Managing the symptoms of urinary tract infection in women

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Urinary tract infections (UTIs) are commonly seen in community settings and can be debilitating for patients, involving dysuria (painful urination), increased urinary frequency and urgency, suprapubic pain, haematuria (blood in the urine), and polyuria (excessive urine production). This article takes an in-depth look at these symptoms, as well as the diagnosis and management of this common problem, which mostly affects female patients.

SIGNS AND SYMPTOMS
Common signs and symptoms of UTIs include (Health Protection Agency [now known as Public Health England] [HPA], 2010):
- Dysuria
- Urinary frequency
- Urinary urgency
- Suprapubic pain or tenderness
- Haematuria
- Polyuria.

Other symptoms that may also present are malodorous and cloudy urine, rigors, pyrexia (fever), nausea and an acute confusional state (Mahaffey, 2006). The presence of bacteria in the urine, also referred to as bacteriuria, can often lead to inappropriate antibiotic treatment — bacteriuria alone is rarely an indication for antibiotic treatment (SIGN, 2012). The diagnosis of UTI should be primarily based on the signs and symptoms described above (SIGN, 2012).

DIAGNOSIS AND TESTING
A full history should be taken, which encompasses information regarding any previous UTIs and their treatment. Aids to diagnosis include (Mahaffey, 2006):
- Near-patient testing
- Microbiology.

Near-patient testing
Near-patient testing may include observing the urine sample to see if it is ‘cloudy’, or the use of urine dipsticks. In the absence of infection, a urine sample should be odour-free and clear. Any sample that is malodorous and cloudy is likely to be indicative of a UTI (SIGN, 2012). However, visual inspection of a urine sample is prone to observer error and, therefore, may not be a useful discriminator when attempting to diagnose a UTI (SIGN, 2012).

Urinary dipsticks, or testing strips, are placed into a sample of urine for a short period of time — the urine will react with the stick, changing colour to indicate the presence of biochemicals and blood cells.

Although the quality of evidence for urine dipsticks strips is weak (SIGN, 2012), they may have a useful role to play in allowing treatment to commence while awaiting confirmation of the infection (it may take the laboratory a while to confirm a diagnosis, so treatment might need to be commenced in the meantime). The SIGN (2012) guidance advises the use of dipstick tests to guide treatment decisions in otherwise healthy women aged under 65 years whose UTI symptoms are mild, or those who present with less than two symptoms.

Urine dipsticks test for four factors:
- Nitrites
- Leucocytes
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Testing for nitrites and leucocytes works on the rationale that bacteria present in the urine cause urinary nitrates to breakdown into nitrites. Similarly, a higher concentration of the leucocyte esterase enzyme will be present in the urine as a result of the increased neutrophils present during infection (Balakrishnan and Hill, 2011).

Urine dipstick testing for nitrites and leucocytes is most effective when the bacterial count is high, however, diagnosis is more accurate if used in combination with other tests (BMJ Best Practice, 2013). If the dipstick result is negative, but the symptoms suggest a UTI, the probability of a UTI is still relatively high (BMJ Best Practice, 2013).

Microbiology testing
Microscopy can be used to detect haematuria, pyuria (white cells in the urine) or bacteriuria (Balakrishnan and Hill, 2011), or to confirm the organism type and guide antibiotic selection in complicated UTI or pyelonephritis (kidney infection) (BMJ Best Practice, 2013). A UTI might be considered complicated if there are risk factors that predispose the patient to infection (e.g. urinary obstruction or vesico-ureteric reflux).

Urine culture and sensitivity testing is the most specific and sensitive test for confirmation of a UTI. A midstream urine sample can be sent for cultures and sensitivity analysis to confirm the diagnosis and to ensure that an appropriate antibiotic can be prescribed (SIGN, 2012). A mid-stream urine sample should be taken for culture to ensure that contamination of the sample is kept to a minimum (Mahaffey, 2006).

There are limitations to both near-patient testing and laboratory microbiology. The detection of protein and blood in the urine by dipstick testing is unreliable, with a high rate of false positives and false negatives, and is, therefore, of comparatively little diagnostic value (Balakrishnan and Hill, 2011).

Similarly, urine dipstick testing in general has been found to be unreliable in the following groups (Balakrishnan and Hill, 2011):
- Pregnant women
- Children under three years of age
- Patients whose urinary tracts have structural anomalies
- Patients with diabetes mellitus
- Patients who are immunocompromised.

Therefore, urine dipstick testing is of little use in these patient groups.

With mid-stream urine samples, it may not always be possible to eradicate all contamination. Specimens need to be either processed promptly or refrigerated after collection in order to minimise bacterial multiplication (Balakrishnan and Hill, 2011). Figure 1 illustrates a protocol for diagnosis of UTI.

CAUSATIVE ORGANISMS
At the current time, Escherichia coli species are the most common cause of UTI (in 70–95% of uncomplicated cases). Other causative pathogens in uncomplicated UTIs include Enterobacteria such as Proteus mirabilis and Klebsiella species,
and resistant UTIs. The HPA and British Infection Association (2010) guidance suggests considering narrow spectrum antibiotics such as trimethoprim or nitrofurantoin as first-line treatments when there are three or more symptoms of UTI.

Previous studies have shown that trimethoprim and nitrofurantoin are broadly equivalent in efficacy for the treatment of uncomplicated UTI where there are no resistant pathogens. However, there is now some evidence to suggest that resistance to trimethoprim is rising, whereas resistance to nitrofurantoin remains relatively low (McKinnell et al, 2011; National Institute for Health and Care Excellence [NICE], 2012).

**The diagnosis of UTI is particularly difficult in elderly patients, who are more likely to have asymptomatic bacteriuria as they get older**

If a patient presents with mild symptoms, or at least two of the common signs and symptoms described earlier, a urine specimen should be sought. If the specimen is not cloudy, then a diagnosis other than UTI should be considered. If the urine is cloudy, the clinician should perform a urine dipstick test (in those under the age of 65 years). Possible results and treatment recommendations are as follows (HPA, 2010):

- A positive nitrite test, with or without a positive leucocyte result, indicates a probable UTI. Based on this result the HPA recommends antibiotic treatment with either trimethoprim 200mg twice-daily or nitrofurantoin 100mg modified release twice-daily (HPA and British Infection Association, 2010)
- A negative nitrite but positive leucocyte result indicates that UTI or other diagnoses, such as diabetes mellitus, glomerulonephritis, or coagulation disorders, are equally likely. In such situations the clinician should:
  - (i): review time of specimen collection (morning is most reliable)
  - (ii): treat if symptoms are severe or consider delayed antibiotic prescription, and
  - (iii): send for urine culture
- A negative nitrite, leucocyte and blood result, or negative nitrite and leucocyte test but positive blood or protein result, indicates that an alternative diagnosis should be considered.

**Management of UTI in elderly patients**

The diagnosis of UTI is particularly difficult in elderly patients, who are more likely to have asymptomatic bacteriuria as they get older. This may be due to changes in the structure of the urinary tract or the existence of co-morbidities, such as type 2 diabetes.

The prevalence of bacteriuria may be so high that urine culture ceases to be a diagnostic test — this is particularly true for elderly institutionalised patients because of the close proximity of other patients/residents and the possibility of cross-infection (SIGN, 2012).

There is no evidence that treatment of asymptomatic bacteriuria in the elderly reduces the risk of symptomatic episodes or mortality — in fact, the evidence actually shows that antibiotic treatment significantly increases the risk of adverse events, such as rashes and gastrointestinal symptoms (SIGN, 2012).

In elderly patients, the use of urine dipstick testing is not routinely recommended. However, if patients exhibit two or more of the common signs and symptoms of UTI, diagnosis should be guided using urine dipstick testing, as described above (HPA, 2010). For elderly patients with swallowing difficulties, or patients of any age with dysphagia due to comorbidities such as recent stroke, both nitrofurantoin and trimethoprim are available in liquid formulations.

Furthermore, there may be high levels of antibiotic resistance...
in residential facilities due to elderly and vulnerable individuals living in close proximity as well as indiscriminate antibiotic prescribing (McClean et al, 2011). UTIs in these patients may, therefore, be harder to treat. Nitrofurantoin may have an advantage over trimethoprim in these patients in terms of its continued low incidence of resistance.

The administration of nitrofurantoin, formulated as a liquid, may ensure effective treatment of uncomplicated UTIs in these vulnerable patient populations, as well as ensuring the appropriate use of antibiotics to minimise future resistance problems (commonly known as ‘antibiotic stewardship’).

A recent European survey of the treatment of UTIs in residential facilities suggests that the volume of nitrofurantoin prescribing is indeed increasing in the institutionalised elderly patient population (McClean et al, 2011).

However, as nitrofurantoin is contraindicated in the presence of significant renal impairment, particular care should be taken when prescribing to elderly patients at increased risk of toxicity (SIGN, 2012).

When performing urine cultures in elderly patients, community nurses should consider the following:
- Do not send urine for culture in asymptomatic elderly people with positive dipstick tests
- Only send urine for culture if there are two or more signs of infection (especially dysuria, fever over 38° or new episodes of incontinence)
- Do not treat asymptomatic bacteriuria in the elderly as it is very common (SIGN, 2012).

CONCLUSION

UTIs are commonly encountered in women in the community, with prevalence increasing with age. Other risk factors include sexual activity, institutionalisation, co-morbid disease and catheterisation (SIGN, 2012).

The diagnosis of UTIs should always be based on the signs and symptoms, although microbiological testing may have a role in confirming the diagnosis.

Guidance from the HPA (2010) suggests considering narrow spectrum antibiotics such as trimethoprim or nitrofurantoin as first-line treatments in uncomplicated UTIs. Both trimethoprim and nitrofurantoin are available in liquid formulations to enable treatment in a range of patient groups, such as those with swallowing difficulties.

Of all healthcare professionals, community nurses are ideally placed to advise clinicians about patients with UTI symptoms, and the most appropriate form of treatment for a particular patient, as they regularly see patients at home or in nursing/residential homes.

KEY POINTS

- UTIs are common in the community and are more prevalent in women, the prevalence increasing with age.
- Other risk factors include sexual activity, institutionalisation, co-morbid disease and catheterisation.
- The diagnosis of UTIs should be based on the signs and symptoms, although microbiological testing may have a role in confirming the diagnosis.
- Guidance from the HPA (2010) suggests considering narrow spectrum antibiotics such as trimethoprim or nitrofurantoin as first-line treatments in uncomplicated UTIs.
- Both trimethoprim and nitrofurantoin are available in liquid formulations to enable treatment in a range of patient groups, such as those with swallowing difficulties.

REFERENCES


