constricted and the breathing becomes more shallow it is reasonable to suspect that the child may have ingested something containing a narcotic. The distressed parents may say that the child has not had any drugs, but many cough mixtures and medicines prescribed for diarrhoea contain narcotics or their derivatives, and bottles of these may lie around forgotten in the house.

Before naloxone became available both the current narcotic antagonists, i.e. nalorphine and levallorphan had some agonist activity of their own, and could themselves produce respiratory depression in the absence of a narcotic (Blumberg and Dayton, 1972), thus worsening the respiratory depression caused by nonopiate drugs such as barbiturates. Naloxone has virtually no agonist activity and therefore is without this disadvantage. It can be given as a diagnostic test and will not produce more depression in non-narcotic overdoses (Evans *et al.*, 1973) or if given in excess (Rumack and Temple, 1974). Therefore if a child presents with unexplained respiratory depression and with constricted pupils, part of the management is to ensure the airway and support respiration if necessary and then to give a diagnostic dose of naloxone 0·01 mg/kg IV.

Case 2 illustrates several further points. The duration of action of naloxone is short while that of many of the narcotics including diphenoxylate is long, and therefore repeated doses of naloxone will usually be needed. The clinical response to IV naloxone is dramatic and immediate. It is important to anticipate the sudden return to full consciousness and to protect intravenous infusions and endotracheal tubes from forcible rejection. Finally, poisoning with Lomotil, the management of which has been well reviewed by Rumack and Temple (1974), can now be confirmed by measuring plasma diphenoxylic acid levels (Ford *et al.*, 1976). The level obtained in this patient, in blood taken 12 hours after the probable time of ingestion, was very high, since similar levels would be expected in an adult as a peak concentration one hour after oral ingestion.

Summary

Two patients are presented with respiratory depression for which no cause was apparent. Both had ingested narcotics without the parents' knowledge. Narcotic ingestion should be suspected if signs of respiratory failure with constricted pupils are present, and a diagnostic test with naloxone should be performed.

I thank Dr H. Barrie for permission to report the 2 patients and for advice, and Dr N. J. Haskins of G. D. Searle & Co., Ltd., for analysis of the diphenoxylic acid level.

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Estimation of gestational age at birth

Comparison of two methods

A scoring system for the estimation of gestational age of newborn babies using 10 neurological measures and 11 external characteristics has been shown by several workers to produce accurate results (Dubowitz *et al.*, 1970; Hancock, 1973; Jaroszewicz and Boyd, 1973; Nicolopoulos *et al.*, 1976). However, the necessary skills for using this system may be difficult to acquire and the system may also be time consuming and disturbing to the sick neonate (Parkin *et al.*, 1976). In a large community where the majority of the mothers are uncertain of the date of their last menstrual period and where there is a high incidence of small-for-dates babies, there is a real need for a method of estimating gestational age that is at once both rapid and accurate.

Five neurological reflexes which appear at certain stages of gestation were found to be good measures of gestational age (Robinson, 1966). We examined the accuracy of these 5 reflexes as a group measured against the scoring system of Dubowitz *et al.* (1970) for the estimation of gestational age.

Patients and methods

Selection of babies. 73 Cape coloured babies were sequentially selected for birthweight equal to or less than 2800 g (i.e. 10th centile for weight at 40 weeks for the Cape coloured male who is later born), from mothers who had had regular menstrual periods and

were reasonably sure of the date of their last menstrual period. None of the babies had neurological malformations or illnesses.

Examination technique. The scoring system combining the 10 neurological measures with the 11 external characteristics as described by Dubowitz *et al.* (1970) was used. The 5 neurological reflexes (Table 1) were examined according to the method of Robinson (1966). The traction reflex was elaborated further (Table 2) by recording the gestational age as 33 weeks when only minimal traction was present, 34 weeks when there was good flexion of the arms but the head not raised in line with the body, 35–36 weeks when the head was in line with the body, and above 36 weeks when there was vigorous flexion of the body as a whole. This elaboration was first suggested by Davies *et al.* (1972) and further developed by us.

Table 1 *Reflexes examined according to Robinson (1966) in assessing gestational age*

Reflex	*Stimulus*	*Positive response*	*Gestational age in weeks if reflex is*	
			Absent	*Present*
Pupil reaction	Light	Pupil contraction	<31	29 or more
Traction	Pull up by wrists from supine	Flexion of neck or arm	<36	33 ,,
Glabellar tap	Tap on glabella	Blink	<34	32 ,,
Neck-righting	Rotation of head	Trunk follows	<37	34 ,,
Head-turning	Diffuse light from one side	Head turning to light	Doubtful	32 ,,

Table 2 *Differentiation of traction reflex*

Response	*Gestational age (w)*
Minimal flexion of arm	33
Good flexion of arm, head not in line with body	34
Good flexion of arm, head in line with body	35–36
Vigorous flexion of whole body	37 or more

All babies were examined within the first 3 days of life. Each baby was independently examined by two observers on the same day, one using the Dubowitz scoring system and the other the 5 neurological reflexes of Robinson. The results obtained by each observer were unknown to the other.

Results

Forty female and 33 male babies were examined, their gestational ages ranging from 29 to 40 weeks according to the dates of the mothers' last menstrual periods. 53 were born preterm (gestational age <38 weeks) and the weights of 28 babies were below the 10th centile for gestational age, using standards for the Cape coloured population (Jaroszewicz *et al.*, 1975).

The relationship between gestational age as determined by Robinson's group of reflexes and that determined by the Dubowitz scoring system is shown in the Fig. The 95% confidence limit for a single estimation of gestational age using the group of reflexes as compared to the scoring system is ±1 week. The correlation coefficient (r) is 0·85, which is statistically significant.

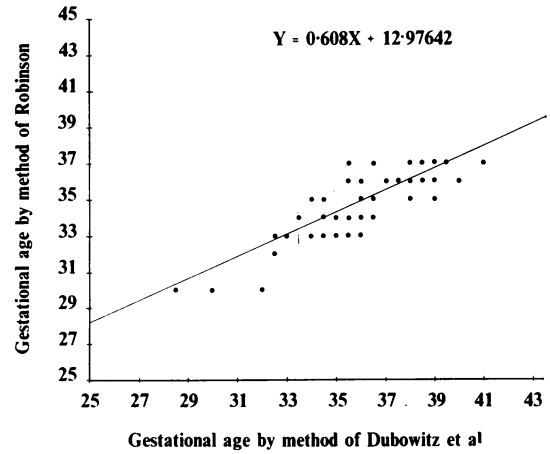

Fig. *Relationship between gestational age as determined by the method of Dubowitz et al. (1970) and that determined by the 5 neurological reflexes of Robinson (1966).*

Discussion

When the two methods of estimation of gestational age are compared, the group of reflexes described by Robinson (1966) compares very favourably with the scoring system of Dubowitz *et al.* (1970). Both were found to be accurate between the ages of 29 and 37 weeks. The value of Robinson's method diminishes with a gestational age greater than 37 weeks, while the Dubowitz scoring system is reliable up to 43 weeks. Few studies have been done on the group of reflexes described by Robinson, but these have been found to meet all the criteria for good assessment of gestational age (Casaer and Akiyama, 1970). The neurological system is also unaffected in the small-for-dates baby (Robinson, 1966; Davies *et al.*, 1972).

On the basis of this study we feel that both methods of estimating gestational age are very satisfactory. The value of the Robinson method is that it can be executed rapidly and easily and can be used instead

of the Dubowitz system for gestational ages 29 to 37 weeks. Where there is evidence of intrauterine growth retardation the Dubowitz scoring system has to be used for gestational ages above 37 weeks, as it remains accurate up to 43 weeks.

Summary

Seventy-three low birthweight babies were independently assessed for gestational age using the scoring system of Dubowitz *et al.* (1970) and 5 neurological reflexes described by Robinson (1966). The results obtained by the 5 reflexes were compared with those obtained by the scoring system and were found to be accurate estimations of gestational age. The 5 reflexes may be used for babies of gestational ages 29 to 37 weeks, but above 37 weeks the scoring system must be used.

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Increased urinary catecholamines in an infant with the diencephalic syndrome

Since Russell (1951) defined the diencephalic syndrome, a number of reports have described the wide spectrum of symptoms. In this report we call attention to the possible role of catecholamines in producing some of the symptoms.

Case report

A 15-month-old female infant was admitted because of severe malnutrition. She was the product of an uneventful pregnancy and delivery, the first child of healthy parents. Birthweight was 4000 g. She had initially been given a milk formula with solids added later, and appeared to be taking a well-balanced diet. She allegedly had had diarrhoea since birth, despite which growth proceeded normally at first, weight reaching 6500 g at age 5 months, but then remaining stationary. Psychomotor development however was normal. At age $10\frac{1}{2}$ months nystagmus appeared.

On admission at 15 months a severe degree of malnutrition was noted. Weight was 6500 g (3rd centile), height 75 cm (10th centile), and head circumference 45 cm (25th centile). Despite marasmus she was in excellent general condition, was hyperactive, and looked unexpectedly happy. Blood pressure measured by a cuff covering 2/3 of her arm ranged from 120/80 to 110/70 mmHg, on several occasions. She had bilateral nystagmus and both optic discs were pale. The following were normal: full blood count; blood glucose and urea; serum electrolytes, Ca, P, alkaline phosphatase, proteins, cholesterol, and total lipids. Urine normal. Blood and urine paper amino acid chromatography were normal. Xylose absorption test, normal. Sweat test, Na 25·5 mmol/l.

CNS studies showed the following: normal skull *x*-ray. CSF protein 1·08 g/l, sugar 40 mg/100 ml (2·22 mmol/l), no cells. EEG showed a disorganised basic rhythm with superimposed paroxysmal discharge waves bilaterally. Brain scanning with ^{99}mTe (Fig. 1) showed an increased uptake of the isotopic substance in the vicinity of the sella turcica. Pneumoencephalogram showed an upward displacement of the 3rd ventricle and an increased distance between frontal and temporal horns (Fig. 2). Carotid artery angiography showed a vascular mass displacing the middle cerebral artery. Fasting growth hormone was 28 ng/ml plasma (increased). Blood thyroxine was 11·3 μg/100 ml (145 nmol/l). Urinary vanillylmandelic acid was normal (2·4 mg/24 h),