Focus

When is a UTI really an STI?

Tim Blackmore is an infectious diseases physician and microbiologist with the Wellington Sexual Health Service and Capital Coast Health

Introduction

Patients presenting to their GP with dysuria often have preconceptions about how they should be managed. In addition to patient demands or expectations, there are many competing pressures on doctors managing such patients.

Purse holders, including Independent Practitioner Associations (IPAs) are keen to minimise laboratory costs and so some recommend empiric treatment of patients with dysuria.

It has also been reported that GPs do not change therapy in response to laboratory results, again driving empiric prescribing without testing.[1]

However, concerns have been raised that empiric prescribing not only leads to overuse of antibiotics – because not all patients with dysuria have urinary tract infection (UTI) – but may also lead to the use of antibiotics ineffective against undetected antibiotic resistant bacteria.

Key points

- STI and UTI in adults are both associated with sexual activity and may present with identical symptoms
- STIs are missed in general practice: 12 per cent of women and 39 per cent of men considered to have UTI and found to have sterile pyuria were infected with chlamydia
- The only reliable way of diagnosing STI is by taking a good history and testing urine and genital specimens
- Empiric diagnosis of UTI in a person with dysuria may result in a case of chlamydia or gonorrhoea going undetected

There are ever increasing numbers of management guidelines for common conditions such as UTI, in part due to the above factors.

As described in a recent article in the *British Medical Journal*, most guidelines or review articles of UTI are not evidence based, and often show a remarkable lack of consistency.[2]

The purpose of this article is to explore some of the issues surrounding empiric management of the patient with dysuria and a clinical diagnosis of UTI.

It is based on the author's experience both as a microbiologist providing results to doctors and as a physician managing patients in outpatients and the sexual health clinic.

Dysuria

Dysuria is often associated with frequency and urgency. The symptoms reflect inflammation and irritation of the urethra, although there may also be symptoms related to other involved structures, such as the renal angle tenderness, vaginal discharge, epididymitis, etc.

Bacterial infection is not the only cause of dysuria; the relative ranking of the differential diagnoses may have more to do with the preconceptions of the doctor or nurse than with the true likelihood of each disease in the particular patient.

There may be rare causes of dysuria in which there are no leucocytes present on urethral samples or first catch urine. It seems that passing concentrated urine may cause urethral irritation and some drugs (eg, marijuana) may also cause irritation without pyuria. However, most important causes of dysuria will usually be associated with pyuria.

Early studies into the diagnosis of UTI relied on the concentration and purity of bacteriuria in midstream urine samples and did not examine urinary leukocyte (WBC) counts. Urinary WBC are a marker of inflammation and their absence (<10-50 WBC/ml) would lead most microbiologists to exclude a diagnosis of UTI requiring treatment.

However, on the basis of studies by Stamm et al, it would not be strictly possible to exclude UTI in a young woman with dysuria, frequency and urgency if there was a pure growth of 103 colony forming units (CFU) per ml of a uropathogen, irrespective of the urinary WBC count.[3] In addition, bacteriuria of pregnancy should also be treated irrespective of the WBC count, because it is a major risk factor for the development of pyelonephritis.

What is the best way to detect significant pyuria?

The gold standard is to manually count urinary WBC in a freshly collected unspun specimen. However, WBC may lyse on storage, so counts may fall with prolonged transport and storage, and the method is also dependent on the expertise and alertness of the microscopist. In an attempt to simplify testing, dipstick measurement of leucocyte esterase (LE) has been introduced and has the advantage of being easier and cheaper to perform (approximately $1 less), and will detect lysed as well as intact WBC.

Significant pyuria is regarded as 10 WBC/ml, which is the lower limit of detection of both the LE test and manual counting. Fortunately symptomatic UTI is almost always associated with ž 90 WBC /ml, a level at which dipstick LE testing is 94 per cent sensitive. Therefore either dipstick or conventional methods may be used to reliably detect pyuria.[4]

How useful are urinary dipsticks in diagnosing UTI?

There have been several studies comparing the utility of urinary dipsticks with manual counting. Conclusions vary, but the consistent finding is that a completely negative dipstick result (negative LE, nitrite, protein and blood) reliably excludes UTI with a negative predictive value of over 99 per cent. If only the LE and/or nitrite is interpreted, then the NNPV is around 98 per cent.

Conversely, the positive predictive value of an abnormal dipstick result is much lower for bacterial UTI, but the absolute value will depend on the patient being tested. For example, the PPV of a positive urinary LE test will be very high in a woman with renal angle tenderness, fever and dysuria, but will be less in a

debilitated or catheterised patient.[4,5]

Is all dysuria with pyuria due to bacterial UTI?

The answer to this question is no, as shown in the box. The prevalence of each of the infections will vary according to sexual behaviour and other risk factors. As shown in the latest figures from ESR, New Zealand prevalence rates of gonorrhoea and chlamydia are at record levels.[6] This suggests health care providers are not identifying and treating sexually transmitted infections (STIs). While many people with STIs do not present to any health service, it is apparent that many do, but do not get tested or treated appropriately.

Both UTI and STI in females are associated with sexual activity, yet for some reason most guidelines for the diagnosis and treatment of dysuria concentrate on UTI and ignore STI. In particular, empiric choices recommended for UTI almost never cover chlamydia infection.

It is suggested in many guidelines that patients should return for follow-up if empiric treatment of UTI is not effective, yet in a small New Zealand study it was shown that patients seldom return. It could be argued this low return rate reflects successful treatment, yet the high rates of asymptomatic carriage of chlamydia in both males and females suggest this would not be a safe assumption. Patients with STI may present with symptoms suggesting UTI, and cases are obviously going undiagnosed.[7]

Testing for STI

Firstly, it is essential to take a proper sexual history, including a history of previous STI, symptoms of vaginal discharge, etc. Although under 35-year-olds who have had several sexual partners are most at risk, it cannot be assumed a sexually active person of any age is not at some risk of STI including chlamydia.

If a sexually active person presents for the first time with dysuria, his or her urine should be tested for the presence of pyuria. It could be argued that, if pyuria is present, there is as great an imperative to exclude chlamydia or gonorrhoea as UTI: STIs are transmissible and reinfection will occur if partners are not treated. The long term sequelae of undiagnosed infection may often lead to tubal infertility and other complications. Therefore, any person with dysuria should be given the opportunity to be tested for STI, which in some groups is more likely than UTI.

It is imperative the patient be informed if testing for STI is to be carried out, as a positive result has many potential repercussions. Take advantage of opportunities to discuss safer sex.

The absence of pyuria, using the urinary LE test, is not reliable for the exclusion of STI in women, although it may be useful in young men.[8]

Testing for gonorrhoea in females requires collecting an endocervical swab and promptly sending it for culture, with a small extra yield from culturing urethral samples. In males a urethral swab should be cultured.

Testing for chlamydia has been improved dramatically by the introduction of nucleic acid amplification tests (NAAT) including PCR and LCR.

In females a first catch urine will detect approximately 90 per cent of infections, with the remainder detected from endocervical swabs.[9] Almost all cases of

chlamydia in males will be detected by testing first catch urine. In both males and females it is preferable that the patient has not voided for one to two hours before collecting the first catch urine sample. In addition, the detection of urinary threads in a first catch urine is suggestive of urethritis and therefore STI.

Older methods of detecting chlamydia such as immunofluorescence and enzyme immunoassay (EIA) are less sensitive than NAAT, and should not be routinely used on their own.[8]

Only by culturing urine will sterile pyuria be detected. This is important because, based on a recent report from Auckland, sterile pyuria is associated with a 12 per cent prevalence of chlamydia in females and a 39 per cent prevalence in males. The population studied was under 35-year-olds who were suspected of having UTI, and their GPs had not requested chlamydia tests.7 These figures may be an underestimate because midstream urine samples were tested rather than the preferred first catch specimens.

Obviously empiric prescribing for UTI without culture will miss sterile pyuria, and with it the opportunity to test for STI. Most authorities recommend urinary culture for all complicated UTI, which by definition would include all men with suspected UTI. Finally, all pregnant women should have their urine sent for culture and, if disease in the neonate is to be prevented, testing for chlamydia and gonorrhoea in pregnant women should also be performed.

Causes of pyuria

urinary tract infection, ie, cystitis, pyelonephritis, prostatitis

E. coli
S. saprophyticus (does not reduce nitrate to nitrite)
Klebsiella spp.
Proteus spp.
Enterococcus spp. (does not reduce nitrate to nitrite)

urethritis

Chlamydia trachomatis
Neisseria gonorrhoeae
Ureaplasma spp.
Mycoplasma spp.
Trichomonas vaginalis

urinary stones

malignancy

tuberculosis

Note: not all bacteria reduce nitrate, so will not be detected on dipstick nitrite tests

Treatment

Treatment will not be discussed in detail here. A particular advantage of making a specific diagnosis of chlamydia is that azithromycin is funded for the treatment of proven chlamydial infection, and for the contacts of proven cases. This is more palatable for the patient because it is a single stat dose rather than seven to 10 days of doxycycline – this dramatically improves compliance and makes contact tracing and treatment easier.

Antibiotic resistance is increasing, with around 80 per cent of New Zealand isolates resistant to trimethoprim and co-amoxyclav. Narrow spectrum antibiotics should be used wherever possible, and in particular quinolones should not be used as an alternative to laboratory testing.

Conclusions

(a) A sexual history should always be obtained: sexual activity is associated with both UTI and STI.

(b) Urine should always be tested for the presence of leucocytes, preferably with a dipstick test while the patient waits.

(c) The absence of pyuria makes UTI

unlikely, but does not completely rule out STI.

(d) Sexually active persons with dysuria should at least have a urinary chlamydia test, preferably also with appropriate swabs taken for chlamydia and gonorrhoea testing.

(e) Urine should be sent for culture if STI testing is not performed initially. If sterile pyuria is detected the patient should be recalled for STI testing.

(f) Pregnant women should always have urine sent for culture irrespective of dipstick results.

(g) Symptomatic patients with well-documented previous UTI are likely to have a recurrence, but their urine should be cultured because of the potential of infection with antibiotic-resistant strains.

References available on request