Referral to a regional centre improves outcome in extremely low birthweight infants

R W I COOKE

Department of Child Health, University of Liverpool, Regional Neonatal Intensive Care Unit, Liverpool Maternity Hospital, Liverpool

SUMMARY Referral of extremely low birthweight infants (<1001 g) from district hospitals in a geographically defined area to a specialist regional centre significantly improved their chances of survival.

Referral of preterm infants or of their mothers antenatally to a regional unit has been widely accepted as improving outcome, though there is little evidence to support this belief. Reports of improved survival either compare results before and after the introduction of a transfer programme, with the problem of historical controls, or contrast the outcome of infants transferred to a regional unit with that of those left behind, though such groups are not comparable. This study compares the 28 day mortality of extremely low birthweight infants in eight geographically defined areas with the rate of referral from their district hospitals to a regional perinatal centre.

Age distribution of anginose mononucleosis

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Methods

Mersey regional neonatal intensive care unit is in Liverpool Maternity Hospital and with the obstetric units provides a regional perinatal referral service for Mersey region and north Wales. For the purpose of this study I divided the region into eight areas corresponding to district or area health authorities. These areas were Clwyd, Gwynedd, West Cheshire, Chester, Warrington, Halton), East Cheshire (Crewe and Macclesfield), St Helens, Liverpool, Sefton (North and South), and Wirral.

The data for the study were obtained from forms LHS 27/1 for each district for the years 1980–3 inclusive and the admissions records of the regional neonatal intensive care unit. Form LHS 27/1 is completed by each district health authority yearly and returned to the regional health authority and to the statistics department of the Department of Health and Social Security in Blackpool or, in the case of Wales, the Welsh Office in Cardiff. Information reported on the form includes the number of
The rate of extremely low birthweight infants was compared with the corrected rate of low birthweight infants for each area: there was a strong correlation between the two (r=0.96, p<0.01).

There was no significant correlation between the rate of low birthweight infants and mortality of these infants or between the rate of extremely low birthweight infants and mortality in the eight areas. The distance in miles of the main hospital in each area from Liverpool did not correlate with referral rate.

Discussion

Advances in neonatal intensive care have undoubtedly contributed to improvements in the survival of extremely low birthweight infants. Crude comparisons between the populations treated in referral centres and district hospitals have, however, suggested that such gains are minimal and that little benefit exists in referring very tiny infants. In this study I looked at the effect of transfer on the smallest infants, among whom any effect would be most obvious. Each area had the same opportunity to refer infants, and during the time of the study the referral rate of extremely low birthweight infants was compared with the corrected rate of low birthweight infants for each area: there was a strong correlation between the two (r=0.96, p<0.01).

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babies did not correlate significantly with their respective rates of occurrence, suggesting that even in areas of socioeconomic deprivation with high rates of low birthweight babies outcome may be independent of this. Extremely low birthweight infants form a high risk population but represent only about 4:1000 of all infants born. Though this study shows that such tiny infants do best when referred to a regional centre, the effect of referral may not be as pronounced in larger infants, and further studies are necessary to clarify the issue.

References

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Blood cultures in neonates with percutaneous central venous catheters

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SUMMARY We compared the results of 74 pairs of blood cultures obtained simultaneously every two weeks from a peripheral vein and a percutaneously inserted central venous catheter in 38 newborns. Three babies (7-9%) had bacteraemia. In two of these the central catheter was colonised 48 hours beforehand.

In most of the reported cases of sepsis related to the use of central venous catheters the diagnosis was based on the natural history or on a positive result of a blood culture obtained either from a peripheral vein or through the catheter. We considered that by obtaining simultaneous blood cultures from a peripheral vein and the catheter, it might be possible to identify catheter colonisation before peripherally drawn blood samples yielded a positive culture.

Patients and methods

Thirty eight neonates, including 27 who weighed less than 1.25 kg, with percutaneously inserted silastic central venous catheters were studied. Clinical data are summarised in Table 1. Catheters were inserted using the peripheral veins of the extremities and scalp exclusively.¹ The infusion included FreAmine III (American McGaw, American Hospital Supply Corporation) and 10% Intralipid (Cutter Laboratories). All infusions and administration sets were changed daily by the nurses under sterile conditions.

The 1 ml blood samples were drawn simultaneously, one from a peripheral vein and the other through the central catheter, at two weekly intervals for as long as the catheters were in place. Each blood specimen was cultured on aerobic and anaerobic culture media. Aerobic culture medium consisted of 10 ml tryptic soy agar broth and the anaerobic culture medium of 10 ml brain heart infusion broth. Blood cultures were inspected daily for seven days.

Results

The mean (SD) duration that catheters were in place was 34.5 (20.6) days, with a range of 14–95 days. Seventy four sets of blood cultures were obtained routinely. In addition, eight sets of blood cultures were drawn because of clinical suspicion of infection, but all yielded negative results. Results of the routine cultures are shown in Table 2. Three of the 38 patients had positive blood cultures, an incidence of bacteraemia of 7.9%. These three cases are described in more detail below. In the first two patients the catheter was colonised before a positive culture was obtained from peripheral blood.

Case 1. A patient with a birth weight of 2880 g was receiving assisted ventilation for the management of

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Clinical characteristics of the 38 infants studied. Values are mean (SD) [range]</th>
</tr>
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<tbody>
<tr>
<td>Birth weight (g)</td>
<td>1228 (705) [620–2930]</td>
</tr>
<tr>
<td>Gestational age (weeks)</td>
<td>29.2 (4.4) [25–42]</td>
</tr>
<tr>
<td>Postnatal age (days)</td>
<td>19.6 (15.7) [1–81]</td>
</tr>
<tr>
<td>Weight when catheter put in place (g)</td>
<td>1515 (790) [650–3320]</td>
</tr>
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</table>