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# Urinary Tract Infections


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## Acute Cystitis

- Bladder infection in women who have normal structure and function of the GU tract
- From AUA guidelines: combination of laboratory confirmation of significant bacteriuria with endorsement of acute-onset symptoms referable to the urinary tract

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# Complicated Urinary Tract Infection
# AUA Guidelines on Recurrent UTI

- An infection in a patient in which one or more complicating factors may put them at higher risk for development of a UTI and potentially decrease efficacy of therapy. Such factors include the following:
- Anatomic or functional abnormality of the urinary tract (e.g., stone disease, diverticulum, neurogenic bladder)
- Immunocompromised host
- Mutli-drug resistant bacteria

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# Microbiology of Acute Cystitis

- 75-90% E coli
  - Type 1 mannose sensitive fimbria attaches to receptor on urothelial cells
- 10-20% Staphylococcus saprophyticus
- 4% each Klebsiella and Proteus
- Source of bacteria: gut microbiome

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# Diagnosis of Acute Cystitis

- Symptoms
  - New onset frequency, **dysuria**, urgency
  - Older females: new onset incontinence
  - No vaginal discharge or pain
  - 90% PPV for having 2 symptoms of UTI [1]
- Lab diagnosis: $\geq 10^2$ uropathogens on culture

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1. Bent S JAMA 287:2701, 2002

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# Lab diagnosis of UTI

- Collection: in women, presence of vaginal epithelial cells and lactobacilli are c/w contamination
- Chem strips:
  - LE produced by breakdown of WBC in urine. Indicates pyuria but not bacteria specifically. Also occurs with vaginal contamination
  - Nitrites: present when bacteria reduce dietary nitrates via bacterial nitrate reductase
  - Nitrite producing bacteria: all enterobacteriaceae including E coli, Klebsiella, Enterobacter, Proteus
  - Bacteria not producing nitrites: all gram positives and psuedomads (Psuedomonas and Acinetobacter)

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# AUA Guidelines on Antimicrobial Prophylaxis

- "Urine testing prior to a higher-risk procedure should include urine dipstick at a minimum, appreciating the test performance characteristics of this test, or more accurately, urine microscopy".
- St. John et al The use of urinary dipstick tests to exclude urinary tract infection: a systematic review of the literature. Am J Clin Pathol 2006; 126: 428.
- "In certain circumstances, there is evidence for the use of urinalysis as a rule-out test for UTI".

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# Treatment of Acute Cystitis

- +/-Send culture, start empiric antibiotics
- ISDA guidelines: Clin Inf Dis 52(5): 561, 2011
  - 3 days of TMP/SMX
  - Alternative:
    - 5 days of Nitrofurantoin/macrocrystals 100 mg po bid
    - Fosfomycin 3 gm in single dose: use in setting of significant renal insufficiency and in G6PD deficiency.
  - Quinolones: 3 day is option but reserve due to higher "collateral damage"

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# Recurrent Infection

- Infection that occurs after documented successful resolution of a prior infection
- 3 UTI in 12 months or 2 in 6 months
- Reinfection: caused by different bacteria
  - come from outside GU tract
- Bacterial persistence: multiple infections caused by the same bacteria
  - Focus within the GU tract- prostate, stone

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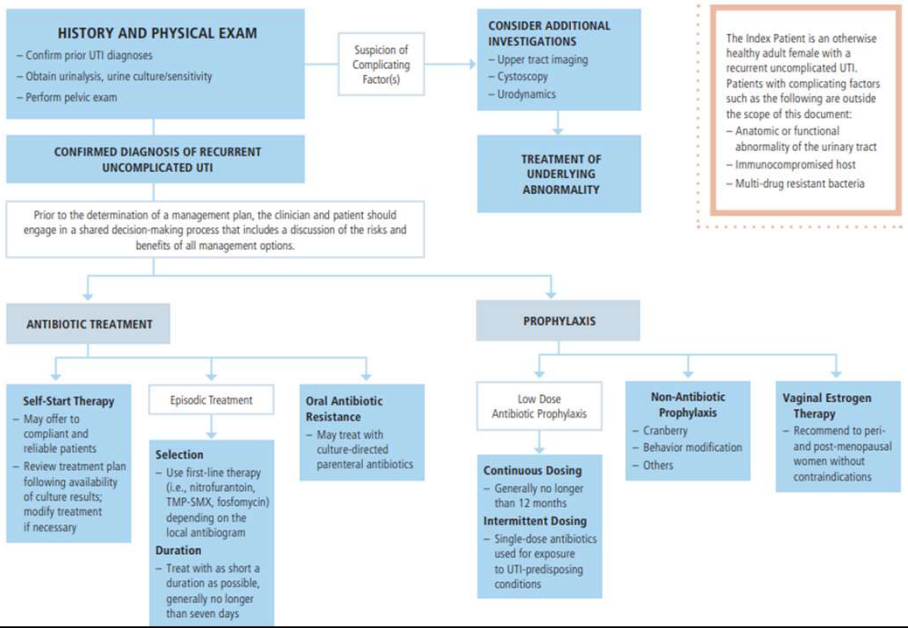
## Recurrent Uncomplicted Urinary Tract Infections in Women: AUA/CUA/SUFU Diagnosis & Treatment Algorithm

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# Unresolved Infection

- Infection that does not resolve with antibiotic therapy
  - Bacterial resistance
  - Inadequate urine concentration of Abx
    - Poor oral absorption
  - Too many bacteria: ex- Staghorn stone
  - Failure to take antibiotics

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# AUA Guidelines on rUTI

- Index patient: otherwise healthy adult female with uncomplicated rUTI's

History and Physical exam

- Confirm prior UTI diagnosis
- Bowel function: source of bacteria
- Obtain UA and urine culture/sensitivity
- Pelvic Exam

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## Guidelines

- To make a dx of UTI, must document positive cultures associated with prior symptomatic episodes
- Obtain repeat urine studies when initial urine specimen is suspected to be contaminated and consider catheterized specimen
- Cystoscopy and upper tract imaging should not be routinely obtained in the index patient with rUTI

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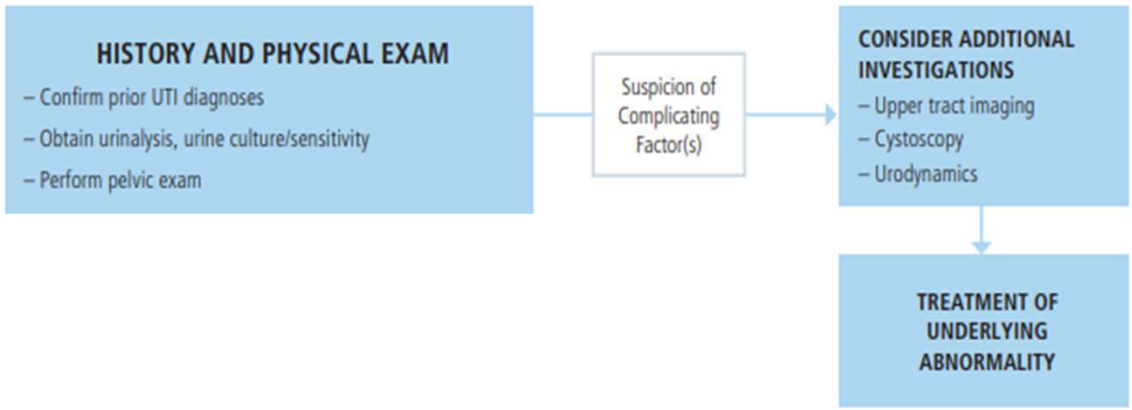
## Suspicion of complicating factors: Consider Additional Investigations

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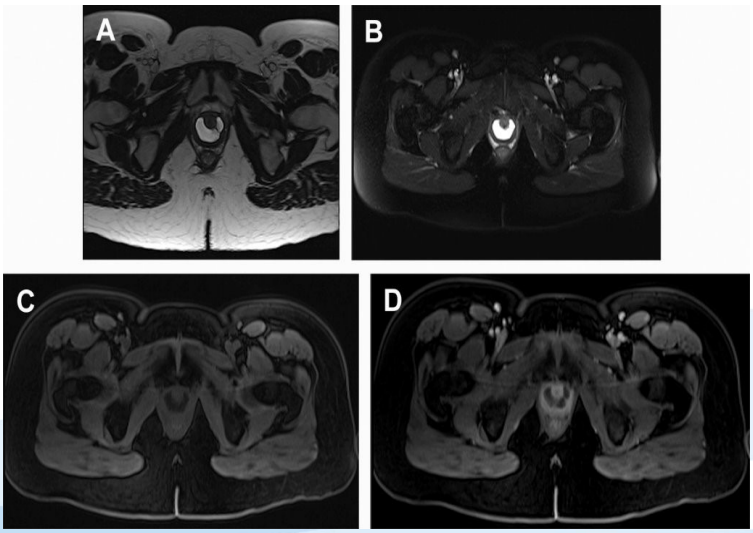
# Urethral Diverticulum

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# Stone Removal & rUTI

- Omar M et al J Urol 194:997, 2015
- 120 patients with recurrent UTI and non-obstructive renal stone
  - 48% infection free after stone removal
  - DK Agarwal et al abstract MP 89-06, AUA 2018
- Non struvite upper urinary tract stones with ≥ 3 UTI in 12 months. median FU was 2.9 years
  - Post op recurrent UTI in 5 (10.9%); only one > 1 year. Success was 89.1% to eliminate further UTI

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## Prior to Treatment

- Obtain UA, urine culture and sensitivity with each symptomatic acute cystitis episode in patients with rUTI
- Select patients can use self start therapy while awaiting culture results
- Clinicians should not treat asymptomatic bacteriuria (level B); omit surveillance in asymptomatic patients with rUTI

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## Clinical Practice Guidelines for the Management of Asymptomatic Bacteriuria

- Screening for asymptomatic bacteriuria:
  - Pregnant women
  - Patients undergoing endoscopic urologic procedures associated with mucosal trauma
    - Urine culture guides targeted therapy, not empiric
    - 1-2 doses of antibiotic if patient has ASB

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**2019 Update by the IDSA Clin Infect Dis: 68:1611, 2019**

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# AUA Guidelines: Antibiotic Treatment

- First line therapy as for simple cystitis, based on the local antibiogram
- As short a duration as possible, not > 7 days
  - Oral
  - Parenteral if resistant to oral antibiotics

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# AUA Guidelines: Antibiotic Prophylaxis

- After discussing risks and benefits, can use prophylactic antibiotics to reduce rUTI
- Effective during the course of antibiotics; no different than placebo once stopped
- Adverse events
  - Nitrofurantoin: pulmonary, hepatic (.001 and .003%)
  - TMP-SMX, Fosfomycin: GI, skin rash

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## AUA Guidelines: Antibiotic Prophylaxis

- Most regimens 6-12 months
- Continuous or post coital
- Need to periodically assess off prophylaxis
- Long term prophylaxis (years) is not evidence based

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## Pre-menopausal Post-Coital Infections

- Low dose antibiotic within 2 hours of sexual activity for 6-12 months
- 3 small studies in the literature-more effective than placebo, as effective as daily prophylaxis

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## Pre-menopausal & rUTI unrelated to sexual activity

- Daily low dose prophylaxis for 6-12 months
- Decrease in rUTI found in 12 of 19 controlled studies
- Self start therapy is less effective
- Resistant bacteria found in 7 of 10 studies during or after treatment
- Increased risk of GI side effects with continuous prophylaxis

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## AUA Guidelines: Non-Antibiotic Prophylaxis

- Only one with evidence support: Cranberry
- Juice, cocktail or tablets
- Proanthocyanins in cranberry prevent adhesion of bacteria to urothelium
- Avoid sugar content in diabetics

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# Estrogen and rUTI

- Clinicians should recommend vaginal estrogen to peri-and post-menopausal women with rUTI- not oral
- Patients on systemic estrogen should still be placed on vaginal estrogen
- Does not increase risk of recurrence in women with breast cancer (but coordinate with oncologist)

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# Estrogen and rUTI

**TABLE 4 Commonly used vaginal estrogen therapy**

| Formulation | Composition | Strength and Dosage |
|---|---|---|
| Vaginal tablet | Estradiol hemihydrate* | 10 mcg per day for 2 weeks, then 10 mcg 2-3 times weekly |
| Vaginal ring | 17β-estradiol | 2 mg ring released 7.5 mcg per day for 3 months (changed by patient or provider) |
| Vaginal cream | 17β-estradiol | 2 g daily for 2 weeks, then 1 g 2-3 times per week |
| | Conjugate equine estrogen | 0.5 g daily for 2-weeks, then 0.5 g twice weekly |

* Estradiol hemihydrate comes in a 4mcg tablet; however, this has not been studied for prevention of rUTI.

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# IBD and rUTI

- GU complications are a significant cause of mortality in Chrohn's Disease (OR =3.28); Bladder cancer and cystitis [1]
- No difference in incidence of UTI in hospitalized CD vs UC vs non IBD [2]
- Risk factors for UTI in IBD patients [2]
  - Age > 30
  - Disease > 90 months
  - Perianal disease
- Can see enterovesical fistula with Chrohn's

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1. Duricova et al *Inflamm Bowel Dis.* 2010; 16: 347-353
2. Peyrin-Biroulet Let al. Infl Bowel Dis 18:697-702, 2012.


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# Enterovesical Fistula

- Causes of EVF
  - Diverticular disease 65% to 79%
  - Malignancy: colon and bladder 10%–20%,
  - Crohn disease 5%–7% (overall 2% of patients with CD)
- Recurrent UTI +/- pneumaturia or fecaluria
- Diagnosis: CT with air in bladder or contrast from GI system
  - r/o diabetes with gas forming UTI or recent instrumentation
- ? Cystoscopy – rule out bladder cancer
- Treatment: surgical repair


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## Acute Non-Obstructive Pyelonephritis

- 5% as common as acute cystitis
- Same risk factors
- E coli with different adhesion factors- P pilus
- Clinical presentation
  - Flank pain/CVA tenderness
  - Fever
  - Nausea/vomiting

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## Evaluation of Pyelonephritis

- Urine C + S, blood cultures in men and women suspected of complicated infection
- CBC, BUN, Creatinine
- Imaging: CT scan
  - R/o obstruction, hydronephrosis
  - Stone
  - Gas/abscess

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# Management of Outpatient Acute Pyelonephritis

- Antibiotics: IDSA Guidelines CID: 52: 561, 2011
  - Ciprofloxacin 500 bid or 1000 mg ER for 7 days
  - Levofloxacin750 mg po qd x 5 days
  - TMP/SMX DS bid for 14 days
  - Beta lactams are less effective
  - * If resistance is high or unknown: up front parenteral 1 g Ceftriaxone or 24 hr dose of aminoglycoside (AG)-
  - Urine is sterile in a few hours


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# Inpatient Treatment of Acute Pyelonephritis

- Antibiotics: IDSA Guidelines CID: 52: 561, 2011
- Initial IV abx then oral for 10-14 days
- IV abx
  - Fluoroquinolone
  - Aminoglycoside +/- Ampicillin: decrease frequency of daily AG for high trough level
  - Extended spectrum cephalosporin
  - Extended spectrum penicillin +/- AG
  - Carbapenem


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# Acute Focal or Multifocal Bacterial Nephritis

- Similar to acute pyelo but usually sicker, more diabetes and sepsis
- Imaging: focal area in kidney, wedge shaped area of decreased enhancement on CT; abscess is more round
- Treatment: at least 7 days of IV abx, then 7 days of oral
- Poor response prompts further CT, likely significant chance to progress to abscess.

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**Clinical value of acute pyelonephritis grade based on computed tomography in predicting severity and course of acute pyelonephritis.**
Paick SH; Choo GY; Baek M; Bae SR; Kim HG; Lho YS; Jung SI; Park HK

Journal of Computer Assisted Tomography. 37(3):440-2, 2013 May-Jun.
DOI: 10.1097/RCT.0b013e318287365e

# Severity of Pyelonephritis


FIGURE 1 . Acute pyelonephritis grades according to CT findings.

A, Grade 1, no renal involvement by CT.

B, Grade 2 CT image showing small wedge-shaped hypodense zones in left renal parenchyma.

C, Grade 3, moderate right renal parenchymal involvement.

D, Grade 4, near whole right renal parenchymal involvement

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# Renal Abscess

- Collection of purulent material confined to the kidney
- Risk- tubular obstruction from prior infection or stone. Common to have recent UTI or pyelonephritis, or skin infection (seeding)
- Bacteria- gm neg rods (used to be staph from skin source). If gm positive source, urine culture may be neg, blood culture pos

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# Renal Abscess

CT: areas of decreased attenuation, later can see enhancing rim

Linder BJ and Granberg CF.
J Ped Urol 12:99e1, 2016

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# Renal Abscess

- Treatment: can use IV antibiotics for < 3 -5 cm.
  - If suspect gm pos- penicillinase resistant penicillin, or vancomycin.
  - For gm neg-3rd generation cephalosporin or aminoglycoside. If patient does not respond, reimage.
- Larger abscess > 5 cm- percutaneous drainage in IR
- Drainage for all sizes in immunocompromised host (ex: transplant patient) or those that do not respond to abx

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# Perinephric Abscess

- Usually from rupture of an acute cortical abscess into perinephric space, or from hematogenous spread
- One third are diabetic
- Management:
  - IV abx. Can use antibiotics for abscess < 3 cm in immunocompetent patients
  - for > 3 cm use percutaneous drainage.
  - Check for the function of the kidney

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Figure 2. Computed tomography scan shows the perirenal fluid collection (11 cm × 12 cm) compressing the right kidney and extending to the surrounding muscle planes as shown by the two arrows. Inside the circle there is the compressed kidney.

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Bartolomeo Lorenzati, Francesca De Taddeo, Mario Nebiolo, Massimo Perotto, Francesco Panero, Maurizio Barale, Laura Spadafora, Walter Cataldi
**Perirenal Fluid Collection: An Uncommon Cause of Septic Shock**
The Journal of Emergency Medicine, Volume 44, Issue 2, 2013, e265–e267
http://dx.doi.org/10.1016/j.jemermed.2012.03.024

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# Emphysema Pyelonephritis

- Severe necrotizing infection characterized by bacterial production of gas within the kidney parenchyma
- Presentation: Usually acutely ill
  - Associated with diabetes –glucose substrate
  - Gram negative bacteria
  - Fever, vomiting and flank pain triad
- Mortality: up to 15-40%
- Diagnosis: Intraparenchymal air in kidney

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# Treatment of Emphysema Pyelonephritis

- Fluid resuscitation. Increased risk of death for BP of 90 mm Hg compared to 100 mm Hg [1]
- Antibiotics: cephalosporins, aminoglycosides and quinolones
  - By in vitro susceptibility data, third-generation cephalosporins is recommended as the empirical antibiotic regimen.[2]


1. Falagas ME J Urol 178: 880, 2007
2. YC LU et al BMC Infect Diseases. 14:418, 2014


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# Treatment of Emphysema Pyelonephritis

- Percutaneous drainage vs. nephrectomy; nephrectomy was standard until late 1980's but mortality was 40-50%
- Assess kidney function, obstruction
- Percutaneous treatment $\geq$ 14 Fr catheter
  - Localized area of air, may need multiple sticks
  - In combination with medical rx, mortality is 13.5% [2]
- Nephrectomy :immediate or delayed (15% of patients with initial PCN); for non fxn kidneys


1. Ubee SS BJU Int 107: 1474, 2010
2. Somani BK J urol 179:1844, 2008


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# Emphysematous Pyelonephritis: Percutaneous Management


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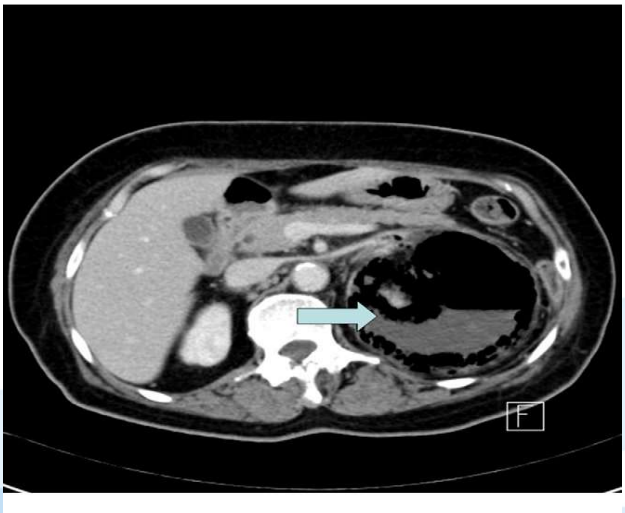
# Emphysematous Pyelonephritis: Nephrectomy

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# Xanthogranulomatous Pyelonephritis (XGP)

- Chronic infection – Proteus > E. Coli
- Usually unilateral, result in an enlarged, nonfunctioning kidney
- Often associated with stone disease (83%) and obstruction
- Starts in pelvis, extends to rest of kidney
- Flank pain, fever, and chills

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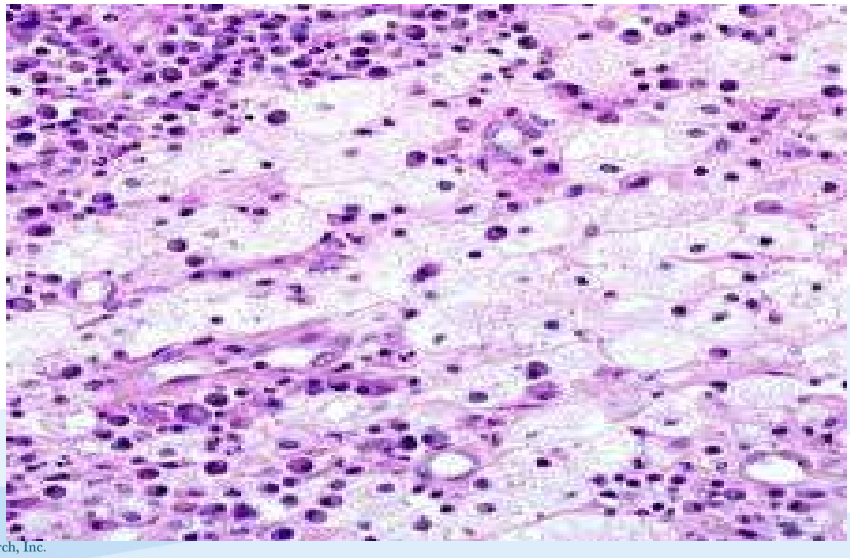
# Xanthogranulomatous Pyelonephritis (XGP)



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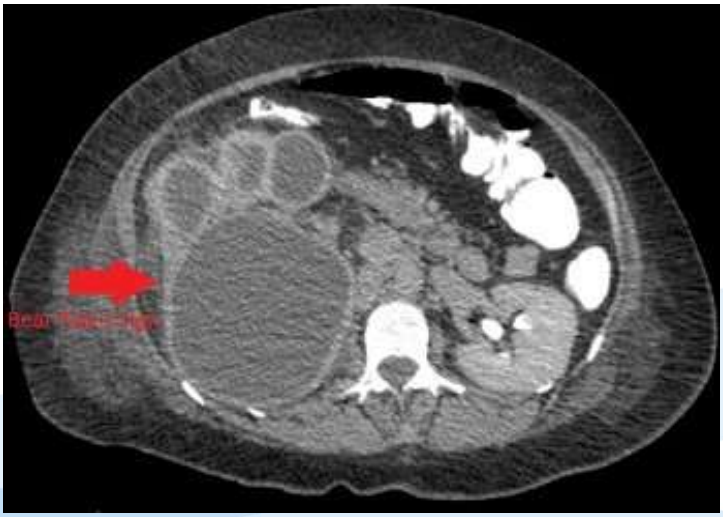
# Xanthogranulomatous Pyelonephritis (XGP): "Bear's Paw Sign"



Tan WP et al Urology 86:e5-e6, 2015

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# XGP Management

- Give IV abx
- Nephrectomy
- Partial nephrectomy if localized - do not perform incision and drainage
- If early – stone removal if kidney functions

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# Renal Scarring: Murugapoopathy

- Setting: UTI in setting of vesicoureteral reflux (in children)
- Contributing factors: presence of bladder and bowel dysfunction
- Sequelae: VUR related nephropathy in kids, chronic pyelonephritis in adults and leading to ESRD
- Dx: Technetium-99m DSMA (dimercapto succinic acid) scan.
- RIVUR study [1]- Only a subset of children with recurrent UTIs will develop renal scars and this will occur even if these children receive antibiotic prophylaxis to reduce the number of UTIs.

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V et al. *Pediatr Nephrol* **35**, 349–357 (2020)
Hoberman A et al. N Engl J Med 370:2367–2376, 2014

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# Febrile UTI in Men

Sources

- Pyelonephritis
- Cystitis
- Prostatitis

Prospective study by Ulleryd et al. showed

- 70 men with FUTI; one third had flank pain
- Over 90% had increases in PSA or prostate volume
- Concluded prostate likely involved

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Ulleryd P et al BJU Int 84:470, 1999

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# NIDDK Classification of Prostatitis

Type I: Acute Bacterial Prostatitis

Type II: Chronic Bacterial Prostatitis

Type III: Chronic Pelvic Pain Syndrome (“Prostatosis”)

- IIIa: WBC in semen, EPS or VB3
- IIIb: no WBC’s present in fluids

Type IV: Asymptomatic Inflammatory Prostatitis

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# Evaluation of FUTI in Men

- History: Sponatneus vs TU vs TR
- Imaging: for sx of flank pain, recurrent UTI or after manipulation[1]
- Assess bladder emptying
- Labs: Creatinine, urine, and blood cultures

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1. Ulleryd P et al BJU Int 84:470, 1999

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# Bacteriology of Febrile UTI in Men

- After prostate biopsy
  - High rate of fluoroquinolone resistance 17%
  - ESBL bacteria-Extended spectrum beta lactamase (ESBL)- mediates resistance to extended spectrum (third generation) cephalosporins and monobactams (aztreonam) but not to carbapenems- up to 69% [2]
    - acquired by plasmids that also confer resistance to other antibiotics (including quinolones)
- After transurethral procedure: less susceptible to carbapenems, more to Pip/Tazo [3]

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1. Qi C et al J Urol 190:2026, 2013
2. Roberts MJ et al Int J Antimicrobial agents 43: 301, 2014
3. Kim SH et al J. Infect. Chemother 20: 38-42, 2014


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# Initial Treatment of FUTI in Men

- EAU guidelines (www.uroweb.org) 2014
  - Broad spectrum PCN, 3rd G cephalosporin or Quinolone ± Aminoglycoside
- By underlying cause:
- Spontaneous: EAU guidelines okay
- Transurethral: favor Pip/Tazo, quinolone
- Transrectal bx: Carbepenem, Amikacin –
  - Liss et al AUA white paper on infection after TRUS/bx J Urol 198: 329, 2017

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# FUTI/Acute Prostatitis: Other Measures

- Retention: SP tube
- Alpha blockers
- NSAID
- 2 weeks or 4 weeks of quinolones [1]
- Men who do not respond to initial therapy
  - CT or TRUS for abscess
  - More common in immunocompromised patients such as DM or HIV

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1. Ulleryd P et al BJU Int 84:470, 1999

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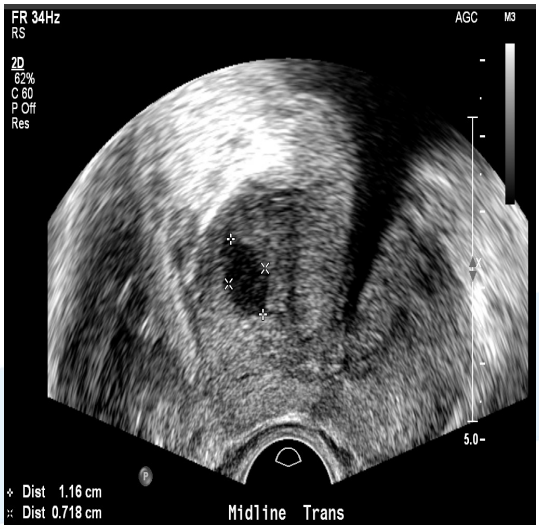
# Prostate Abscess: TUR vs IR vs antibiotics

- Large or multilocular abscess: TUR (consider intraop US) [1]
- Smaller or difficult location: IR/TRUS drainage [2]
- Size 1-2 cm or less: consider antibiotics [3]

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1. Ackerman AL et al Int J Urol 25: 1030110, 2018
2. Yadav AS et al Nephro-Urol. Mon 3: 264–7, 2011
3. Barozzi L et al AJR 170: 753-7, 1998

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# Chronic Bacterial Prostatitis NIH Category II

- Suspect in men with recurrent UTI (symptom free between)
- E coli > proteus. Gm pos are not pathologic
- Evaluation:
  - 2 glass test: VB2 and VB3
  - Assess emptying
- Treatment: no diff among quinolones or duration if > 4 weeks
- EAU guidelines 2021[1]:
  - 1st line: quinolones or at least 4 weeks
  - 2nd line: Trimethoprim for 6-12 weeks

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1. www.uroweb.org

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# Refractory Chronic Bacterial Prostatitis

- Daily dose low antibiotics
- Self start therapy
- TURP: cure rates of 30%
- Dutasteride [1]
  - Reduce trial: Dutasteride vs placebo for PCA risk
  - All men had initial biopsy
  - Development of at least one UTI: placebo 10.5% vs 6.8% in Dutasteride (p=0.008)

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1. Toren P et al BMJ 346: 2109, 2013

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## Category III:
## Chronic Prostatitis/Chronic Pelvic Pain Syndrome

- Not infectious by definition
- Rule out other sources of pain- retention, malignancy, etc.
- Assess for pain outside of the pelvis as indication for central nervous system disorder
- EMG dyssynergic: Strongly consider a diagnosis of pelvic floor dysfunction
- EMG synergistic and low flow: video UDS looking for BN obstruction

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## Epididymitis

- Classic teaching: by age group: 15 -35 by STD, other ages by enteric organisms [1]. Need accurate sexual history
- Non STD: E. coli, Enterococcus, Pseudomonas, Klebsiella : urine culture
  - Recent prostatitis or UTI, hx of insertive anal intercourse
  - Recent surgery, endoscopy or catheter
  - Retention from BPH or stricture
- Treatment: per CDC [3]
- STD: **Ceftriaxone** 500 mg IM single dose plus **Doxycycline** 100 mg orally 2 times/day for 10 days
- Enteric organism : **Levofloxacin** 500 mg orally once daily for 10 days


1. Ryan L et al: Europ J Clin Micro Infect Dis 37:1001–1008, 2018
2. Pilatz A et al, Eur Urol 68:428–435 4, 2015
3. www.cdc.gov/std/treatment-guidelines/epididymitis


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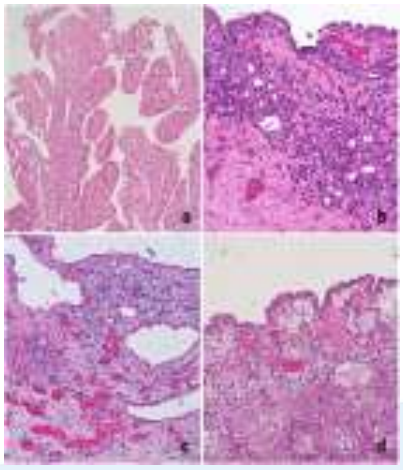
# Nephrogenic Adenoma



- From seeding of exfoliated renal tubular cells [1]
- Benign, mimics malignancy
- MC site is bladder> renal pelvis, ureter, urethra
- On cysto- papillary, polypoid or sessile

Pathology from Turcan D et al Path Res Pract 213: 831, 2017

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1. Mazal PR et al NEJM 347: 653, 2002

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# Nephrogenic Adenoma

- Associated with chronic infection, inflammation or prior therapy
- Sx: hematuria, LUTS, flank pain, hydronephrosis
- Rx: complete surgical resection
- Long term followup needed: recurrence 0.5 to 80%

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1. Gordetsky J et al Urology95: 29, 2016

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# Malakoplakia

- Inflammatory disease of bladder from abnormal macrophage function
- Path:  aggregates of large histiocytes (von Hansemann cells) which contain concentrically laminated calcific inclusions (Michaelis-Gutmann bodies).
- Bladder irritability and hematuria
- Can involve the kidney
- Treatment: control of UTI which stabilizes the disease with long term antibiotics

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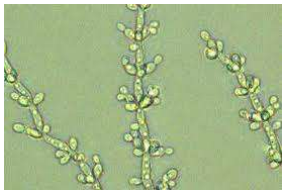
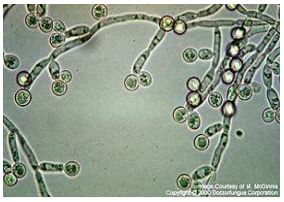
# Fungal UTI

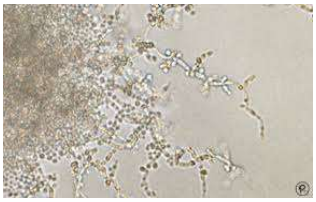
** = Fluconazole resistance



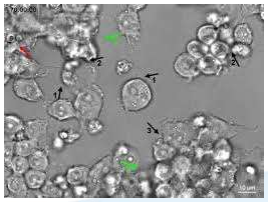
Candida tropicalis



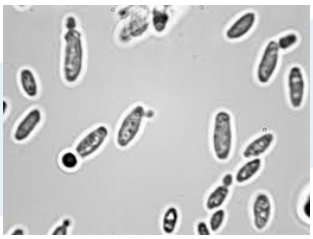
Candida albicans: most common



Candida parapsilosis



Candida glabrata: 2nd MC **
See in heme cancer & kidney transplant



Candida krusei **

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# Clinical Practice Guideline for the Management of Candidiasis: IDSA

- Treatment for Asymptomatic Candiduria
- Elimination of predisposing factors, such as indwelling bladder catheters
- Only recommended for high-risk patients
  - neutropenic patients
  - very low-birth-weight infants (<1500 g),
  - patients who will undergo urologic manipulation
    - Fluconazole 400 mg po qd several days before and after

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**Clin Infect 62 e1-e50, 2016**

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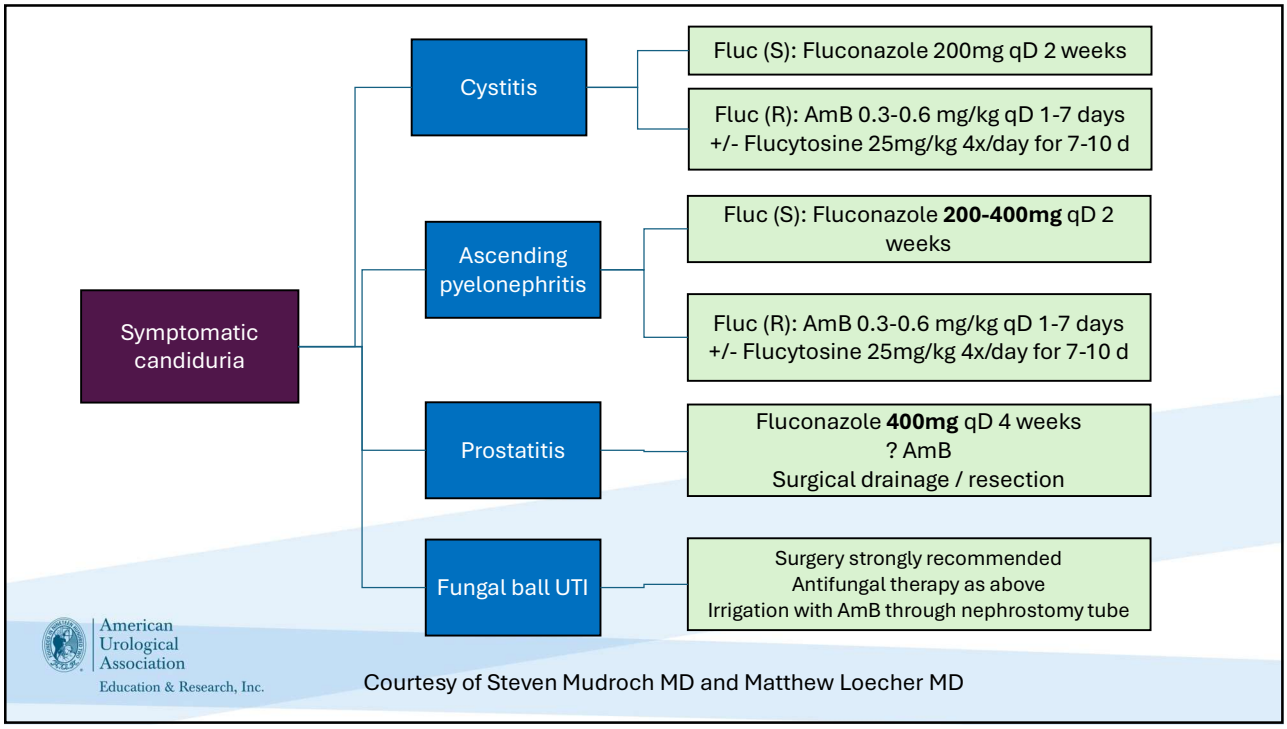


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Courtesy of Steven Mudroch MD and Matthew Loecher MD

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# Treatment of asymptomatic funguria peri-op: AUA Guidelines & IDSA Guidelines

| Procedure | Indication/treatment |
|---|---|
| Low risk surgical procedure | Pregnant females only |
| Not entering urinary system | No |
| Catheter, nephrostomy or stent | No |
| Endoscopic, robotic, or open surgery on the urinary tract | AUA: single dose prophylaxis<br>IDSA: Fluconazole 400 mg po qd several days before and after the procedure |

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1. Lightner DJ, et al: Best practice statement on urologic procedures and antimicrobial prophylaxis. J Urol 2020; **203:** 351.

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# Other peri op situations with funguria: AUA guidelines

- Symptomatic funguria: antifungal treatment, rather than single-dose prophylaxis, for patients for urinary catheter, nephrostomy or stent placement or exchange
- A longer course of periprocedural antifungal treatment in neutropenic patients with funguria who have a urinary tract obstruction and are undergoing surgery on the GU tract.
- Fungal cultures and sensitivities are recommended in patients who have fungus balls.

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## Use of prophylactic antibiotics: AUA Best Practice Statement

- No longer recommended to prevent bacterial endocarditis per the AHA
- Prophylaxis does not exceed 24 hrs.
- Should be administered within one hour of an incision; vancomycin and fluoroquinolones may be administered within two hours of the procedure.
- AP may be considered during TOV, removal of ureteral stent/PCN, especially when other patient/procedural risk factors are present
  - Some studies have demonstrated lower risk of symptomatic UTI when AP is given prior to TOV

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## Use of prophylactic antibiotics: AUA Best Practice Statement

- Risk factors for infection
  - Anatomic anomalies
  - Neurogenic lower urinary tract dysfunction
  - Recent GU tract instrumentation
  - Undergone recent antibiotic use
  - Immunodeficiency:
    - Transplant patients
    - well controlled diabetics are not immunodeficient

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## Antibiotic Prophylaxis for Cysto and UDS

- AP NOT recommended for simple outpatient cystoscopy/UDS in healthy adults in the absence of infectious signs and symptoms
  - Single dose sulfamethoxazole and trimethoprim (Bactrim, Bactrim DS) recommended in patients with neurogenic bladder, immunosuppressed patients, those with suspected abnormalities of the GU tract, those who underwent recent GU instrumentation, those who recently received antimicrobials
    - Alternatives include 1st/2nd generation cephalosporins, amoxicillin and clavulanate potassium (Augmentin), or aminoglycoside +/- ampicillin

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## Prophylaxis for Patient with Orthopedic Hardware

- Ortho: during first two years of joint replacement
- High risk procedures:
  - Prostate biopsy
  - Treating infected stones

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## Q1: Which of the following is the most common causative organism of recurrent UTIs in women?

A. Proteus mirabilis
B. Staphylococcus saprophyticus
C. Klebsiella pneumoniae
D. Escherichia coli

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## Q2: How is recurrent UTI defined in adult females?

A. ≥2 episodes in 12 months
B. ≥2 episodes in 6 months or ≥3 episodes in 12 months
C. ≥1 episode every month for 6 months
D. ≥4 episodes in 24 months

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## Q3: The species of Candida that is often resistant to Fluconazole is:

A. Albicans
B. Tropicalis
C. Parapsilosis
D. Glabrata
E. Lusitaniae

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## Q4: Which of the following is NOT considered a risk factor for rUTI in premenopausal women?

A. Sexual activity
B. Use of spermicides
C. Diabetes mellitus
D. Postmenopausal status

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## Q5: In postmenopausal women, what intervention has been shown to reduce the risk of rUTIs?

A. Daily cranberry juice
B. Vaginal estrogen therapy
C. Continuous antibiotic prophylaxis
D. Oral vitamin C

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## Q6: Which of the following patient populations should receive imaging in the work-up of rUTIs?

A. All premenopausal women
B. Women with hematuria and recurrent UTIs
C. Women with ≥2 UTIs in 6 months
D. Women using spermicides

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# Thank You!

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