

## Short reports

# Single dose trimethoprim-sulphamethoxazole treatment of symptomatic urinary infection

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**SUMMARY** Seventy-nine children with symptoms of urinary tract infections were randomly allocated to treatment with a single dose or a 7-day course of trimethoprim-sulphamethoxazole. Of the 42 patients (39 girls, 3 boys) who fulfilled the criteria for the trial, 23 were given a single-dose regimen and 19 of them a 7-day regimen. Both groups of patients had sterile urine cultures 2 days after starting treatment. Eight patients had underlying structural renal abnormalities (n=3, single-dose regimen; n=5, 7-day regimen). One patient in the single dose group had a recurrence of infection on day 7. These results show that single dose trimethoprim-sulphamethoxazole is as effective as the conventional 7-day course in children with symptomatic urinary tract infection. Further investigation of the renal tract is necessary regardless of the fact that the infection has been eradicated by single-dose treatment.

12 years (n=33 <5 years, n=46 >5 years) with symptoms of urinary tract infections were randomly allocated to a single-dose or 7-day course of TMP-SMX. Any patient with symptoms was accepted, including patients with loin pains and temperatures greater than 38°C. If microscopical examination of the urine showed pyuria or bacteruria, a second midstream specimen was obtained or (in children less than 18 months) a suprapubic aspiration was performed. Antibiotic treatment (Table 1) was then begun before the culture was available. The diagnosis of urinary tract infection was based on any growth from a suprapubic aspiration in children less than 18 months, or bacteriuria (greater than 10<sup>5</sup>/ml) on two consecutive midstream specimens in children over age 18 months.

Urine cultures were performed 2, 4, and 7 days after starting treatment. The criterion for cure was eradication of the infecting organism. Each child had an intravenous urogram, and those under age 5 years also had a micturating cystourethrogram.

## Results

Forty-two of the 79 children fulfilled all the criteria for the study, 23 of whom were randomly allocated to single-dose treatment and 19 to a 7-day course.

Thirty-seven children were excluded from the study. Of these, 27 did not meet the criteria for a diagnosis of a urinary tract infection, organisms in 3 children were resistant to TMP-SMX, one child required intravenous therapy after vomiting single dose medication, 1 child had a previously diagnosed structural abnormality, 2 children had inadequate

Table 1 Dosage schedule

Course	Age (years)	Trimethoprim (mg)	Sulphamethoxazole (mg)
Single dose	<2	80	400
	2-5	160	800
	6-12	320	1600
7-day	<2	20	100
	2-5	40	200
	6-12	80	400

In the management of urinary tract infection in children there are no clear guidelines concerning the duration of treatment. Studies on single-dose treatment in children have often excluded patients with congenital abnormalities<sup>1</sup> or clinical pyelonephritis.<sup>2</sup> Fairley *et al.*<sup>3</sup> suggested that radiological abnormalities were more likely to be present in adults who did not respond to single-dose therapy.

This study was undertaken to assess the efficiency of single dose trimethoprim-sulphamethoxazole (TMP-SMX) compared with a 7-day course in children presenting to a hospital casualty with a symptomatic infection, including clinical pyelonephritis, and who had not been investigated previously. Radiological investigations were then performed attempting to show whether underlying structural abnormalities were more likely to be present in children who did not respond to single-dose treatment.

## Patients and methods

Seventy-nine children aged between 6 months and

Table 2 Results of treatment

Treatment	Girls:boys	Cure	Relapse
Single dose (n=23)	20:3	23	1
7 day (n=19)	18:1	19	0

Table 3 Symptoms and signs

Symptoms	%
Frequency	50
Dysuria	67
Abdominal pain	57
Fever	57
Haematuria	21
Abdominal tenderness	30
Vulvovaginitis	34

follow-up, and parents of 3 children refused radiological investigations.

All 42 children in both treatment groups had sterile urine cultures 2 days after starting treatment (Table 2). One patient in the single dose group had a recurrence of infection (*Escherichia coli*) on day 7 but all other urine cultures remained sterile.

Symptoms and signs at presentation are shown in Table 3.

*E. coli* was the most common organism, being present in 21 of 23 urine specimens in the single-dose group and in 18 of 19 specimens of children in the 7-day course. *Proteus mirabilis* was cultured in the remaining 2 children in the single-dose group and *Klebsiella pneumoniae* in the other child who received a 7-day course.

Radiology showed renal scarring in 3 children (vesicoureteric reflux in 1) who received single-dose treatment. In the 7-day course, renal scarring was present in 5 children (vesicoureteric reflux in 3) and was bilateral in 2 children. Only one patient in the 7-day group had vesicoureteric reflux without scarring. The child who had reinfection on day 7 had a normal pyelogram and cystogram.

## Discussion

The results of this trial show that single-dose TMP-SMX is as effective as a 7-day course in children with symptomatic urinary tract infections. In the study performed by Källenius and Winberg<sup>1</sup> 27 of 29 girls were cured by single-dose sulphafurazole but the children had been previously investigated and none of them had clinical pyelonephritis or renal scarring. The recurrence rate of infection was 52% within 2 months and 72% within a year and was no different from that of a 10-day course. Bailey and Abbott<sup>4</sup> compared single-dose amoxicillin with a 7-day course in 26 children with

symptomatic and asymptomatic infection, and 75% of them were cured by the single dose including 2 of 4 children with radiological abnormalities. In another study Bailey and Abbott<sup>2</sup> showed that single dose TMP-SMX was as effective as a 7-day course in 20 children with asymptomatic and symptomatic infection but that study did not include any patient with clinical pyelonephritis. Seven of 10 children were cured by single-dose TMP-SMX and 8 of 10 children with a 7-day course. One child with a structural abnormality did not respond to single-dose treatment.

This appears to be the first report of single-dose treatment for urinary tract infection in children with symptomatic infections, including clinical pyelonephritis, who had not been previously investigated. The higher dose of TMP-SMX in this study is perhaps the reason for the success rate being better than that of Bailey and Abbott.<sup>2</sup> In particular this study shows that response to single-dose treatment does not identify children who are likely to have an underlying structural abnormality as all 3 children with renal scarring were cured by single-dose treatment. Fairley *et al.*,<sup>3</sup> using a single dose of kanamycin, reported an 83% cure rate in adults with a normal intravenous pyelogram but only a 37% rate in those with structural abnormalities. Russ *et al.*<sup>5</sup> reported that 82% of adults were cured by a single dose of TMP-SMX while 2 of 5 patients who failed to respond to single dose TMP-SMX had structural abnormalities; however radiology was performed in only 14 of 48 patients. On the basis of our findings we recommend that single-dose TMP-SMX be used for the initial management of urinary tract infection and that radiological investigations be performed in every child regardless of his response. Further studies however are required to show if the recurrence rate is higher after single-dose treatment.

None of the children reported serious side effects. Vomiting necessitated treatment intravenously in one child who received a single-dose. This was probably related to TMP-SMX, as mild gastrointestinal symptoms have been noted in 3-4% of patients.<sup>6</sup> Haematological side effects—such as thrombocytopenia, leucopenia, and marrow aplasia—are idiosyncratic and rare. The recommended daily dose of TMP-SMX for the treatment of *Pneumocystis carinii* is considerably greater than the single dose given in this trial.<sup>6,7</sup>

Patient non-compliance is always a problem in children. There are various reasons for this, but one is the decreasing parental enthusiasm once symptoms abate. Single dose TMP-SMX provides a safe, effective, economical dosage regimen, better tolerated by child and parent alike, that has particular application in outpatient management.

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#### References

- <sup>1</sup> Källénus G, Winberg J. Urinary tract infections treated with single dose of short-acting sulphonamide. *Br Med J* 1979; **i**: 1175-6.
- <sup>2</sup> Bailey R R, Abbott G D. Treatment of urinary tract infection with a single dose of trimethoprim-sulfamethoxazole. *Can Med Assoc J* 1978; **118**: 551-2.
- <sup>3</sup> Fairley K F, Whitworth J A, Kincaid-Smith P, Durman O. Single dose therapy in management of urinary tract infection. *Med J Aust* 1978; **ii**: 75-6.

- <sup>4</sup> Bailey R R, Abbott G D. Treatment of urinary-tract infection with a single dose of amoxycillin. *Nephron* 1977; **18**: 316-20.
- <sup>5</sup> Russ G R, Mathew T H, Caon A. Single day or single dose treatment of urinary tract infection with cotrimoxazole. *Aust NZ J Med* 1980; **10**: 604-7.
- <sup>6</sup> Rubin R H, Swartz M N. Trimethoprim-sulfamethoxazole. *N Engl J Med* 1980; **303**: 426-32.
- <sup>7</sup> Lipson A, Marshall W C, Hayward A R. Treatment of *Pneumocystis carinii* pneumonia in children. *Arch Dis Child* 1977; **52**: 314-9.

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## Timing of neonatal cerebroventricular haemorrhage with ultrasound

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**SUMMARY** Sequential real-time ultrasound examinations were performed in 174 neonates to determine the time of occurrence of cerebroventricular haemorrhage (CVH). Of the 47 infants in whom CVH was detected, in 36 (77%) CVH was present at the first examination. Of the 34 infants with CVH who were examined first within 6 hours of birth, 24 (71%) already had haemorrhage demonstrable at the initial scan. Extension of a CVH after its initial detection occurred in only 3 infants. Of 124 consecutive infants of birthweights less than 1500 g, 38 (31%) developed CVH, 56% of the outborn and 27% of the inborn babies. Our results indicate that most infants who develop CVH have done so within 6 hours of birth.

Real-time ultrasound equipment has assumed an important role in the detection of intraventricular haemorrhage in preterm infants. Since there is no known risk of the procedure and minimal disturbance to the neonate during its use, we considered it could be employed serially to time the occurrence of cerebroventricular haemorrhages (CVH) (that is germinal layer or intraventricular haemorrhage).

#### Subjects and methods

During a 12-month period all infants weighing less than 1500 g at birth, together with those exceeding this weight who had other risk factors—such as severe hyaline membrane disease requiring assisted

ventilation—were examined using an ADR real-time ultrasound scanner with a 7 MHz linear array transducer. Examinations were performed as soon as possible after birth, repeated daily for 3 days, and then again at one week. The brain was examined using a series of oblique coronal sections through the anterior fontanelle by angling the transducer forwards then slowly rotating it backwards with the anterior fontanelle as the fulcrum. CVH was diagnosed when the appearance of echogenic blood clot was visible in, or immediately inferolateral to, the lateral ventricle. The extent of the haemorrhage in the anteroposterior direction was assessed by an oblique parasagittal scan. We had confirmed the accuracy of our technique previously by comparison with computerised tomography (CT) scans and necropsy results.<sup>1</sup>

#### Results

A total of 174 infants was studied. In 47 CVH was detected. Of the 124 infants of birthweight less than 1500 g, 38 (31%) developed CVH. Of the 16 infants of birthweight less than 1500 g who were outborn, 9 (56%) developed CVH (all these being present at the time of admission to our hospital), while haemorrhage occurred in 29 (27%) of the 108 very low birthweight infants born within the hospital. This difference was statistically significant ( $P = 0.04$ , Fisher's exact test).

Haemorrhages in infants of birthweight less than 1500 g were classified as follows: 13 haemorrhages