

# General practice management of childhood urinary tract infection

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**SUMMARY.** The incidence of urinary tract infections (UTI) in the paediatric population of a group practice was recorded. A questionnaire involving two case studies was sent to general practitioners and paediatric consultants in the region to assess the management of children suspected of having UTI and the attitudes to referral of these cases to the paediatrician. Disturbing inconsistencies in the management plans were found among both general practitioners and consultants. The reasons for these inconsistencies and the implications arising from them are discussed.

## Introduction

URINARY tract infection (UTI) in children is common and every case is worthy of investigation.<sup>1-5</sup> General practitioners have been criticized for their management of the condition, in terms of both failure to confirm diagnosis and referral for further investigation.<sup>6</sup> It is less clear what constitutes appropriate further investigation.

This study was initiated, first, to assess the incidence of childhood UTI in primary care, and secondly to probe attitudes among consultant paediatricians and general practitioners to those investigations they consider necessary in first-time childhood UTI.

## Method

The practice is a semi-rural group partnership comprising 10,500 patients. At the end of every consultation the diagnosis, if made, or main symptom is recorded using a code number derived from the Royal College of General Practitioners (RCGP) classification of diseases. This code and a number identifying the patient are then stored on a microcomputer.

In this retrospective study the diagnosis, as recorded by the individual practitioner, was accepted, since within the practice there are no agreed criteria for diagnosing UTI. The classical symptoms and signs of urinary infection—frequency, dysuria, loin pain, fever and renal tenderness—may present in the older child, but the infant and young child may superficially appear to have an upper respiratory tract infection or exhibit lethargy,

vomiting, slow weight gain, fever, abdominal pain or enuresis.

Using a retrieval programme covering a two-year period ending February 1983, all children aged 1–10 years in whom UTI had been diagnosed were identified and their records studied for evidence of a pretreatment midstream specimen of urine (MSU) culture yielding significant bacterial growth. A significant bacterial count of  $10^5$  organisms per millilitre, or a pure growth count of  $10^4$  organisms per millilitre in the presence of pus cells, was regarded as confirming the diagnosis.

A questionnaire was compiled based on two cases seen in the practice.

*Case 1.* A boy aged two and a half years had been 'off colour' and unwell for two days, voiding urine frequently, with dribbling and 'tummy ache'. There was no record of previous UTI. An MSU was arranged with a course of co-trimoxazole (Septrin) to follow collection of the urine specimen.

*Case 2.* An eight-year-old girl presented with dysuria and frequency with no known history of past UTI. An MSU was arranged with a course of co-trimoxazole to follow specimen collection. Cultures in both cases yielded significant growth of *Escherichia coli* sensitive to co-trimoxazole.

During June 1983 the questionnaire was posted to 100 general practitioners and 20 consultant paediatricians within the South East Thames Region. The general practitioners, chosen randomly from a list of members of the RCGP South East Thames Faculty, were asked to indicate at what stage they would refer the patients and what investigations they would expect to be performed. Consultants were asked if they expected the patients to be referred and what investigations they would make.

## Results

From Table 1 it can be seen there were 58 consultations in which the diagnosis of UTI was made, representing 42 episodes in 37 patients. The records of nine patients were not analysed as they had left the practice. In all the 33 episodes generated from the remaining 28 patients a pretreatment MSU had been cultured, but only nine of these cultures confirmed the diagnosis; so the diagnosis was confirmed in about a quarter of all episodes. There were five confirmed cases in the first year of the study and four in the second year. The incidence of UTI in the study was therefore 0.43 per 1,000 patients per year, meaning that the average general practitioner with 2,500 patients will see one childhood UTI in a year.

Seventeen (85 per cent) paediatricians replied to the

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questionnaire as did 60 (60 per cent) general practitioners. Not all respondents answered all parts of the questionnaire. The results are summarized below.

Case 1

**Referral.** Thirty-five (58 per cent) of general practitioners would refer this boy at the first attack, but only 11 (18 per cent) general practitioners would do so if it were a girl. A further 16 (27 per cent) general practitioners would refer only if a post-treatment MSU was at some stage positive. The remainder would refer only at the second or more attacks (Figure 1).

Among the consultants, 13 (76 per cent) would expect the boy to be referred after the first attack, and seven (41 per cent) if it were a girl.

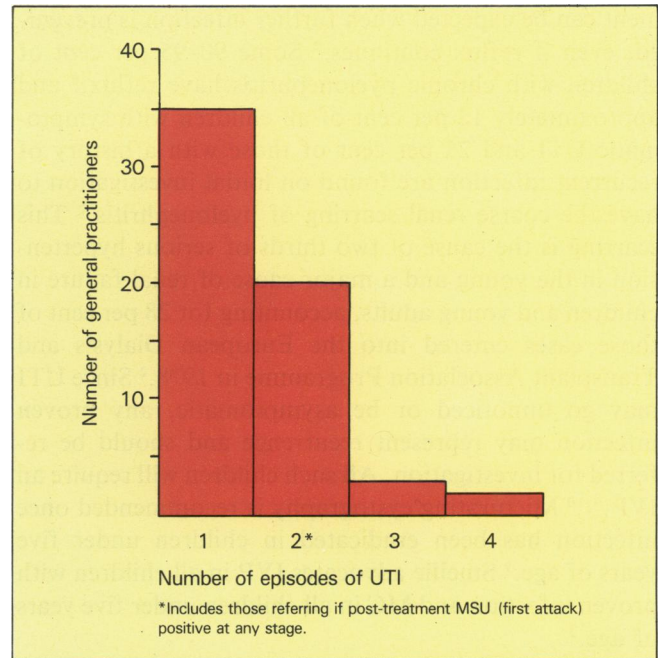
**Investigations.** For this boy aged two and a half years, 31 (51 per cent) of the general practitioners expected both an intravenous pyelogram (IVP) and micturating cystogram (MC) to be done. This expectation that both investigations would be performed was expressed by 86 per cent of those practitioners who would refer at a first attack.

All 17 of the consultants would arrange an IVP, but only seven (41 per cent) would proceed to MC irrespective of the IVP result. Two consultants combined an IVP with expression cystography.

Thirty-two (52 per cent) general practitioners would arrange an MSU culture about one week following completion of treatment, while 19 general practitioners would do this two weeks after treatment. Seven (12 per cent) general practitioners would perform more than one post-treatment MSU culture and only two (3 per cent) would do monthly MSU cultures for three months or more. Three (5 per cent) general practitioners did not consider post-treatment MSU culture necessary.

Case 2

**Referral.** Nine (15 per cent) general practitioners would refer this girl, while seven (41 per cent) consultants expected her to be referred; 26 (44 per cent) of those general practitioners not referring the girl would do so had she been male. Of those general practitioners not referring the girl, 28 (47 per cent) would refer if a post-treatment MSU culture showed significant bacterial growth.



**Figure 1.** The number of attacks of UTI in boys after which general practitioners would refer to a specialist.

**Investigations.** All 60 general practitioners would arrange a post-treatment MSU culture; 37 (62 per cent) at about one week and 14 (23 per cent) at two weeks after completion of treatment. Repeated post-treatment MSU culture was arranged by nine (15 per cent) general practitioners at monthly intervals for up to six months after the initial infection. Of those general practitioners referring the girl initially or at a later stage, 47 per cent expected both IVP and MC to be done.

Five (20 per cent) consultants would proceed to IVP in this case. None of the consultants include both IVP and MC as part of routine investigation, although one consultant combined IVP with expression cystography.

Discussion

Potts and Irwin<sup>6</sup> found inconsistencies in a general practitioner's intention and actual success in obtaining an appropriate midstream specimen of urine (MSU) for culture. Although all children in whom UTI was diagnosed in our study had pre-treatment MSU cultures, our low incidence rate of positive cultures may reflect poor collection technique.

The same authors put forward evidence that there are still cases of delayed referral to hospital because of outmoded practice. The importance of referral of any proven UTI is that up to 50 per cent of such children may have structural or functional abnormalities in the urinary tract system detectable on IVP and MC.<sup>7</sup> A third of these abnormalities can be expected to be vesicoureteric reflux,<sup>7</sup> and in a large number of cases the kidneys will be scarred,<sup>1</sup> although normal renal develop-

**Table 1.** Urinary tract infection in the study population.

	Number
Total consultations in study period	55,300
Consultations in which UTI was diagnosed in children	58
Individual episodes	42
Individual patients	37
Records studied	28
Cases confirmed by positive MSU	9

ment can be expected when further infection is prevented, even if reflux continues.<sup>2</sup> Some 90–95 per cent of children with chronic pyelonephritis have reflux,<sup>8</sup> and approximately 12 per cent of all children with symptomatic UTI and 25 per cent of those with a history of recurrent infection are found on initial investigation to have the coarse renal scarring of pyelonephritis.<sup>2</sup> This scarring is the cause of two thirds of serious hypertension in the young and a major cause of renal failure in children and young adults, accounting for 28 per cent of those cases entered into the European Dialysis and Transplant Association Programme in 1978.<sup>2</sup> Since UTI may go unnoticed or be asymptomatic, any proven infection may represent recurrence and should be referred for investigation. All such children will require an IVP.<sup>9,10</sup> Micturating cystography is recommended once infection has been eradicated in children under five years of age.<sup>9</sup> Smellie advocates IVP in all children with proven infection and MC in all children under five years of age.<sup>2</sup>

Despite these recommendations being advanced in the literature for many years, our study shows current practice among general practitioners and consultants to be rather different. Even in our first case study there was only a one in four chance of the boy having both IVP and MC as recommended, depending on the general practitioners' attitude to referral and a paediatrician's level of investigation.<sup>2,9</sup> Given that the child referred at the first attack would get an IVP, there was still only a 50 per cent chance of a MC being performed. Yet a recent study in New Zealand again stressed the need for detailed investigation of all childhood urinary tract infections and that the frequency of underlying anomalies is the same in both girls and boys, so that delaying the investigation of girls appears to be unjustified.<sup>11</sup> Both groups of doctors in our study provided evidence of the continuing delay in investigating girls with UTI. As Potts and Irwin showed in Northern Ireland, this appeared to be significantly greater among general practitioners.<sup>6</sup>

We find the disparity in the views displayed by both general practitioners and consultants difficult to explain. In our study all consultants agreed that initial investigation is by IVP to reveal, presumably, any congenital or acquired upper tract abnormalities and any evidence of obstruction, and to give an idea of the size and shape of the bladder and any outflow-tract abnormality. They did not agree that MC is the investigation of choice for identifying those children with a structural or functional urinary tract abnormality such as posterior urethral valves or vesicoureteric reflux. Perhaps IVP alone is a good predictor of reflux when the condition is severe. But less severe forms of reflux also put the child at risk of renal damage in the presence of UTI. Are other less invasive or better forms of investigating the whole urinary tract readily available in district general hospitals? There will be large numbers of children with UTI in whom no underlying cause can

be found. This should not deter early attempts at identifying those children with a clear and remediable cause for their urinary infections.

Because UTI responds so rapidly to specific chemotherapy it is easy to understand the reluctance of the busy general practitioner to defer treatment in order to arrange collection and culture of MSU specimens when he can issue a prescription with the virtually certain knowledge that the child's symptoms, and the parent's anxiety, will soon be relieved. Such an uncritical approach to the interests of children must be deplored. This aspect of management was not assessed in our questionnaire but in our study of cases in the practice all episodes diagnosed had pretreatment MSU cultures performed. Our low incidence of positive cultures may indicate poor collection technique. More detailed attention to methods of collecting suitable specimens combined with refrigerated storage, or more immediate transport to the laboratory might improve our detection of childhood UTI. In a semi-rural practice this is sometimes difficult. At present we encourage patients or their relatives to take specimens direct to the hospital laboratory, as well as bringing a specimen for naked eye examination in the surgery. Perhaps we should do direct microscopy on these specimens.

We observed that the average general practitioner might expect to see just one proven childhood UTI in a year; so that it would not involve much extra work to take careful steps to achieve bacteriological confirmation. If two or more pretreatment MSUs are collected for culture, this still represents little increase in workload. Moreover, the majority of general practitioners only perform one post-treatment MSU rather than a monthly check culture for up to six months as suggested by some authors.<sup>5,9</sup> Both these aspects of management might improve considerably with the extensive use of dip-slides. So why not make these available on the National Health Service?

We can only conclude that attitudes to referral displayed by general practitioners in our study confirmed the outmoded practice described by Potts and Irwin.<sup>6</sup> The notion that a first UTI in a boy requires immediate referral and that a girl need only be referred at a second or third attack may well have its origins in undergraduate medical teaching, but there is scant evidence to consider such practice acceptable today.

Since all paediatricians recommended an IVP in case study 1, why not facilitate direct access to the investigation for general practitioners? Three general practitioners in our study were able to do this and then to refer if the IVP showed an abnormality or if there was a recurrence.

To conclude, we suggest that the general practitioner must recognize the protean nature of childhood UTI and the necessity for an adequate bacteriological diagnosis. An accurate diagnosis enables radiological investigations to identify the subgroup of children who, if their UTI is unrecognized and untreated, are at risk of

suffering serious renal damage. Within a health district it should be possible for general practitioners to take up the issue with consultant paediatricians and implement a practical and consistent management policy for childhood UTI. Could this become another example of the integration of child care at both primary (general practitioner) and secondary (consultant) levels?

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## The value of autopsies

A retrospective review of 100 consecutive autopsies was made jointly by a clinician, surgical pathologist and forensic pathologist. The mean patient age was 64.5 years. Sixteen per cent of postmortem anatomical diagnoses were not confirmed at autopsy. Autopsy revealed 171 new anatomical diagnoses. Of these, 33 diagnoses in 27 patients were important in relation to the cause of death and if known pre-mortem would have altered therapy and possibly outcome in two patients. In 11 cases the missed major diagnoses should have been entertained on the basis of available clinical data. Of the 19 sudden deaths, the cause of death was not included in the clinical differential diagnosis in seven cases. Autopsy resulted in a substantial change in the death certification of 43 cases. The data indicate that the autopsy has a great deal to offer in correcting clinical diagnoses and effecting scientific discipline for clinicians.

Source: Pounder DJ, Horowitz M, Rowland R, *et al.* The value of the autopsy in medical audit—a combined clinical and pathological assessment of 100 cases. *Aust NZ J Med* 1983; **13**: 478-482.

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