



Fig 1—Agreement between individual observers and the consensus response from the reference centre (some κ values are missing because they could not be calculated when the number of “yes” or “no” responses = 0)

observers achieved a $\kappa \geq 0.6$ compared with 19/23 for indrawing ($P < 0.001$) and 20/24 for nasal flaring ($P < 0.001$). The differences remained significant ($P < 0.005$) when only data from the 18 research clinicians were compared with the reference centre.

Comment

The video recordings allowed us to assess interobserver variability among 30 clinicians from at least five countries exposed to exactly the same clinical information. Good general agreement between

observers and a derived consensus response was found for nasal flaring and indrawing, although, as reported previously,⁴ this masks sometimes major differences between individuals. Given their use as indicators of disease severity,^{1,2} this is reassuring. However, the poorer agreement for deep breathing is of concern. Differences in interpretation of this sign—which should identify children with metabolic acidosis, a life threatening complication of severe malaria^{1,5} could reduce the effectiveness of a management algorithm for this disease.

Improving interobserver agreement may improve the power of clinical studies, make studies more comparable, and make their results more generalisable. Video recordings may be useful in standardising definitions of simple respiratory signs and could be used to train health workers using algorithms, increasing their effectiveness.

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An endoluminal brush to detect the infected central venous catheter in situ: a pilot study

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Catheter related sepsis is a potentially life threatening infection caused by an indwelling intravenous catheter, with the same organism cultured from peripheral blood and from the removed catheter. If such sepsis is suspected the catheter is usually removed, although subsequent bacterial culture shows most catheters to be sterile.^{1,2} We evaluated a new brush (Endoluminal, FAS Medical, London) for detecting infection in the lumen of a central venous catheter. The brush has nylon bristles wound tightly around the distal end of a stainless steel wire and slides along the lumen of the catheter to its distal (inner) end. It is then removed for culture. The

technique is based on the principle that bacteria collect on the fibrin sleeve on the catheter's inner surface; fibrin thus becomes enmeshed in the brush's bristles.

Methods and results

We studied 115 catheters from 112 ward based surgical patients (16-91 (median 65) years) receiving intravenous nutrition whose central venous catheters (diameter 14-18 mm) were going to be removed either on termination of treatment (n=44) or if the catheter was thought to be the source of infection, causing either sepsis or unexplained fever (n=71). We obtained informed consent from each patient, and the study was approved by our local ethics committee.

The brush was passed along then withdrawn from the catheter with the catheter in situ. The catheter was then removed and the tip sent for culture. Blood was aspirated from a peripheral vein (a) before brushing to determine if catheter related sepsis was present and (b) one minute after brushing to determine if a bacteraemia had been induced by brushing a colonised catheter (growth of ≥ 100 colony-forming units externally³ or

Table 1—Performance of brush roll cultures compared with external (Maki roll) and internal (sonication) tip cultures. Values are numbers of catheters

Catheter	Total No	Maki roll (colony forming units)		Sonication (colony forming units)		Brush roll	
		≥100	<100	≥100	<100	Positive	Negative
Sterile	66	0	66	0	66	0	66
Contaminated	10	0	10	0	10	0	10
Colonised	24	19	5	18	6	16	8
Catheter related sepsis	15	10	5	10	5	14	1

internally⁴). We assessed patients immediately after and one hour after removal of the brush, for evidence of systemic upset.

The external surface of the catheter was cultured by using the Maki roll technique³ and the internal surface by a modified vortex and sonication technique.⁴ The number of colony forming units at 24 hours were counted and recorded. The brush was rolled back and forth across a 5% horse blood agar plate at least four times.

Results

The organism responsible for most of the colonised catheters was the coagulase negative staphylococcus (18 catheters). Other organisms were *Escherichia coli* (4), *Staphylococcus aureus* (3), *Streptococcus faecalis* (2), *Candida albicans* (3), and a mixed growth (9). Brush and tip organisms were phenotypically similar in all positive cases.

The brush was positive in 14/15 (93%) (table 1) cases of catheter related sepsis. In colonised catheters, including catheter related sepsis, the sensitivity of the brush was 0.77 when compared with the Maki roll and sonication. When a negative brush culture was compared with sterile (no intraluminal or extraluminal growth) or contaminated (growth of <100 colony-forming units³) catheters, the specificity was 1.00. The brush therefore delivered a positive predictive value of 1.0 when compared with colonisation of the catheter tip, and a negative predictive value of 0.89.

Altogether, 36/71 (51%) catheters were found to be sterile in the group of patients thought to have infection caused by the catheter.

No patient recorded symptoms or signs of systemic upset during or after the procedure. A bacteraemia was induced in 3/50 (6%) patients after brushing, although repeat cultures at 24 hours were negative in all cases (and no antibiotics were used).

Comment

A reliable test not requiring removal of the catheter is needed to identify catheter related sepsis. In our study, the brush detected organisms in 77% of colonised catheters and 93% of cases of sepsis. It also detected organisms in 11.4% of patients in whom infection was not suspected. Although the brush missed 11% of colonised catheters, this compared favourably with the Maki roll (12%) and sonication (13%).

The brush may have the potential to reduce the removal of sterile catheters wrongly suspected of harbouring infection.

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Conflict of interest: None.

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Prevalence of psychiatric disorders in young people in the care system

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See editorial
by Chiswick
and pp 1521, 1524

Recently, professional and political concern has grown about the severity and types of problems experienced by young people in the care system, this group being one of the most vulnerable in terms of psychological disturbance. Their risk of psychiatric ill health is higher than that of any other easily identified group in our society,¹ and studies have consistently identified a high incidence of behavioural problems.² No study has systematically examined the psychiatric disorders of adolescents being looked after by local authorities, so we aimed to assess the prevalence and types of psychiatric disorder among adolescents in the care system and compare them with those of a comparison group of adolescents.

Subjects, methods, and results

All adolescents aged 13 to 17 years looked after by the Oxfordshire local authority—that is, living in residential units and foster care—were included in this study. The comparison group consisted of adolescents with no previous or current contact with any local authority, matched for age and sex, and randomly selected from the same school or, when the adolescent was not attending school, from the same general practice. The study used a two phase, multimethod design. The first phase involved screening the adolescents using the Achenbach child behavioural checklist and the youth self report questionnaires.³ Adolescents who were identified as high scorers as defined by Achenbach were approached to enter the second phase of the study, when they were interviewed using the Kiddie schedule for affective disorders and schizophrenia.⁴ The main statistical analyses were carried out using SUDAAN version 6.34, using weighting methods for two phase sampling designs and allowing for non-responders as described by Pickles *et al.*⁵

Altogether 134 adolescents (69 boys and 65 girls) were being looked after by Oxfordshire local authority on a given date, 38 in residential units and 96 living with

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