Recurrent Urinary Tract Infection

No single definition of the frequency of recurrent urinary tract infection (UTI) exists. A traditional definition is two proven episodes within six months or three within a year, although clinically any second episode may be treated as a recurrence.\(^1\)

Epidemiology

Aetiology

*Escherichia coli* has been shown to be responsible for 70-95% of all UTIs.\(^2,3\) *Staphylococcus saprophyticus* and *Proteus mirabilis* are culprits less regularly.

Incidence

- Women have a lifetime risk of UTI of 1 in 2, and incidence increases with age.\(^3\)
- UTI is uncommon in otherwise healthy young and middle-aged men. Incidence is higher in older men.\(^4\)
- Most recurrences are thought to be re-infection with the same organism. Studies have shown between 30-44% of non-pregnant women with a first episode of cystitis will have a recurrence.\(^1\)
- In children presenting with UTI before the age of 1 year, around three quarters will have a recurrence and after the age of 1 year, roughly 40% of girls and 30% of boys will have a recurrence.\(^5\)

Risk factors

There is evidence to suggest that deregulation of candidate genes in humans may predispose patients to recurrent UTI.\(^6\) Diabetes is also a predisposing factor.\(^7\)

In women\(^{1,3}\)

- Sexual intercourse (honeymoon cystitis).
- Atrophic urethritis and vaginitis (postmenopausal).
- Abnormalities of urinary tracts (indwelling catheter, neuropathic bladder, vesico-ureteric reflux (VUR), outflow obstruction, anatomical anomalies).
- Incomplete bladder emptying (dysfunctional urination).
- Contraception - diaphragm, spermicide-coated condoms.
- History of urinary tract surgery.
- Immunocompromise - eg, HIV.
- First UTI under the age of 15.
- History of recurrent UTI in mother.

In men\(^4\)

- Abnormalities of urinary tracts as above.
- Incomplete bladder emptying (prostatic enlargement, chronic indwelling catheter).
- Previous urinary tract surgery.
- Immunocompromise.

In children\(^5\)

- Any condition that leads to urinary stasis (VUR in 41% cases but also renal calculi, obstructive uropathy - or family history of VUR, voiding disorders) or poor urine flow - eg, phimosis.
- Constipation.
- Impaired immune function.
- Sexual abuse.
- Impaired renal function.

Presentation

- Symptoms include:
  - Dysuria
  - Frequency
  - Urgency
  - Nocturia
  - Haematuria
  - Suprapubic discomfort
• Signs may include:
  • Suprapubic tenderness.
  • Cloudy or foul-smelling urine.
  • In the elderly, incontinence, confusion, anorexia, fever, shock.

Investigations

Primary care

• MSU culture, urine microscopy:
  • MSU is recommended in cases of recurrent UTI, due to the increased likelihood of resistant organisms.
  • In children, a clean catch urine sample is the recommended method for urine collection. This is much easier in toilett-trained children.

• Consider ultrasound in children to visualise anatomical anomalies. See the separate Childhood Urinary Tract Infection article for more details.
• Men with recurrent UTI should be referred to a urologist for further investigation. Those with haematuria should be referred urgently.
• Urgent referral is also recommended for women with recurrent UTIs associated with haematuria (visible or non-visible) for investigations to exclude urological cancer.[3]
• Women referred for investigations of recurrent UTI rarely have pathology.[1] There are no UK-based guidelines to guide the need for further investigations but Canadian guidelines recommend the following should have further tests (cystoscopy or CT scan):[8]
  • Those with underlying factors giving them high risk of UTI such as previous urological surgery, stones, anatomical abnormalities, immunocompromise and flow problems).
  • Those with cultures showing multi-resistant organisms.
  • Those with pneumaturia or faecaluria.
  • Those with haematuria.

Secondary care
Imaging recommendations are specifically made for children within the latest National Institute for Health and Care Excellence (NICE) guidance and are age-related.[5]

• Dimercaptosuccinic acid (DMSA) scanning, used to demonstrate renal function.
• Cystography to demonstrate VUR - may use indirect radionuclide cystography.

CT scan is the imaging of choice for underlying pathology in women with recurrent UTI, although ultrasound may be used as an alternative with or without X-ray.[8]

Specialist investigation of recurrent UTI in men will include prostate assessment as well as investigation for other underlying abnormalities.
Management

Women

In the case of a relapse, send an MSU and treat with an antimicrobial for three days (5-10 days if underlying abnormality is present). If symptoms are mild, it may be appropriate to offer a delayed prescription, or wait a day or two to see if symptoms improve.

Consider offering a standby prescription for future infections.

Prophylaxis options include:\[3\]

- If related to sexual intercourse:
  - Change the contraceptive method if a diaphragm or spermicide is being used.
  - Suggest using a lubricant.
  - Consider offering 100 mg trimethoprim tablets, one to be taken within two hours of sexual intercourse (off-label).

- If unrelated to sexual intercourse, consider a six-month course of low-dose nitrofurantoin (50-100 mg nocte) or trimethoprim (100 mg nocte).
- In postmenopausal women, the use of topical oestrogen is not established. There is evidence this can reduce recurrence.\[8\] Scottish Intercollegiate Guideline Network (SIGN) guidelines advise against its use for preventing recurrence of UTI.\[10\] Other guidelines recommend it as an option for some women.\[8\]

There is now thought to be limited evidence for the benefit of cranberry juice in the prevention of UTI.\[11\] There is also no evidence for lifestyle advice measures such as drinking more fluid or methods of personal hygiene.

Refer if there is repeated failure of treatment.

Men\[4\]

There is little high-quality evidence to inform this section, due to the relative rarity of UTI in men, compared with women.

- Exclude chlamydial infection in sexually active men.\[12\] Consider urethritis as an alternative diagnosis.
- Prescribe an antibiotic to be taken for seven days. Trimethoprim or nitrofurantoin are usual first-line choices, unless local guidelines say otherwise.
- Recurrent cystitis in a man is likely to be secondary to associated conditions - eg, prostatitis, prostatic hyperplasia, calculi in the genitourinary tract, or VUR.
- Refer men with recurrent UTI for investigation for underlying causes and for advice about prophylactic antibiotics where required.

Children\[5\]

General principles

- Follow local policy when available.
- Children with a high risk of serious illness and/or younger than 3 months should be referred immediately to secondary care. This should be assessed in accordance with NICE guidance "Feverish illness in children".\[13\]
- Do not delay treatment if the sample cannot be obtained and the infant or child is at high risk of serious illness.
- Treat each episode of acute UTI the same as a first episode.
- If a second episode occurs within a year, check for anatomical abnormalities, voiding problems and constipation. Make sure that the bladder and the bowel are emptied regularly.
- Advise parents/carers on the importance of adhering to treatment regimes.
- The need for further investigation and referral for recurrent UTI is age-related and dependant on the type of infection - these are detailed in NICE guidance and the separate Childhood Urinary Tract Infection article.

Antibiotic choice

- Children aged 3 months and over with cystitis or lower UTI should be treated with three days of oral antibiotics according to local guidance. 7-10 days of treatment are required for those with an upper UTI or pyelonephritis.
- Cochrane reviews have been unable as yet to ascertain the optimum duration of treatment or which antibiotic is best for lower UTI in children.\[14\]
- Choice of antibiotic should be based on local guidelines and resistance patterns.

Prophylaxis

NICE guidelines advise, in order to try to prevent recurrence in children who have had a UTI, that:

- Dysfunctional elimination syndromes and constipation should be addressed.
- Adequate fluid intake should be encouraged.
- Children should have ready access to clean toilets when required and should not be expected to delay voiding.
Antibiotics should not be used for prophylaxis after a single UTI but may be considered for recurrent UTI. A Cochrane review found long-term antibiotic prophylaxis to reduce recurrence of symptomatic UTI in children but that the benefit was small and must be weighed up against the risks of antibiotic resistance. In infants and children, there is no need to treat asymptomatic bacteriuria with prophylactic antibiotics.

See also the separate Childhood Urinary Tract infection article for more detail.

Complications

Most people will recover fully with treatment. However, recurrent UTI is a risk factor for pyelonephritis, which can cause renal scarring. This in turn can lead to hypertension and impaired renal function.

Further reading & references

- Gupta K, Trautner BW; Diagnosis and management of recurrent urinary tract infections in non-pregnant women. BMJ. 2013 May 29;346:f140. doi: 10.1136/bmj.f140.
- Urinary tract infection (lower) - women; NICE CKS, July 2015 (UK access only)
- Urinary tract infection (lower) - men; NICE CKS, October 2014 (UK access only)
- Urinary tract infection in children: diagnosis, treatment and long-term management; NICE Clinical Guideline (August 2007)
- Management of suspected bacterial urinary tract infection in adults; Scottish Intercollegiate Guidelines Network - SIGN (updated July 2012)
- Guidelines on Urological Infections; European Association of Urology (2015)
- Fever in under 5s - assessment and initial management; NICE Guideline (updated August 2017)

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