized as a cause of UTI



Microbiology of UTI

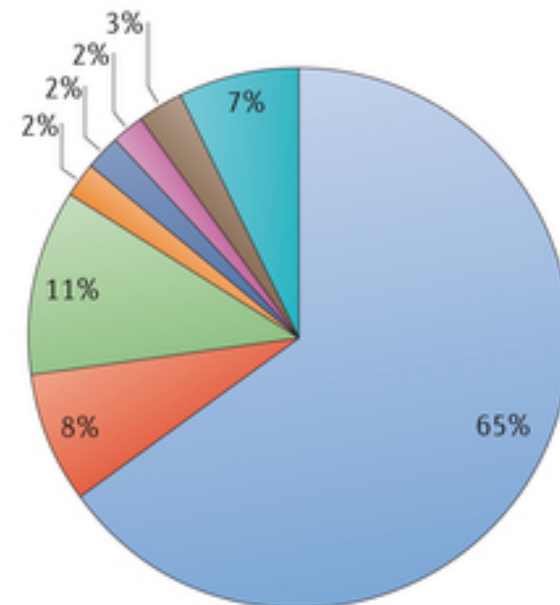
Uncomplicated UTI



Risk factors

- Female gender
- Older age
- Younger age

Complicated UTI



Risk factors

- Indwelling catheters
- Immunosuppression
- Urinary tract abnormalities
- Antibiotic exposure

Nature Reviews | Microbiology

Urinary Tract Infections

- Acute uncomplicated cystitis
- Acute uncomplicated pyelonephritis
- Recurrent UTI
- Complicated UTI- sepsis
- CA UTI
- Candida UTI

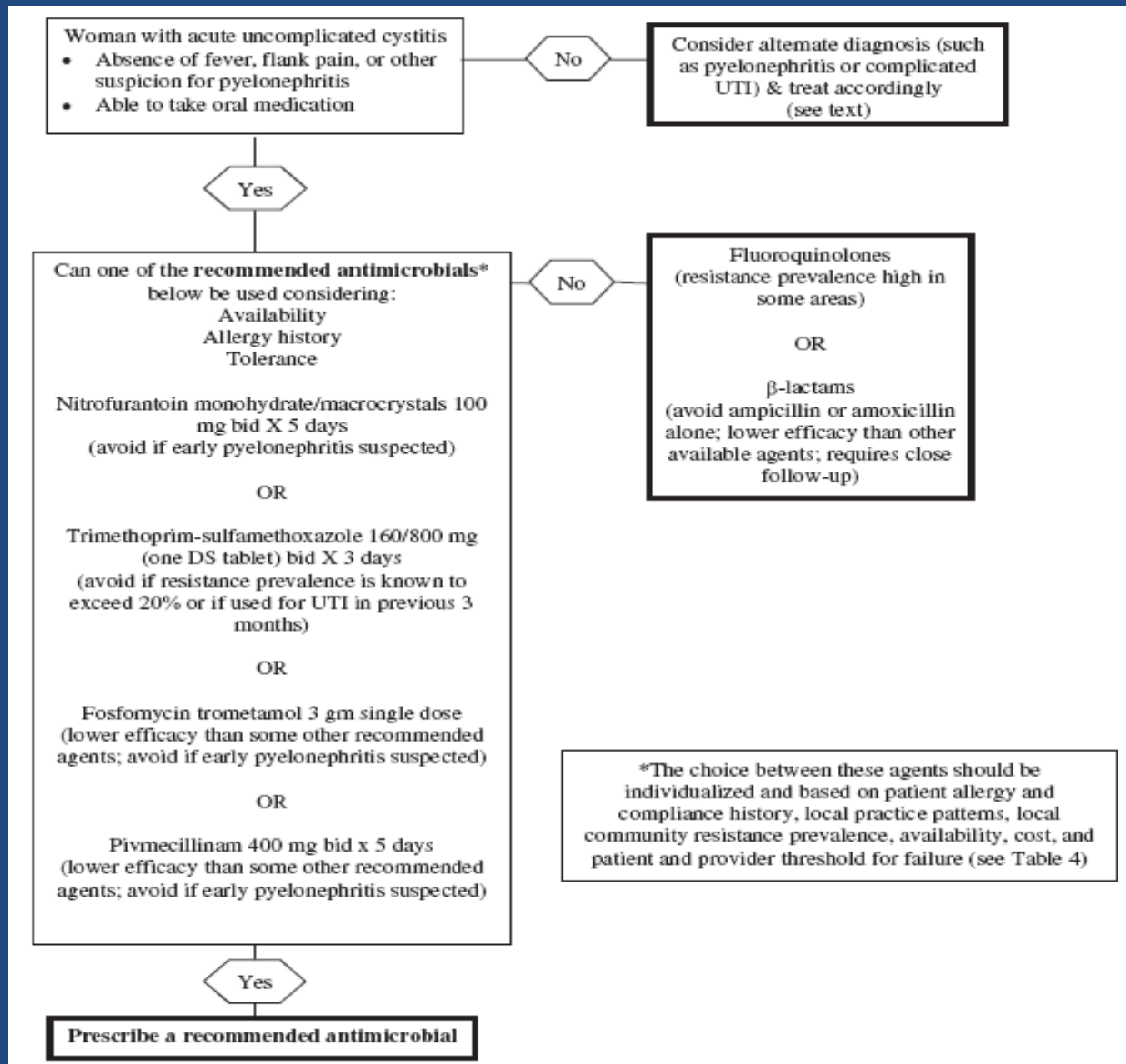
Treatment of UTIs

- Acute uncomplicated cystitis
- Acute uncomplicated pyelonephritis

Treatment of UTIs

For AUC and AUP consider :

- Antimicrobial resistance
- Collateral damage
 - Cephalosporins linked to subsequent infections VRE, ESBL Klebsiella, Beta lactamase R acinetobacter, C Dif
 - Fluoroquinolones linked to infection with MRSA and FQ R in GN



Acute uncomplicated pyelonephritis

- Urine culture and susceptibility testing
- Oral ciprofloxacin 500 BID x 7 days (w or wo initial IV). Resistance < 10%
- Oral TMP/SMX (160/800) if uropathogen known to be susceptible x 14 days. If susc not known initial IV (ceftriaxone or AG)
- Oral B- lactam less effective. If used initial IV (ceftriaxone or AG) 10-14 days

Recurrent UTIs

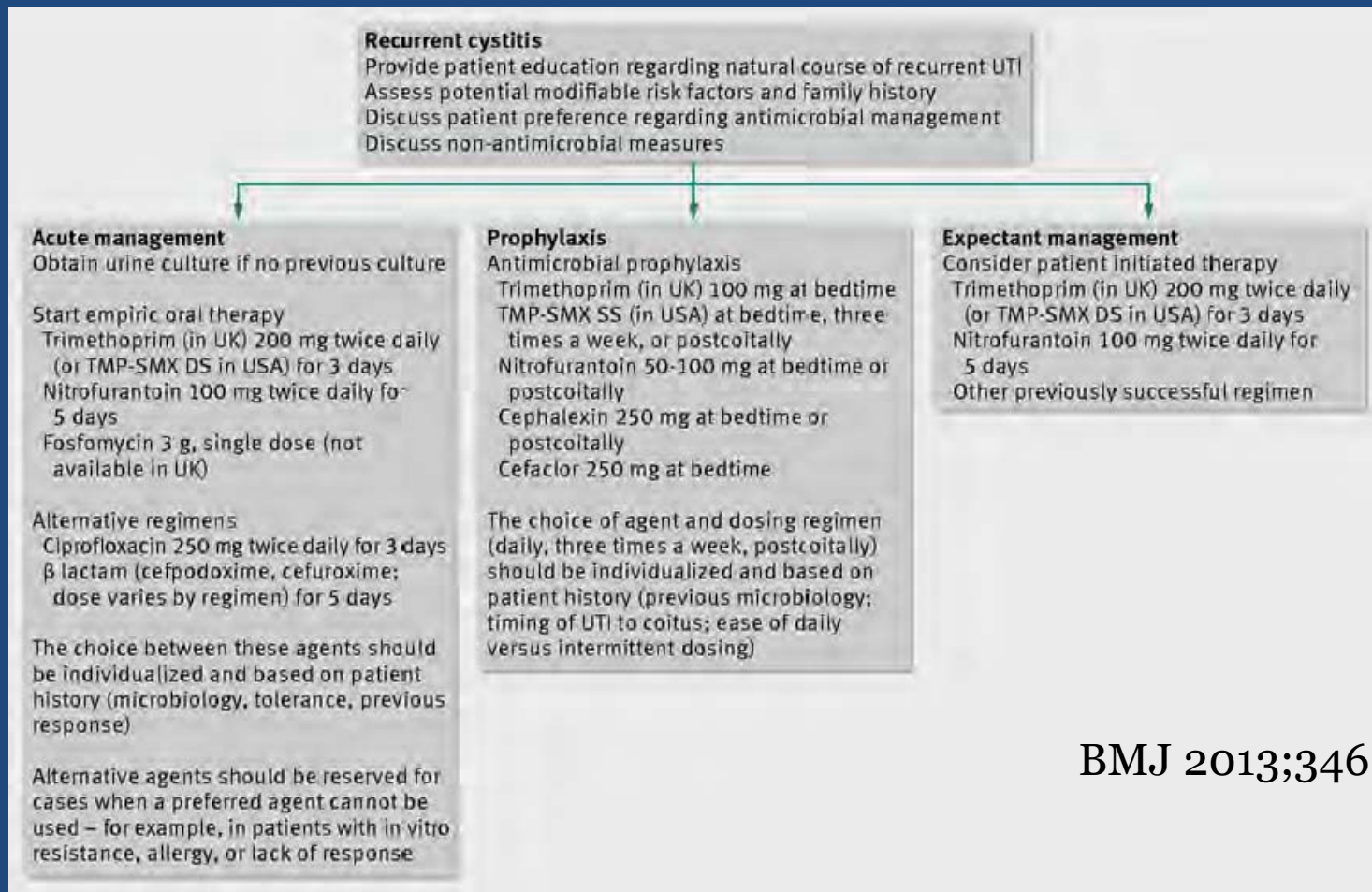
- 2 or > episodes 6M or 3 or > in a year. Non pregnant adult women
- Relapse : If current infection is caused by same pathogen as the initial UTI and occurs within 2 weeks
- Re infection: If current infection is caused by a different strain than initial UTI .

Recurrent UTI : Risk Factors

- Spermicidal products
- Sexually active
- Genetic factors
- Variations in innate immune system (low CXCR1 and CXCR2 expression)

Preventive measures

- Antimicrobial prophylaxis
- Patient centered approach



Non antimicrobial strategies

- Lactobacillus : L crispatus intravaginal suppositories, oral capsules with L rhamnosus GR-1 and L reuteri RC- 14
- Estrogens
- Cranberries
- Urination before and after sexual activity

Drug induced UTI's

- Recent reports of drug induced UTI's related to sodium-glucose cotransporter 2 (SGLT2) inhibitors “flozins”
- Oral hypoglycemics that work by increasing the amount of glucose spilled in the urine
- Include canagliflozin (Invokana), empagliflozin (jardiance) and dapagliflozin (Farxiga)

Complicated UTIs

Initial evaluation:

- Detailed history- Previous UTI, prior ATB use
- Physical exam – Sepsis ?
- UA and Urine culture
- Imaging

If obstruction

- Prompt urologic evaluation

Complicated UTIs

- Diabetes Mellitus
- Acute pyelonephritis
- Emphysematous pyelonephritis
- Renal abscess
- Renal papillary necrosis
- UTI in renal transplant recipients
- Nephrolithiasis
- Prostatitis

Diagnosis of CA-UTI

- In patients with indwelling urethral, indwelling supra pubic or intermittent catheterization
- Presence of symptoms or signs cw UTI with no other identified source of infection along with 10^3 CFU/ml of ≥ 1 bacterial species in a single urine specimen.

Diagnosis of CA-UTI

- Signs and symptoms cw UTI include: new onset of worsening fever, rigors, altered mental status, malaise, or lethargy with no other identified cause, flank pain; CVA tenderness; acute hematuria; pelvic discomfort
- When catheter removed : dysuria, urgent or frequent urination, supra pubic pain or tenderness

Diagnosis of CA-UTI

- A urine culture should be obtained prior to initiating antimicrobial treatment
- If an indwelling catheter has been in place for > 2 weeks at the onset of CA-UTI and is still indicated, the catheter should be replaced and a urine sample sent from freshly placed catheter
- If catheter can be discontinued, a culture of voided midstream urine specimen should be obtained

Banner Clinical Practice

- Discuss with patient indication and risk of placing an indwelling urinary catheter and document in chart.
- Select an indication for the catheter when ordering.
 - Urinary retention or obstruction
 - U.O. monitoring in critically ill, incontinent, uncooperative
 - Peri-operatively for selected surgical procedures
 - Fluid challenge in patients with ARF
 - Urinary incontinence posing risk to patient
 - Prolonged immobilization
 - Palliative care in terminally ill
- Continuing the catheter requires daily renewal order.
 - Nursing will contact you on daily basis for indication and order
 - Exceptions include certain urologic/gyn/perineal procedures

CA UTIs

- Cefepime 2 gm IV q 12h, Pip/tazo 3.375 gr q 6h or IMP 500 mg q 6h
- Discontinue or exchange catheter
- Duration 5- 14 days
- Shorter duration in uncomplicated UTI 3d
- Do not use moxifloxacin

Zosyn extended infusion

- Zosyn 4.5 gm IV q 6h will be automatically replaced 3.375 GM IV extended infusion (4hs) q 8h. MIC <16
- ER 30 min infusion will continue

CID 2013; 56(2): 272-282

J Pharm Pract.2011 Dec ;24(6):571-6

J Expert Opin Drug Metab Toxicol.2010 Aug; 6(8): 1017-31

System Antibiotics - Windows Internet Explorer

http://intranet.bhs.bannerhealth.com/BHSystem/Departments/Infection+Prevention+and+Control/System+Antibiotics.htm?clicksrc=ewLeftNav

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ments >> Infection Prevention and Control >> System Antibiotics

Antibiotics

How to view facility antibiotics for the various Banner facilities

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Candida UTI

- Candidemia rarely results from asymptomatic candiduria
- Patients who have symptoms of UTI should be treated . Oral fluconazole .
- Candiduria + indwelling catheter ,remove catheter. If not possible -> repeat UA
- Treatment of asymptomatic candiduria:
 - Very low birth weight infants
 - Patients undergoing urologic procedures
 - Neutropenic patients

Recommended reading

- Clinical Practice Guidelines CID 2011:52 e 103-120
- Urinary Catheter Guidelines CID 2010:50 625-663
- Infect Dis Clin N Am 28 (2014) 1-159
- Uncomplicated Urinary Tract Infection N Engl J Med 366;11
- Approach to a Patient with Urosepsis J Glob Infect Dis 2009 Jan-Jun; 1 (1): 57-63