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## 10-MINUTE CONSULTATION

# Uncomplicated urinary tract infection in women

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**What you need to know**

- In about a third of women with an uncomplicated urinary tract infection, the infection may resolve by about 7-10 days without the need for antibiotics
- The option of "wait and see" (which typically involves providing a delayed prescription) can be discussed as part of a shared decision making process within the consultation
- Although the risk from delaying antibiotics is low, consider pyelonephritis or sepsis in patients who are systemically unwell and have high fever, rigours, nausea/vomiting, flank pain, low blood pressure, high heart rate, high respiratory rate, not passing urine for 12-18 hours, and behaviour change

*A 32 year old woman presents with suspected urinary tract infection (UTI). She is passing urine more frequently and has suprapubic pain and dysuria. After two days, her symptoms have not improved.*

This article outlines how to identify uncomplicated UTI in adult non-pregnant women (18-65 years old) and discuss options with women to help them make an informed decision about its management.

## What you should cover

Acute UTIs are common community infections. They affect most women at least once in their life and are far less prevalent among men.[1-3] Women with an acute UTI present with diverse symptoms that can be burdensome and adversely affect their quality of life.[4 5]

## History

Take a history to differentiate between an uncomplicated UTI and other causes of urinary symptoms. Recurrent UTI (≥3 UTIs within a year), asymptomatic bacteriuria, and infection associated with an indwelling urinary catheter each require a different approach, not covered here. Diagnostic studies support the diagnostic value of commonly recognised symptoms such as dysuria, haematuria, nocturia, urgency, and frequency, as well as those that reduce the probability that a patient has a UTI,[6 7] and table 1 lists the likelihood ratios of these symptoms. In particular, the presence of two or three of the key symptoms (haematuria or cloudy urine, dysuria, and new nocturia) are indicative of a UTI.[6 8 9] However, no individual or combination of symptoms can be fully diagnostic for a UTI. Check for red flags suggestive of acute pyelonephritis or sepsis (box 1), which would require immediate management or referral to hospital.

**Table 1 | Summary likelihood ratios (LR) of symptoms suggestive of an uncomplicated urinary tract infection (UTI)[6 7]**

| Symptom | Positive likelihood ratio (95% confidence interval) |
|---|---|
| Symptoms increasing the probability of UTI* | |
| Haematuria | 1.72 (1.30 to 2.27) |
| Dysuria | 1.30 (1.20 to 1.41) |
| Nocturia | 1.30 (1.08 to 1.56) |
| Urgency | 1.22 (1.11 to 1.34) |
| Frequency | 1.10 (1.04 to 1.16) |
| Symptoms decreasing the probability of UTI† | |
| History of vaginal discharge | 0.3 (0.1 to 0.9) |
| History of vaginal irritation | 0.2 (0.1 to 0.9) |

* All values reported for threshold of ≥102 colony forming units (CFU)/mL (growth of bacteria on urine culture); therefore, probabilities at higher reference standards are lower.

† Values reported for threshold of ≥105 CFU/mL.

**Box 1: Red flags for acute pyelonephritis and sepsis**

**Acute pyelonephritis[10 11]**

- Flank pain (on the back, at or below level of ribcage)
- Rigors or fever >37.9°C
- Nausea or vomiting
- New or different myalgia, flu-like illness

**Sepsis[12]**

- ≥21 breaths/min
- Heart rate ≥91 beats/min

This is part of a series of occasional articles on common problems in primary care. *The BMJ* welcomes contributions from GPs.

- Systolic blood pressure 91-100 mm Hg or <90 mm Hg (that is, >40 mm Hg below normal)
- Not passed urine in the past 12-18 hours or more
- Behaviour changes (acute deterioration, altered behaviour or mental state)

*Consider other causes*—These include vaginal infections (such as *Trichomonas*, *Candida albicans*, *Gardnerella*), vaginitis (after sexual intercourse, irritants, pelvic inflammatory disease) and vulvovaginal atrophy. Ask about:

- Recent sexual activity (UTIs are common among sexually active women[10])
- Previous UTI (most women with a UTI report a history of UTI during the 12 months before the current episode[13])
- Use of spermicidal agents or a diaphragm (spermicidal agents affect the vaginal flora, and the diaphragm increase the levels of introital and periurethral colonisation with bacteria[14])
- Current pregnancy? (UTIs are common during pregnancy)
- Diabetes? (UTIs are more common in patients with type 2 diabetes[10]).

### Is examination necessary?

In most non-pregnant women with UTIs, clinical examination is not required, and the consultation can be safely conducted remotely. However, if the patient is systemically unwell and presents with any red flag symptom, arrange a physical examination. Assess her temperature, blood pressure, heart rate, and respiratory rate for signs of systemic illness or sepsis and palpate the abdomen and the back for flank or suprapubic tenderness.

### What investigations might be needed?

Urine dipstick tests are the most commonly used point of care test in primary care.[15] For the laboratory diagnosis of UTI, dipstick results can modestly improve diagnostic precision, but cannot definitively rule out a UTI (table 2).Where symptoms are highly suggestive of a UTI, a urine dipstick is usually not needed.

**Table 2 | Investigations for uncomplicated UTI in 18-65 year old non-pregnant women[15]**

| No of suggestive symptoms present* | Urine dipstick score | | | Possibility of UTI | Further testing |
|---|---|---|---|---|---|
| | Nitrite | Leucocyte | RBC | | |
| 2 or 3 | | May not be needed[9] | | Highly likely | Urine culture typically not needed |
| 1 | + | − | + | Likely† [15] | Send urine for culture‡ |
| | + | + | − | | |
| | + | − | − | Likely§ | |
| | − | + | + | | |
| | − | + | − | Equally likely to other diagnosis | |
| | − | − | − | Less likely¶ | No indication for urine culture |

Urine dipstick cut-off score is based on the sum of nitrite=2, leucocyte=1.5, red blood cells (RBC)=1.

* Suggestive symptoms: dysuria, new nocturia, cloudy urine/haematuria

† Positive predictive value (PPV) of 92% (95% CI 86% to 96%), which is the probability that patients with a positive test have a UTI. Cut-off point on dipstick score ≥3 (NPV= 42%, 95% CI not reported).

‡ Growth cut-off thresholds used to define a UTI can vary (in some laboratories or countries it may be ≥103 CFU/mL, in others ≥105 CFU/mL). Culture results should be interpreted with consideration of the severity of signs and symptoms.

§ Positive predictive value of 81% (95% CI= 77% to 84%). Cut-off point on dipstick score ≥2 (NPV=57%, 95% CI 52 to 62%)

¶ Negative predictive value (NPV) 76% (95% CI 66 to 84%) which is the probability that patients with a negative test truly do not have a UTI. Cut-off point on dipstick score ≥1

## What you should do

### Constructing a shared decision making conversation

There are typically two main options that are reasonable to consider: immediate antibiotics or a "wait and see" approach. To enable the patient to make an informed decision, the clinician needs to explain both options, with the benefits and harms of each, and discuss the patient's preferences. Box 2 suggests an approach to this.

**Box 2: Elements of a shared decision making conversation**

A shared decision making discussion following the diagnosis of an uncomplicated UTI typically involves the following (although it may not be a simple linear process as presented here).

- *Explain that there is choice about the next steps and a decision to be made*—Invite the patient to partner with you in the decision making to the extent that she desires, and reassure any patient who feels overwhelmed or uncertain about her involvement
- *Elicit the patient's expectations about management of the condition*—This can include past treatments and experiences, along with fears and concerns (including symptom severity and how it may affect daily tasks); this allows for detecting and discussing misperceptions where necessary, either now or later in the process
- *Explain the options:*
  - Wait and see (this may involve providing a delayed prescription for antibiotics and clear information about to when to use it)
  - Start taking antibiotics immediately
- *Discuss the options' benefits and harms* (including their likely probability or size):
  - Describe the natural course of an uncomplicated UTI and explain that, for some women, it will resolve within about a week without taking antibiotics. Also explain that there is uncertainty about exact timeframes and whether the patient will be one of the women who gets better without antibiotics (if not, antibiotics may need to be started later)

- Explain that taking antibiotics will probably shorten the duration of symptoms, but this carries the risk of side effects and of antibiotic resistance
- Regardless of which option is chosen, provide advice on symptom management (such as paracetamol or ibuprofen)

- *Weighing up*—Provide the opportunity for the patient to weigh up the benefits and harms of the options and consider them in the context of her preferences, values, and circumstances
- *Check the patient's decision-making readiness*—Explore if the patient has any questions, is ready to make a decision, or needs further information, time, or the involvement of other people
- *Safety-netting*—Provide safety-netting information about when to start taking antibiotics (if delayed prescription) or reconsult:
  - Nausea or vomiting
  - Rigors
  - Shivering, chills, and muscle pain
  - Feeling confused or very drowsy
  - Not passing urine all day
  - Blood in the urine
  - Temperature above 38ºC
  - Kidney pain in the back or under the ribs
  - Worsening UTI symptoms
  - If taking antibiotics, no improvement in UTI symptoms after 48 hours
- *Written information*—Provide written patient information leaflet with summary information[16]

## What is the natural course of a UTI?

There is uncertainty around the natural course of uncomplicated UTI, with few studies examining this.

In a systematic review of the placebo-controlled arms of three randomised trials (346 placebo group participants), some women seemed to improve or become symptom-free spontaneously, with most improvement occurring in the first nine days.[17] When asked at seven days, the percentage of participants who reported being symptom-free was 37% in one study and 28% in another. One study asked women again at nine days and six weeks, with 42% and 36% respectively reporting being symptom-free. In 39% of the women, symptoms either failed to improve by six weeks or became worse. The rate of serious complications was low, with progression to pyelonephritis reported in only one placebo participant each in two of the trials.

Another estimate of the mean duration of UTI symptoms is provided by an observational study of women with suspected uncomplicated UTI.[18] In the 511 women who had seen a clinician for their symptoms and rated the initial problem as moderately bad or worse, the mean reported symptom duration was 3.8 days. However, most of the study participants took antibiotics. For the 17 participants (approximately 3%) who did not take antibiotics, their reported mean symptom duration was 4.9 days. In a related five-arm randomised trial, a similar duration of moderately bad or worse symptoms was reported: 3.5 days in the immediate antibiotic group and 4.8 days in the delayed (by 48 hours) prescription group.[19]

## What difference do antibiotics make?

Surprisingly, we could not find a synthesis of antibiotic versus placebo randomised controlled trials for uncomplicated UTI in women under 65 years old, and therefore no quantification of the effect, perhaps because antibiotic treatment is the traditional management of uncomplicated UTI. The extent to which antibiotics reduce recovery time, reduce the risk of progression to pyelonephritis, and reduce the risk of recurrence is unknown and not presented in evidence based clinical practice guidelines.

Harms are also hard to quantify; for the antibiotics most commonly prescribed for UTI (such as nitrofurantoin, trimethoprim), we could not find synthesised evidence of their harms. For other antibiotics commonly prescribed in primary care, commonly reported adverse effects include diarrhoea, rash, and nausea.[20 21] Candidiasis is also possible from antibiotic use. Another harm of antibiotic use is the contribution to antibiotic resistance. This is already particularly a problem for trimethoprim, with existing resistance rates of at least 30% of *Escherichia coli* isolates to trimethoprim.[22] Patients with antibiotic resistant *E coli* UTI are more like to experience clinical response failure.[23]

Despite being unable to quantify how much difference antibiotics make to UTI symptom duration, they are effective in treating the infection. Refer to the current NICE guideline for information on which antibiotic to use (guided by local antibiotic resistance patterns, where possible), and recommended dose and duration.[24]

## Offering a delayed prescription

The option of a delayed prescription will be acceptable to many patients. In a cohort study in Amsterdam, 37% of women who were asked by their general practitioner to delay antibiotic treatment were willing to do so (however no further details about how this option was presented to patients are provided in the study).[25] When a delayed antibiotic prescription is chosen, NICE recommend advising patients to start taking them if symptoms do not start to improve within two days (or sooner if symptoms worsen).[24] However, there is no evidence provided in support of this timeframe, and it is unclear whether the two day limit is from the start of symptoms or from first consultation. The findings from the systematic review that estimated the natural course of uncomplicated UTI[17] suggest that a two day timeframe may be too short, with few participants likely to have improved by then, although about a third may have improved by 7-10 days. There seems to be considerable uncertainty and variability in the time for spontaneous recovery; so when "wait and see" (delayed prescribing) is discussed with the patient as an option, this should include careful description of when to reconsult or start antibiotics (box 2).

## Other treatments

There is little evidence to support the use of various over-the-counter medications that patients will often have tried before a consultation or concurrently with antibiotics. A 2016 Cochrane review of urinary alkalisers found no randomised trials.[26] There are no randomised trials of cranberry products for the treatment of uncomplicated UTI,[27 28] and a Cochrane review found they did not prevent recurrent urinary tract infections in women any more than placebo or no treatment (risk ratio 0.86, 95% CI 0.71 to 1.04).[29]

A systematic review of the effectiveness of non-steroidal anti-inflammatory drugs (NSAIDs) compared with antibiotics for uncomplicated UTI found five randomised trials.[30] For the outcome of symptom resolution, three trials found that NSAIDs were inferior to antibiotics, but two trials (smaller, with higher or unclear risk of bias) found no significant difference between the arms. In the groups that received NSAIDs, the percentage of women with symptom resolution by day 3 or 4 ranged from 39% to 58%. In two of the three trials that reported pyelonephritis, rates were slightly higher in the NSAID group.

### Education into practice

- How do you invite patients to share in decision making about management of an uncomplicated UTI, including a discussion about their expectations?
- How can you facilitate a balanced discussion about the benefits and harms of using antibiotics immediately or adopting a "wait and see" approach?

### How this article was created

We searched Medline and the Cochrane Library to identify published systematic reviews and randomised controlled trials on the diagnosis and management of uncomplicated urinary tract infections, including antibiotic benefits and harms, natural course of the condition, and commonly used alternative treatments (cranberry, urinary alkalisers, non-steroidal anti-inflammatory drugs). We included journal articles identified in the references of articles from the initial search. We searched for relevant NICE guidelines on uncomplicated urinary tract infections. We have referred to recent systematic reviews and meta-analyses but have cited individual clinical studies where there is no higher quality of evidence.

### How patients were involved in the creation of this article

We discussed the article with two women who have had uncomplicated urinary tract infections; they emphasised the importance of information about whether alternatives to antibiotics work, about safety-netting information (box 2), and the provision of written information.

Contributors: TCH and CDM conceived the article and are guarantors. All authors wrote and reviewed the article.

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