rate in terms of the amount of sweat produced and the virtual absence of failures.

On the first day of life the average level of sweat sodium was decidedly higher than on the second and subsequent days, with an appreciable number of day 1 results exceeding the level of 70 mEq/l., generally accepted as the upper limit of normal. In one case the level was as high as 138 mEq/l. All 5 out of the 6 cases with high values on day 1, and which were available for retesting later, then gave normal levels well below 70 mEq/l. (Fig. 1).

We conclude that a high sweat sodium (>70 mEq/l.) on day 1 is not necessarily indicative of CF, but from day 2 onwards it is much more likely to be so.

Although the method is obviously not practicable as a routine screening procedure for CF, there are two circumstances when it is indicated. (1) Intestinal obstruction due to suspected meconium ileus, since if that diagnosis is confirmed by finding an abnormal sweat sodium level, conservative treatment with enemas may be appropriate; and (2) a previous sib has suffered from CF, with the 25% risk for subsequent offspring.

Summary

Sweat sodium was measured in 65 infants aged between 2 hours and 2 months; in many cases potassium and chloride were also measured. Localized sweating was induced by injecting intradermally 0.25 mg bethanechol. On day 1 an appreciable number of normal infants had a sweat sodium >70 mEq/l., but from day 2 onwards such a high level is unlikely to be found in the absence of cystic fibrosis.

Gestational age assessment in Nigerian newborn infants

An objective assessment of maturity is often the only way to judge the gestational age of newborn infants in paediatric practice in Zaria, a city situated in the savannah belt of West Africa. Few mothers know the date of their last menstrual period. This, and the lower average birthweight of their children compared to European newborns, leads to confusion in the distinction between short gestation and small-for-dates infants. The average weight at birth of 1400 babies born in Zaria between October 1971 and April 1972 was 2988 g.

The most readily applicable postnatal criteria in use are neurological (Amiel-Tison, 1968) and physical external characteristics (Farr et al., 1966b). The accuracy of prediction is increased by using combinations of these parameters (Farr, Kerridge, and Mitchell, 1966a; Dubowitz, Dubowitz, and Goldberg, 1970). We were interested to see if the observations made on American and European infants could be directly applied to the African.

Methods

We have based this study on the system proposed by Dubowitz et al. (1970). All healthy live babies born in March and April 1972 were examined by one of us (M.J.B.) within 24 hours of delivery. 640 women delivered before 50 were found who satisfied the

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<th>Table: Correlation coefficients for individual criteria</th>
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<td>Criterion</td>
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<td>Square window</td>
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<tr>
<td>Ankle dorsiflexion</td>
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<tr>
<td>Arm recoil</td>
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<td>Leg recoil</td>
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<td>Popliteal angle</td>
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<td>Nipple formation</td>
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<td>Ear form</td>
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<td>Ear firmness</td>
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<td>Genitalia</td>
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</table>

Overall correlation coefficient 0.7416.

P 0.1 correlation coefficient 0.3541.

References


requirements stated below. 25 were Yoruba, 4 Hausa, and the remainder of other tribal groups. Their periods of gestation varied from 31 to 42 weeks.

The characteristics noted are listed in the Table. If the score differed on the two sides of the body, the mean was taken. No attempt was made to reassess the infants, since in the obstetric unit concerned, most were discharged within 12 hours.

The date of the mother’s last menstrual period was not known at the time of examination. If subsequently the date which she gave corresponded with that given at the antenatal booking clinic, and if her periods were regular, the date was accepted.

The total scores obtained, and those for the individual criteria were analysed by regression analysis on ICL 1901 computer (Table).

Results

The relation between total score ($x$), and gestational age ($y$) is shown in the Fig. The regression formula was $y = 26.975 + 0.2260x$, and the correlation coefficient $(r) = 0.7416$. The 95% confidence limits were 3·13 weeks at a mean score of 52·96. Estimating the gestational age from the score using Dubowitz’s regression equation gives a mean difference in age from the mothers’ dates of 0·414 weeks (SD 1·343). This is not significantly different from zero.

The correlation coefficients for the individual criteria varied widely (Table). Those not significant at the 1% level were excluded in an attempt to simplify the assessment and increase its accuracy. The resulting correlation coefficient obtained was 0·7706, and the regression formula $y = 28.72 + 0.2571x$. The 95% confidence limits were 2·44 weeks at a mean score of 39·78.

Discussion

This study shows that the neurological and external criteria described above may be directly applied to Nigerian newborns. Dubowitz’s regression formula is valid for these babies, and does not differ significantly from the one which we obtained. The study confirms that a combination of these parameters greatly increases the accuracy of prediction. It is, however, subject to the errors of all assessments which are compared with a post-menstrual age based on the first day of the last menstrual period. The variation in time between ovulation, the onset of menstruation, and the day of conception means that the minimum error is ±2 to 3 weeks (Casaer and Akiyama, 1970).

We were surprised to find that the skin colour and opacity were useful criteria in African babies. The infants were, however, examined within a few hours of delivery when they were still pink.

Fig.—Distribution of gestational age against total score. D is regression line obtained by Dubowitz et al. (1970), Z is regression line obtained in Zaria.

Lanugo was best observed by holding the child in ventral suspension at eye level.

Our findings do not suggest that Nigerian children are born at a more advanced stage of development, as has been stated for Ugandan children (Geber and Dean, 1957).

The small effect of observer error was commented on by Dubowitz. It is interesting to note that in a preliminary study in which all three of us examined a combined total of 50 infants, the overall correlation coefficient was 0·56 (P 0·01 was 0·3721). Thus, while clearly an important consideration, it does not invalidate the accuracy of observation.

Rather than proliferate regression formulae, we would suggest direct application of Dubowitz’s work, and point out its value in the assessment of the maturity of African newborns.

Summary

The application of European criteria for gestational assessment to Nigerian newborns has been investigated. The accuracy of prediction is not significantly different.

We thank Professor J. Moore of the Department of Obstetrics for her co-operation, and Dr. D. Baxter and Miss H. Pope for their help in processing the results.

References


Absence of IgA and growth hormone deficiency associated with short arm deletion of chromosome 18

We report a boy with short stature, minor somatic anomalies, slight mental retardation, deficiency of immunoglobulin IgA, and deficient growth hormone (GH) secretion. He has only 45 chromosomes, with a translocation involving the pairs 13 and 18, resulting in a short arm deletion of chromosome 18, as demonstrated by a modified Giemsa staining technique (Sumner, Evans, and Buckland, 1971).

**Case report**

The boy, now 12 years old, was born to a 39-year-old mother and 43-year-old father. Both parents and the 14-year-old brother are healthy and of average height. No other cases of growth failure are known in the family. The baby was delivered in brow presentation, after a long second stage of labour of 55 minutes. Respiration was rapid during the first week, but there was no other evidence for brain lesion.

The boy walked at 1·6 years, spoke a few words at 2·4 years and sentences at 6 years. He began school in a special class for slow learners at 7 years, because his level of development was estimated to be 1 year behind average. 3 years later he was transferred to a normal class. His height velocity has been subnormal from birth, and from the second year onwards his height has been from 4·0 to 4·8 SD below the mean for age. His bone age has lagged from 1·0 to 1·5 years behind his chronological age.

The boy (Fig. 1) has ptosis of left upper lid and convergent squint of the left eye with amblyopia. The auricles are large and protruding. The neck is short with slight pterygia and with left-sided torticollis. The shoulders and the thoracic cage are broad and 'Turner-like', with widely spaced nipples. The extremities are normal, as is the penis; the testes are of normal size, 4·5 ml at 12·4 years. The dermatoglyphs of the palms are normal. No signs of puberty have appeared as yet. He has enjoyed good health without any increased susceptibility to infections.

**Cytogenetic studies.** Peripheral blood lymphocyte cultures and karyotype analysis of the patient and his parents have been described (Leisti, 1971). Both parents had normal karyotype. The patient had only 45 chromosomes; one chromosome was missing from pair 13 and another from pair 18, while an additional chromosome was present in group C. Detailed analysis of the banding patterns of 15 cells showed that the long arm of this additional chromosome had a band pattern typical of the long arm of chromosome 13, and that the short arm had a pattern typical of the long arm of chromosome 18. Characteristically, the very proximal paracentric region of the long arm (Fig. 2) constantly had a distinct band typical of chromosome 13, suggesting that the long arm of chromosome 13 had remained intact in the process of translocation and that most or all of the short arm of chromosome 18 had been lost.

**Immunological studies.** Methods used in the immunological studies have been described earlier (Savilahii, 1972). The absence of serum IgA was verified on several occasions (below 0·06 mg/100 ml). Serum IgM and IgG concentrations were normal. The other members of the family had normal serum immunoglobulin levels. Jejunal and rectal biopsies showed no IgA-containing cells in the mucous membranes, whereas an excess of cells containing IgM was present. IgA was absent from the saliva and jejunal...
Gestational age assessment in Nigerian newborn infants.

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