

How accurately do parents collect urine samples from their children? A pilot study in general practice

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SUMMARY

Childhood urinary tract infections (UTIs) are of great importance, but few data exist on how accurately parents collect urine samples. By instituting three simple, practical changes we reduced the contamination rate from 27.5% to 13.2%.

Keywords: children; urinary tract infection; urine samples.

Introduction

It is of great importance that children with urinary tract infections (UTIs) are identified and managed correctly. Vesico-ureteric reflux occurs in 2% of children, and one in 10 of them will develop renal scarring.¹ The detection and management of UTIs in children is a small part of a GP's work, but it is an area where failure to investigate, treat, and refer appropriately can have serious consequences, especially in the first few years of life.

In 1991, the Royal College of Physicians published guidelines for the investigation and management of children with UTIs.² They emphasized the importance of making a bacterial diagnosis, instituting prompt treatment after a sample has been taken, and of checking for eradication of infection by means of a follow-up sample. They also recommended that all children should have renal tract imaging after a first episode of confirmed infection.

Management of childhood UTIs has shown considerable variation.³ In our practice we were unsure of the contamination rate of the children's urinary samples and whether they were being collected properly by the parents. To quantify these points we undertook the following survey.

Method

A telephone survey was carried out by one of the general practitioners (JG) working in a six-partner, inner-city training practice with a list size of 10 551, comprising 275 children aged under 2 years (2.6%) and 1161 children aged 2 to 11 (11%). A comprehensive list of patients aged under 12 who had presented with a urine sample over the three-month period from 1 October 1995 to 31 December 1995 was obtained for four out of the seven doctors in the practice (chosen at random) to provide manageable numbers.

The criteria decided upon for sample collection were:

- **Method of collection.** Clean-catch samples should be collected in a sterile container issued by the practice.

- **Storage.** If not delivered immediately, the sample should be stored in a refrigerator.
- **Delivery.** The urine sample should be delivered by the parents to the practice or directly to the hospital laboratory on the same day as collection.
- **Classification.**^{3,4} Positive: >10 pus cells and pure growth >10⁸/l; negative: <10 pus cells and no growth; contamination: any other result.

The parent(s) of each child being studied were telephoned by JG and asked standard questions about how the sample had been collected, stored, and delivered. If unavailable on the telephone, the parents were sent a questionnaire asking the same questions.

The urine sample results were studied in the same way for three consecutive months after the following changes were made:

- Sterile foil dishes were provided for catching urine in. These were to help in collecting urine samples of children under the age of four.
- Explanatory leaflets were designed and distributed to all parents.
- The profile of childhood UTIs was raised by discussing the issue at a practice meeting.

Results

First quarter. Fifty-one urine samples were collected. The results are shown in Table 1. The highest contamination rate occurred in the 0- to 23-month age group, with four out of the six samples (66%) being contaminated. Information on collection, storage, and delivery was obtained by telephone in 76.5% of cases (39), by letter in 7.8% of cases (4); in 15.7% of cases (8) the information was unobtainable ($n = 51$).

Of the 43 responding patients, 30.2% (13) had used a non-sterile container while 69.8% (30) had used the sterile container that had been provided. In the 0- to 23-month age group, all six samples had been collected in a non-sterile container. Of the 69.8% (30) using a sterile pot, 13.9% of responders (6) recalled touching the inside.

Storage in a refrigerator had not been necessary in 44.1% of cases (19) owing to prompt collection and delivery. When storage in a fridge had been necessary, nine had used a fridge but 15 had not. Over 42 hours delay occurred in 9.4% of samples (4).

Second quarter. Fifty-three urine samples were collected in the second quarter of the study. The contamination results for both quarters are shown in Table 1.

Table 1. Contamination of urine samples.

	First quarter	Second quarter
Positive	13.7% (7/51)	15.1% (8/53)
Negative	58.8% (30/51)	71.7% (38/53)
Contaminated	27.5% (14/51)	13.2% (7/53)

The contamination rate in the 0- to 23-month age group was 62.5% (5/8).

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Discussion

Diagnostic problems with urinary tract infections may have far-reaching consequences for children. A false-positive result may lead to unnecessary investigations and treatment; a false negative result risks renal damage. This emphasizes the need to enquire how a sample was collected.

Our pilot study shows no statistically significant results, owing to the small sample size, but the trends seen suggest that a larger sample will reach significance. Revision of the retrospective data collection method will also improve accuracy. That said, simple steps did reduce our initial contamination rate of 27.5% to 13.2%, while the rate of positive samples remained about the same. These more accurate samples allow a tighter focus on children at risk.⁴ Results for the 0- to 23-month age group at increased risk of renal scarring are unsettling. Introducing our changes seems not to have influenced the contamination rate.

Hardy showed in 1976 that suprapubic aspiration is the most accurate test in children aged under three years, followed by clean-catch urines and then bag urines.⁵ Our figures, albeit based on small numbers, show the need to review this area. Our pilot study also reveals that larger studies across several practices are needed to test our trends' significance in reducing contamination by simple measures, and also to test the optimum primary care collection method in children, especially in those under two years old.

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