The British Journal of General Practice

The Journal of The Royal College of General Practitioners

Published by The Royal College of General Practitioners, 14 Princes Gate, London SW7 1PU.
Editorial Office: 12 Queen Street, Edinburgh EH2 1JE.
Printed in Great Britain by Hillprint Ltd., Bishop Auckland, Co. Durham DL14 6JQ.

The management of suspected urinary tract infection in general practice

'A diagnosis is not an end in itself, merely a mental resting place for therapeutic considerations.'[1]

URINARY tract infection is common. When adult women are questioned about symptoms of acute dysuria and frequency one half of them will admit to them at some time, but only one in 10 consult a doctor with these symptoms.[2] In general practice 2–3% of consultations are due to symptoms suggesting urinary tract infection.[3] Given the tendency to recommend routine microbiological urine examination, the inevitable consequence can be a heavy workload for the clinical laboratory.

The usefulness of rapid diagnostic tests which could reduce laboratory workload is addressed in two papers published in this issue of the *Journal*.[4,5] Hiscoke and colleagues have found that when tests for nitrite, blood and protein using reagent strips are all negative in a clear urine the absence of bacteriurira can be predicted with a predictive value of 98.5%. Positive strip tests in a turbid urine detected 80% of infections. On this basis they recommend testing all patients with suspected infection by this method and sending only positive urine samples to the laboratory. In the second paper Ditchburn and Ditchburn find that simple low power microscopy is more accurate than a reagent strip which measures nitrite and pyuria. They believe that it is not normally necessary to send urine samples that do not have significant pyuria for culture.

Before carrying out any urine investigation, however, the general practitioner needs to consider what the test actually measures and whether the result will modify the patient's management. In some people defences against ascending infection fail to prevent potential pathogens in the bowel flora from reaching the urethra and ascending to the bladder where they multiply. These pathogens can then ascend to the upper tract and cause kidney scarring which may lead to renal failure. It is therefore important to distinguish between organisms that are multiplying in bladder urine (urinary infection) and organisms that accidently enter the urine during micturition (contamination). This can be achieved by counting bacteria.[6] Bacteriuria is 'significant' when a recognized pathogen is isolated with a concentration greater than 10^8 organisms per litre in a properly collected specimen, preferably on two occasions. This definition, known as the Kass criterion, should be applied with caution for several reasons: different species of bacteria multiply at different rates; frequency of micturition can interfere with the result; in some women bacteria may be involved in a urethral lesion and may not get an opportunity to multiply in bladder urine; and in men bacteria may multiply in prostatic fluid where counts may be low because of the presence of a prostatic antibacterial factor.

When a properly collected and stored specimen of urine is sent to the laboratory it is cultured and the Kass criterion used to decide whether bacteriuria is 'significant'. Smaller numbers of organisms in pure growth and mixed growth cultures will also be reported. Anaerobic cultures may be offered or requested. Can inspection,

microscopy and rapid diagnostic tests for protein and nitrite shortcut this procedure? The following should be borne in mind when considering this question.

First, undue importance can be attached to the presence or absence of pyuria as a diagnostic aid. Leucocyte excretion rates vary so it is difficult to define normal levels and pyuria may arise for many reasons apart from urinary tract infection.[7] It is not possible to assume that low white cell counts are always due to contamination. Secondly, treating proteinuria alone as evidence of a urinary tract infection verges on malpractice since there is no correlation between them.[7] Thirdly, following multiplication in the bladder most gram negative organisms reduce dietary nitrate in the urine to nitrite. This can be detected by the Greiss nitrite reaction which is available as a dipstick. False positives are uncommon but false negatives can be a problem if the bladder incubation time is insufficient and because some pathogens do not produce this reaction. The reaction cannot differentiate between pure and mixed cultures and sensitivity differs for different species. Finally, anaerobic infection may be missed.[8]

It would seem, therefore, that bacteriuria can only be established with certainty if bacterial cultures are obtained either by conventional means at the laboratory or by using a dipslide or boric acid preserved sample.[8,9] When, however, does infection need to be established with certainty, and why?

Women with symptoms suggesting urinary tract infection may or may not have bacteriuria.[10] The presence of bacteriuria does not identify a population of women with symptoms who need antibiotics[11] as most infections will be overwhelmed by natural defence mechanisms.[10] Nor does the absence of bacteriuria tell us with certainty that antibiotics can be avoided. As outlined above the Kass criterion is of limited value and in any case bacteriuria may be present the following day.[10] In addition, the presence of bacteriuria does not signify a subgroup at risk of kidney damage as kidney scarring occurs in childhood and mostly before the age of five years.[12] There is no evidence that bacteriuria is related to a rise in blood pressure, renal scarring or to deteriorating renal function even when women with renal failure are followed up for many years.[13,14] In these circumstances, as with sore throats, we are left with clinical criteria when deciding whether or not to prescribe antibiotics or to refer women with a 'sore urethra'. However, there is conflicting evidence about whether or not the result of urine examination can be predicted on clinical grounds.[15,16] A useful rule of thumb is to give a short course of antibiotics to those with severe symptoms as there is evidence that this is helpful in reducing the duration of symptoms and the subsequent development of bacteriuria, whether or not bacteriuria was originally present.[3,10] Urine cultures and further investigation should be considered in the few women who have frequently recurring attacks to see if any pathogen or remedial cause can be identified; prophylactic therapy may well be justified. Post-treatment investigation is not usually helpful. Further advice on management can be found elsewhere.[17,18] About 4% of women have covert bacteriuria and if they become pregnant they risk developing pyelonephritis which can be prevented by therapy. It would therefore seem reasonable to use nitrite sticks in the antenatal clinic and to send positive specimens to the laboratory for investigation.

Pyelonephritis is rare among men and is not excluded by a normal mid-stream urine sample; this diagnosis is thus made clinically. Bladder infection in men is less common than in women but urine culture is needed as a small number of organisms may be significant; contamination is unusual. Men with infection need referral for further investigation[19] as obstructive uropathy may result in kidney damage.

Three per cent of girls and 1% of boys have a symptomatic urinary tract infection before the age of 10 years. Sixty per cent of these children have no structural abnormality and have a good prognosis, 10% have a surgical problem, for example stones or obstruction, but 30% have vesicoureteric reflux and the 10–14% who develop kidney scarring fall into this group. One quarter of those with scars eventually develop hypertension; this process may take 10 years. Six per cent of those with hypertension develop renal failure.[7,20,21] Early diagnosis and investigation can considerably reduce the amount of renal scarring among children.[22] Urine culture is the only way to diagnose urinary tract infection accurately and dipslides and boric acid preservation of urine samples are excellent methods for use in general practice. Follow up is essential and the general practitioner has a crucial role in deciding when urine assessments are needed. Nitrite sticks may be helpful in monitoring children with known reflux who develop intercurrent illness at home.[7]

Despite the development of laboratory aids for the diagnosis of urinary tract infection it would seem preferable to attempt to limit the number of specimens to those which are clinically useful and to examine them by the best methods available.[8,9] Other methods, including nitrite sticks, may be helpful in screening in the antenatal clinic and in monitoring the progress of sick children at home.

DAVID BROOKS
General practitioner, Manchester

References

1. Wulff H. *Rational diagnosis and treatment.* London: Blackwell Scientific, 1976.
2. Waters WE. 1969. Prevalence of symptoms of urinary tract infection in women. *Br J Prev Soc Med* 1969; **23:** 263.
3. Brooks D. The syndrome of dysuria and frequency in adults. *A study from general practice. MD thesis.* University of Manchester, 1972.
4. Hiscoke C, Yoxall H, Greig D, Lightfoot NF. Validation of a method for the rapid diagnosis of urinary tract infection suitable for use in general practice. *Br J Gen Pract* 1990; **40:** 403-405.
5. Ditchburn RK, Ditchburn JS. A study of microscopical and chemical tests for the rapid diagnosis of urinary tract infections in general practice. *Br J Gen Pract* 1990; **40:** 406-408.
6. Kass EH. Asymptomatic infection of the urinary tract. *Trans Assoc Am Physicians* 1956; **69:** 56.
7. Postlethwaite RJ. Urinary tract infection in childhood. In: Brooks D (ed). *Urinary tract infection.* Lancaster: MTP Press, 1987: 73.
8. Maskell R. *Urinary tract infection in clinical and laboratory practice.* London: Edward Arnold 1988: 26-42.
9. Meers PD (ed). *The bacteriological examination of urine: report of a workshop on needs and methods. Public Health Laboratory Service monograph no. 10.* London: HMSO, 1978.
10. Brooks D, Garrett G, Hollihead R. Sulphadimidine, co-trimoxazole, and a placebo in the management of symptomatic urinary tract infection in general practice. *J R Coll Gen Pract* 1972; **22:** 695-703.
11. Tapsall JW, Bell SM, Taylor PC, Smith DD. Relevance of significant bacteriuria to the aetiology and diagnosis of urinary tract infection. *Lancet* 1975; **2:** 537-639.
12. Jones KV, Jones ERV, Asscher AW. Covert urinary tract infection in children. In: Asscher AW, Brumfitt W (eds). *Microbial diseases in nephrology.* Chichester: John Wiley, 1986.
13. Asscher AW, Chick S, Radford N, *et al.* Natural history of asymptomatic bacteriuria in non pregnant women. In: Brumfitt W, Asscher AW (eds). *Urinary tract infection.* London: Oxford University Press, 1973.

14. Brettle RP, MacCallum CJ, Murdoch J, Gray JA. The adult female — a 20 year study of bacteriuria in female patients: In: Asscher AW, Brumfitt W (eds). *Microbial diseases in nephrology.* Chichester: John Wiley, 1986.
15. Brooks D, Mauder JA. Urethral syndrome in women and its diagnosis in general practice. *Lancet* 1972; **2:** 893-898.
16. O'Dowd TC, Pill R, Smail JE, West RR. Clinical judgement in the management of frequency and dysuria in general practice. *Br Med J* 1984; **288:** 1347-1349.
17. Brooks D, Mallick NP. *Renal medicine and urology.* Edinburgh: Churchill Livingstone, 1982.
18. O'Dowd TC. Women with urinary symptoms. In: Brooks D (ed). *Urinary tract infections.* Lancaster: MTP Press, 1987: 33.
19. Gower PE. Urinary tract infections in men. Investigate all ages. *Br Med J* 1989; **298:** 1595-1596.
20. Smellie JM, Prescod N. Natural history of overt urinary tract infection in children. In: Asscher AW, Brumfitt W (eds). *Microbial diseases in nephrology.* Chichester: John Wiley, 1986.
21. Jacobson SH, Eklof O, Ericson CG. Development of hypertension and uraemia after pyelonephritis in children: 27 year follow up. *Br Med J* 1989; **299:** 702-706.
22. Winberg J, Bollgren I, Kalennius S, *et al.* Clinical pyelonephritis and focal scarring: a selected review of pathogenesis, prevention and prognosis. *Pediatr Clin North Am* 1982; **29:** 801-804.

General practice training in the hospital

SERIOUS concerns about the quality of training that is offered to junior hospital doctors continue to be expressed. Difficulties with lifestyle have been highlighted[1-3] and so too have inadequate arrangements for learning. Consistent findings have been lack of time for teaching and the absence of a structured programme of learning throughout each attachment. These inadequacies have been described for posts used in vocational training for general practice for many years[4-6] as well as more generally for all senior house officer appointments.[7]

In this issue of the *Journal,* Karen Kearley presents the results of a survey of the views of general practitioner and hospital based teachers, and of current and recent trainees on the quality of hospital based training.[8] These results confirm the findings of previous work and reinforce the lesson that the educational opportunities of working in hospital are not being exploited to the full — at least for future general practitioners. The respondents' comments provide clear evidence of the obstacles that need to be overcome if training in hospital is to be improved, and provide clues to how better provision might be developed for the future.

A common concern has been the lack of clarification about what is expected of trainees; for most hospital posts there is no clear indication of what consultant teachers want them to learn. The failure to provide adequate protected time for learning has been consistently highlighted, and any formal teaching that does take place is often unrelated to the needs of doctors whose careers lie in general practice. This, together with the lack of feedback on performance and the extent to which they have matched up to their teachers' expectations, can make the hospital years a particularly frustrating time for trainees. These features are country wide and are not restricted to obstetrics and gynaecology and to paediatrics — the disciplines studied by Kearley.[8]

Overcoming these deficiencies in hospital training presents a major challenge for all involved in postgraduate medical education, be they consultants and general practitioners working locally or advisers and deans at regional level. All must collaborate to ensure that the learning potential of each hospital post is fully developed and matched to the career intentions of the individual junior doctor who works in it.

An important difficulty that cannot be overlooked is that of balancing the time needed to fulfil the service commitments of all hospital posts, junior and consultant, with the time needed for learning and teaching. For some specialties this problem has been exacerbated by recent changes in manpower structure that have led to a decrease in the numbers of middle grade registrar posts, and in consequence to greater pressure on the time of senior house officers and of consultants. Obstetrics and paediatrics have been particularly badly affected.

Another major contributing factor to the present inadequacies is an attitudinal one. An indefinable but significant number of hospital consultants still cling to the view that 'learning on the job' is the best way to train. They believe that if this needs to be supplemented by formal teaching, then the time required for this is minimal and that this teaching can be left to other junior doctors. The concept of protected time for teaching, which is a feature of the general practice component of training, is not one that is readily accepted by many hospital consultants. If progress is to be made in improving the standards of teaching during the hospital years, then not only will sufficient time for teaching have to be allowed, but the attitudes of hospital teachers will have to be modified so that they accept that learning has to be planned and carefully organized to cover an agreed programme. How can these changes be brought about, and could general practitioner teachers have a role in this?

One of the factors that led to improvements in the quality of the general practice component of vocational training was undoubtedly the development of local trainer workshops.[9] Over the years, these have provided opportunities for trainers to meet together to discuss the content and organization of their teaching and the ways in which it might be improved. Workshops have become powerful instruments of change and they have been important in sensitizing trainers to the general and specific needs of learners. An important lesson for teachers has been the need for them to identify each trainee's specific learning needs and to be much more explicit in creating the opportunities for meeting these needs.

Tait has suggested[10] that there should be occasions for hospital and general practitioner teachers to meet together locally in groups to consider how vocational training programmes might be planned. Such groups could consider the broad aims of the local three year integrated programme as well as the individual posts during which the more specific objectives might be achieved. Different teaching and assessment methods could be compared and evaluated, and local obstacles to progress could be defined and solutions jointly developed. The conflict between service and teaching would be high on the agenda of such a group. The views of local trainees could be incorporated into its work and their concerns taken into account as modifications to the training programme were developed.

A mixed workshop need not be defensive in its approach. Most