

THE KNOWLEDGE BRIDGE BETWEEN GPs AND SPECIALISTS  
**Medical Grapevine**

# Recurrent Urinary Tract Infections



Figure 1: E. coli Bacteria

Urinary Tract Infection (UTI) is one of the most common bacterial infections in women. Forty percent to 50% of women will experience at least one episode of UTI in their lifetime and one in four of them will develop a recurrence.

Bacteriuria is defined as the presence of bacteria in the urine. In symptomatic patients, the presence of 100 Colony-forming Units (CFU)/ml is enough to diagnose bacteriuria but in asymptomatic patients, the presence of 100,000 CFU/ml is required to diagnose UTI.

Recurrent UTI (RUTI) is symptomatic UTI that follows the resolution of a previous UTI and there is an occurrence of three or more episodes over a 12-month period. RUTI can be re-infection (a new infection with the same or different organism occurring two-weeks after successful treatment) or relapse (UTI of the same organism from a focus inside the urinary tract within two-weeks of treatment). Re-infections are more common and account for 80% of RUTI. However, it is often difficult to distinguish a re-infection from a relapse.

**Risk Factors for Recurrent Urinary Tract Infection** - Less than 5% of women with RUTI will have an anatomical or functional abnormality.

## Bacteriology and Mechanism of Infection

Most community acquired UTI are caused by bacteria and Escherichia coli (E. coli; Figure 1) is the most common uropathogen detected in 70% to 95% of cases. Staphylococcus saprophyticus is second most common (5% to 20%). Proteus mirabilis, Klebsiella species and Enterococci cause UTI occasionally.

Hospital-acquired UTI or UTI complicated by underlying host factors tend to be polymorphic and multi-drug-resistant. The organisms in hospital-acquired UTI are E. coli (50%), Enterobacter faecalis (15%), Klebsiella, Citrobacter, Serratia, Pseudomonas, Providencia, Enterococcus and Staphylococcus epidermidis.

Most organisms causing UTI originate from the faecal flora. RUTI begin with colonisation of the vagina with enteric flora, specifically uropathogens such as E. coli. These uropathogens then enter an interim period of periurethral and distal urethral colonisation. Subsequently, bladder colonisation and infection occurs.

Uropathogen E. coli (UPEC) is able to form an acidic polysaccharide capsule that protects the bacteria from phagocytosis by leucocytes and possesses various adhesive organelles or pili which facilitate adhesion to particular organ niches. Biofilms of UPEC can also be formed by the organism entering a group of superficial bladder cells and confer resistance to host immunity response and antibiotics by hiding the bacteria in the biofilm matrix. During this reservoir stage, both host and bacteria are quiescent (may be for months) after initial infection despite antibiotic treatment. Eventually the UPEC will detach from the intracellular biofilm and burst into the bladder.

Risk Factors	
• Sexual intercourse	• Malignancy
• Use of contraception (spermicide, diaphragm)	• Urolithiasis
• Antimicrobial use	• Neurogenic bladder
• Menopause	• Indwelling catheter
• Genetics	• Ureteric stent
• High residual urine	• Medical conditions e.g. diabetes mellitus, renal failure, renal transplant, immunosuppression
• Urogenital surgery	• Distance of urethra from anus
• Urinary incontinence	
• Cystocele	

Table 1. Risk Factors for RUTI

## HISTORY/ PHYSICAL EXAMINATION/ INVESTIGATIONS

Symptoms depend on site of infection. Cystitis causes dysuria, frequency, urgency, haematuria and suprapubic discomfort. Loin pain and fever usually indicate upper urinary tract involvement.

### History Taking

History taking should include a detailed account of the patient's previous UTI (frequency per year, triggering factors, antibiotic treatment and investigations for UTI). Patients should be screened for risk factors as stated in Table 1.

### Physical Examination

Physical examination to palpate for suprapubic tenderness and check for renal angle tenderness should be done.

## Investigation

Table 2 tabulates investigations for patients with RUTI. Aims of investigations are to verify diagnosis, determine appropriate treatment and find any possible causes of recurrence.

There is no consensus among clinicians, but cystoscopy and radiological evaluation are often not indicated for young women with RUTI.

Investigation	Remarks
UFEME and culture	Urine culture is the gold standard for the diagnosis of UTI
Urine dipstick	False negative rate is high (40% to 80%). It can detect protein and glucose in the urine which may indicate an underlying renal or diabetic problem
Oral Glucose Tolerance test	To exclude Diabetes Mellitus (DM)
HbA1c	To check control of DM
Residual urine	High residual urine may be due to obstruction or reduced bladder contractility and may require urodynamics studies
X-ray and Ultrasound KUB	To exclude stones, hydronephrosis, renal damage or abscess
Cystourethroscopy	To look for bladder diverticulum

Table 2. Investigations for Recurrent Urinary Tract Infection

## Management of Urinary Tract Infection

All reversible factors should be corrected. Infection should be treated with a full course of an appropriate antibiotic. Thereafter, prevention of recurrences should be employed.

### Antibiotic Prophylaxis

Long term antibiotic prophylaxis with various antibiotics can be given to patients at bedtime to lower the risk of RUTI, and is proven to be effective by preventing RUTI in 95% of patients. Prophylaxis can be continued for 6 to 12 months. UTI may recur in 50% of patients after cessation of antibiotic prophylaxis. For women who have identified sexual intercourse as their risk factor, post coital antibiotic prophylaxis can be given.

### Patient Initiated Therapy

Patient initiated therapy may be helpful for women who are unwilling to take long term daily antibiotic prophylaxis. They can be empowered to initiate antibiotic therapy for three days at the onset of their UTI symptoms.

### Oestrogen

Falling oestrogen levels lead to a change in vaginal flora and vaginal pH. There have been conflicting results on the use of oestrogen in treatment of RUTI in postmenopausal patients. However, local oestrogen inserted into vagina is generally found to be more effective than systemic oestrogen for prevention of RUTI.

### Cranberry Juice

Cranberry juice has been a popular preventive method for many years. It works by acidifying the urine and by reducing bacterial adhesion.

### Probiotic Agents

The urogenital micro flora of a healthy woman comprises of about 50 species of organisms with different composition according to reproductive stages and exposure to several factors. Premenopausal women have a flora of mostly lactobacilli and certain properties of these strains appear important in conferring protection to the host by production of bacteriocins, hydrogen peroxide and biosurfactants. The concept of treating and preventing urogenital infection by instilling probiotic organisms has great appeal to patients and caregivers. However, proper selection of strains, proof of concept and efficacy must accompany products to be successful.

## Myths about Recurrent Urinary Tract Infection

Several studies have shown that there is no association between RUTI and pre and post-coital voiding patterns, frequency of urination, delayed voiding habits, wiping patterns, douching, use of hot tubs, bubble baths, frequent use of pantyhose or tights, bicycle riding, and volume of fluid consumed.

## Conclusion

One in four women with UTI will suffer from recurrences. In healthy, young and premenopausal women the most common risk factor is sexual intercourse. Risk factors for RUTI should be identified and reversed. Various approaches to prevent RUTI include long-term antibiotic prophylaxis, post coital antibiotic prophylaxis and patient initiated therapy. Local oestrogen, cranberry juice, and probiotics may be helpful in lowering risks of recurrence.