matory. There seem to be no reports of it occurring in juvenile rheumatoid arthritis, though it may complicate the adult form (Bywaters, 1957). The unusual childhood symptoms of intermittent claudication in this child might have acted as a warning of the lower limb arterial disease before the onset of gangrene.

The presence of raised serum IgG and circulating immune complexes in association led to a search for the nature of the antigenic stimulus. The nature of the strange cerebral episode with CSF neutrophilia and glucose of 50 mg/100 ml (2.78 mmol/l) remains uncertain, though a viral or bacterial infection is possible, as well as a primary vasculitis. Knowledge of the precise antigen assumes greater therapeutic importance if, as possibly occurred in this child, the process remains active despite prolonged attempts at immune suppression. Apart from the use of plasmapheresis to remove circulating immune complexes (Jones et al., 1976), it is hoped that methods will shortly become available to identify the antigenic stimulus and to remove it. In rabbits there is evidence that vasculitis is more likely to be caused by a single large dose of antigen than by repeated daily doses (Dixon et al., 1958, 1961), which suggests that this child's illness might be due to a single past infection.

In the usual absence of positive rheumatoid serology in juvenile rheumatoid arthritis, this boy was confidently given this diagnosis until arterial histology was provided in such a tragic manner. A clue might have been provided earlier by the preceding pyogenic infection, absence of rashes, diminished peripheral pulses, and intermittent claudication. A plea is made for a greater awareness of these unusual reactions, so that the pathogenesis may be studied, rather than burying them under the blanket diagnosis of Still's disease.

Summary

After an episode of abacterial meningitis in a 5-year-old boy there developed splenomegaly, uveitis, and a granulomatous arteritis of the lower limbs requiring amputation of one leg. Immune complexes persist in the blood, but the precise antigenic stimulus remains conjectural.

Thanks are due to Dr. Barbara M. Ansell for clinical guidance.

References


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Assessment of gestational age in twins

The ability to assess the gestational age of an infant at birth with accuracy has greatly facilitated the identification and management of the high risk neonate. Dubowitz et al. (1970) used a scoring system which combined neurological and external criteria and showed that gestational age could be accurately estimated in singletons at birth. Other authors have since confirmed the accuracy of this method in various population groups, but its reliability in multiple pregnancies and growth retarded babies has not been fully investigated. Dubowitz et al. (1970) found that small-for-dates babies scored appropriately, while Keet et al. (1974) found no significant difference in the assessed gestational age within sets of twins. The numbers in both papers were too small, however, to draw definite conclusions.

The aim of the present study was to test the reliability of the Dubowitz scoring system in twins, with particular emphasis on the relatively growth-retarded twin.

Patients and methods

Sixty-six consecutive sets of twins born in the Peninsula Maternity Services were studied and their gestational ages assessed (by D.L.W.) using the method described by Dubowitz et al. (1970). In most cases the date of the mother's last menstrual period
was not known. On completion of the study the sets of twins were divided into two groups depending on their birthweight differences. The weight of the lighter twin of each pair was expressed as a percentage of the weight of the heavier one, and 85% was arbitrarily chosen as the cut-off point.

If the lighter twin weighed less than 85% of its heavier fellow, the pair was classified as discordant. If the weight difference was less than 15%, they were classified as concordant. The assessed scores and gestational ages within sets of twins were compared, using the paired t test.

Results

There were 37 concordant and 29 discordant sets of twins; each set having a heavier and lighter baby as shown in the Table. The discordant twins provided the heaviest and the lightest group, the latter being relatively growth retarded, while the intrauterine growth in concordant pairs was very similar.

Gestational age, assessed from the total score, showed no significant difference within pairs of concordant twins, who scored equally when either neurological or external criteria were considered. The assessed gestational age in discordant twins showed a significant difference within pairs (P<0.001). Separate scores for neurological and external features made it clear that this finding was almost entirely due to a difference in the external features score. A detailed comparison of the score attained for each external feature showed that the lighter twin scored lower on skin opacity, breast nodule size, ear form, and external genitalia, while scoring higher in skin texture.

The highest total score was seen in the heavier discordant twins, the group with the best intrauterine growth. Comparing groups, the mean external score was noted to decrease as the mean birthweight dropped, a trend not seen in the mean neurological score.

Discussion

Twins with similar birthweights score equally when assessed by the Dubowitz scoring method, while twins born discordant for weight score equally on neurological criteria only; the external features score and total score of the lighter of discordant twins are significantly reduced, giving an assessed gestational age below that of the better grown twin. The heavier twin has an intrauterine growth rate nearer to that of a singleton, upon whose features the Dubowitz scoring system has been devised. The assessed gestational age of the heavier twin might therefore be expected to be more accurate than that of the lighter twin. The latter has less mature external genitalia and prominent vessels visible over the abdominal wall; both features related to wasting of subcutaneous tissue. Less mature ear form and a delayed nipple nodule development may also be features related to retarded intrauterine growth.

The small-for-dates singleton with features of intrauterine growth retardation would be expected to share the external characteristics of the lighter twin, and may therefore also be expected to underscore when external features are assessed. It is suggested that if external characteristics are used in estimating the gestational age of growth-retarded infants, the results should be interpreted with caution.

Summary

Pairs of twins born concordant for weight score equally on both neurological and external criteria. The assessed gestational age of discordant twins is significantly different; while scoring equally on neurological criteria, the lighter twin scores less on external criteria. It is suggested that this pattern of underscoring may also be present in growth retarded singletons. If external criteria are used in estimating the gestational age of growth retarded infants, the results should be interpreted with caution.

Table  Details of 66 sets of twins

<table>
<thead>
<tr>
<th>No. of pairs</th>
<th>Concordant</th>
<th>Lighter</th>
<th>Discordant</th>
<th>Lighter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Heavier</td>
<td></td>
<td>Heavier</td>
<td></td>
</tr>
<tr>
<td>Mean birthweight (g)</td>
<td>2329</td>
<td>2205</td>
<td>2695</td>
<td>2040</td>
</tr>
<tr>
<td>Range</td>
<td>(1150–3750)</td>
<td>(1100–3700)</td>
<td>(1150–3570)</td>
<td>(960–2900)</td>
</tr>
<tr>
<td>Mean gestational age* (w)</td>
<td>37.0</td>
<td>36.9</td>
<td>37.6</td>
<td>36.9</td>
</tr>
<tr>
<td>Range</td>
<td>(32.3–40.2)</td>
<td>(32.3–41.5)</td>
<td>(33–41.3)</td>
<td>(22–41.2)</td>
</tr>
<tr>
<td>Mean total score</td>
<td>47.0</td>
<td>46.7</td>
<td>49.2</td>
<td>46.6</td>
</tr>
<tr>
<td>Mean neurological score</td>
<td>24.3</td>
<td>24.4</td>
<td>25.0</td>
<td>24.5</td>
</tr>
<tr>
<td>Mean external score</td>
<td>22.7</td>
<td>22.3</td>
<td>24.2</td>
<td>22.1</td>
</tr>
</tbody>
</table>

*Gestational age assessed.
†P<0.001.
A cot for metabolic studies

Complete collection of urine from infants is difficult. Adhesive urine bags often become detached and may cause severe excoriation of the skin after a short period. Mothers want to handle their babies during the collection and will not accept the older restraining devices such as chairs and hammocks. We have constructed a cot for timed collections of urine and metabolic balance studies which is based on the model used in the Philadelphia Children's Hospital (Winter et al., 1967) but has been modified to allow the mother to handle her baby.

The principle is similar to that of the cages used in animal metabolic experiments (Hepner et al., 1960). Urine is separated from stool by a nylon mesh and is collected in a stainless steel pan with sloping sides. The upper part is made of perspex and is 90 cm long, 52 cm wide, and 56 cm high. The baby lies on a nylon mesh hammock (20 threads to the inch) which is supported by two perspex rods (Fig.). Urine flows on to the sloping pan of the lower trolley which is made of stainless steel and perspex. The slopes of the pan are 14° on the long sides and 9° on the short sides. Plastic tubing at the base of the pan allows the urine to drain into a collection bottle kept in a bucket of ice. The bottle can be removed through a door, fitted with a lock, in the side of the trolley. The entire upper cot can be lifted off the trolley for cleaning.

All inside surfaces are smooth and the corners are rounded to allow optimal drainage of urine, which may be emitted in all directions. Lubrication with silicone oil reduces droplet formation on the stainless steel pan. The top of the cot is open and strengthened by perspex rods from which toys are suspended. One side of the cot can be lowered completely so that the baby can be fed and nursed by his mother. When the infant passes a stool the nylon mesh is changed and the baby cleaned. He lies naked and it may be necessary to use an overhead servo-controlled heater to keep him warm.

When 300 to 1000 ml water were poured gently over the nylon mesh, 85-90% was recovered. The proportion recovered is smaller for volumes less than 300 ml and increases with the total volume. The deficit is due to evaporative losses, surface wetting of the nylon, and droplet formation on the stainless steel pan. Droplet formation could be reduced if the surface of the pan had steeper slopes.

Despite its advantages and convenience the metabolic cot does have some limitations. The mesh does not retain a fluid stool, so that uncontaminated urine cannot be collected from infants with diarrhoea. The cot can only safely accommodate infants who cannot walk on the hammock. This has rarely been a restriction because most of the children needing this type of investigation are under the age of one year or have developmental retardation. We have used this cot for over a year and have collected urine

References


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Fig. Cot used for metabolic balance studies and urine collection, but which allows normal feeding, nursing, and handling.
Assessment of gestational age in twins.

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