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How accurate is test-weighing? M. F. Whitfield (introduced by L. S. Taitz). Jessop Hospital for Women, Sheffield.

This study attempted to quantify the error in test-weighing using standard baby scales and ward personnel. Standard Salter ‘Trent’ baby scales were used to test-weigh 100 bottle-fed infants (mean weight 2·9 kg, range 2·2–4·9), the feeding bottles being similarly weighed, before and after feeding, on a Metzler laboratory balance. The measurements were carried out by nursing staff who normally carry out such measurements.

The systematic weighing errors (1 SD) in test-weights (TW) and feed weights (FW) were evaluated as 13·4 g (100 measurements) and 0·1 g (125 measurements) respectively. Four results were discarded because the TW exceeded the FW by more than 2-fold.

In the remaining 96 measurements FW (± 1 SD) was 62·1 ± 16·4 g (range 25–100) and TW 57·24 ± 22·86 g (range 10–130). 32% of the TW was within 10% of the FW; 44% of the TW underestimated FW by more than 10%, one by as much as 87%, and 24% of TW overestimated FW by more than 10%. 73% of the TW was within ± 30% of FW. The regression line TW = 0·77655 FW + 0·0265 calculated for 96 points was not significantly different from TW = FW. At test weights of at least 60 g no significant differences between TW and FW were found, although there was considerable scatter of results (1 SD of FW = 10 g). At TW below 60 g TW underestimated FW significantly (TW = 40 g, n = 26, P < 0·001, TW = 20 g, n = 5, P < 0·01). The magnitude of the mean TW error was independent of body weight but the error as a percentage of feed weight was greatest in the 2–2·5 kg infants (30%).

It is concluded that test-weighing with standard baby scales at one feed is an inaccurate guide to feed intake, the error increasing in those taking least milk.


Phenytoin has been widely used in children for many years, but there is little information about its pharmacokinetics in a steady-state. The results of one study suggest that fluctuation in plasma concentration is clinically acceptable if the drug is given once daily (Buchanan et al., 1973). We used saliva phenytoin levels, which show a good correlation with plasma levels in adults (Cook et al., 1975), to determine kinetic data and to assess a once-daily dose regimen. Mixed saliva was collected from 6 children (aged 6–13 years) in a steady-state on a once-daily (0800 h) dose-frequency regimen. Samples were collected at hourly intervals from 0800–2000 h on day 1 and at 0800 on day 2 and assayed by RIA.

The mean half-life was 12·3 h (range 5·0–20·2), the mean clearance was 0·067 l/kg per hour (0·028–0·130), and the mean apparent volume of distribution was 1·15 l/kg (0·29–2·56). The mean steady-state saliva concentration was relatively low, being 2·07 μmol/l (0·77–4·78) on a mean dose of 6·42 mg/kg (4·2–9·7), and the fluctuation in concentration ranged from 152·2 to 363·2%.

The wide interindividual variation in drug elimination rate and the large fluctuation in concentration suggests that dose regimens should be individualised and that once-daily administration is unlikely to be acceptable. Saliva concentration profiles are a convenient and effective means of assessing dose-frequency regimens and investigating drug pharmacokinetics in children.

References

Hydroxykynurenine hydroxyanthranilic acid ratios in children with febrile convulsions. J. McKiernan, D. Mellor, S. Court, and J. Edson, Department of Child Health, University of Nottingham.


Increasing awareness of the potential toxicity of
CNS irradiation and intrathecal medication has led to studies on psychometry and CAT scanning after such treatment. Less interest has been focused on the biochemical changes within the brain and CSF. There have been studies showing disturbance of protein, glucose, and various enzymes during and after treatment. Raised CSF levels of creatine phosphokinase (CPK) have been reported as in neurodegenerative disorders. In one study procoagulant activity in CSF was shown to be increased during CNS prophylactic treatment, and in some patients this remains permanently raised. This activity is probably due to the presence of a lipoprotein factor, derived from myelin breakdown. Combining cytology of CSF with estimation of protein, glucose, CPK, and procoagulant activity on patients receiving CNS prophylaxis, patients with meningeal relapse, and those off therapy, we have confirmed disturbances most notably of procoagulant activity suggesting demyelination. Persistence of the process once all treatment has stopped does appear likely in some cases. We discuss the potential use of measurement of myelin basic protein and 2', 3'-cyclic nucleoside monophosphate phosphodiesterase (CNP) as more accurate methods of determining disturbances of myelination. All these estimations have practical applications in assessment of the degenerative disorders as well as in leukaemia.

**Concept of nonepileptic ‘anoxic’ seizure threshold and its relation to age.** J. B. P. Stephenson. Royal Hospital for Sick Children, Glasgow.

Approximately 130 children had seizures induced by ocular compression in the supine position, as a diagnostic and therapeutic measure in provoked convulsions. The relation of the duration of asystole to the duration of EEG flattening, if present, allows mathematical derivation of ‘anoxic’ seizure threshold. This threshold is low in early childhood and increases with age.


Methylmalonic acidaemia may occur secondary to the impaired synthesis of 5'-deoxyadenosineco- balamin, a cobamid which acts as the coenzyme of methylmalonyl CoA mutase in the conversion of L-methylmalonyl CoA to succinyl CoA. Supplementation of these patients with vitamin B12 leads to an increase in hololenzyme activity and consequent fall in the levels of methylmalonic acid and improvement in the clinical condition. Due to the high doses of B12 required, parenteral administration has been used as first choice, and the oral route is regarded as unsatisfactory. Two recent reports suggest that this latter opinion may no longer be valid, but successful experience with oral treatment remains very limited. The case is reported of a boy now aged 2½, diagnosed as having methylmalonic acidaemia at age 7 months after admission with severe dehydration and acidosis precipitated by infection. There was a 6-month history of vomiting and failure to thrive. Diagnosis of methylmalonic acidaemia was based on both increased urinary output of methylmalonic acid (21 mmol/l) and impaired propionate/methylmalonate metabolism in skin fibroblasts. Treatment with parenteral B12 produced a rapid and complete clinical recovery and he was maintained on intramuscular B12 1 mg weekly. At age 2 he was gradually changed on to increasing doses of oral B12 and is at present receiving 4 mg daily with a g/g creatinine ratio of 3 on a 2 g/kg protein intake.


Previous studies have demonstrated differences in the lung volumes of babies born by caesarean section, compared with those born vaginally, in the first 6 hours (Milner et al., 1978). The study was undertaken to determine the time for the lung mechanics and thoracic gas volume (TGV) of babies born by section to reach the values of vaginally-born babies.

Serial measurements of lung mechanics and TGV were made in 15 babies born by elective section, and results compared with those of 31 babies born vaginally. The most striking difference was in TGV in the two groups. During the first 48 hours after delivery TGV in the babies born by section approached that of the vaginally-born babies. There was also a tendency for the section babies to have higher resistances and lower compliances than the vaginally-born babies, these differences disappearing after 48 hours.

The differences in the section babies are attributed to an increased volume of lung fluid which is gradually absorbed by pulmonary lymphatics.

**Reference**


In two groups of healthy low birthweight infants, one preterm and one light-for-dates, respiratory mechanics was measured in the prone, supine, and right lateral postures. No difference due to posture were noted in the light-for-dates group.

In the preterm infants the values for elastic work, inspiratory viscous work, total viscous work, total work of breathing, tidal volume, and minute volume were greater in the prone position than in the supine. There was no difference between those results obtained in the lateral position and those in the prone and supine. Thus, in comparison with the supine position, the prone but not the lateral position resulted in an improvement in ventilation. The prone position is recommended for healthy preterm infants.

Small bowel mucosal changes in asymptomatic children with coeliac disease on gluten-free diets. P. J. Congdon, J. M. Littlewood, A. Crollick, and M. K. Mason. Department of Child Health, St James's University Hospital, Leeds.

33 asymptomatic children with biopsy-proved coeliac disease were re-evaluated while on a gluten-free diet. They had been referred from paediatricians for repeat jejunal biopsy and at this time their degree of gluten withdrawal was assessed by a dietitian. Certain laboratory investigations were also made to see if mucosal relapse could be predicted.

Of 33 intestinal biopsies only 15 were normal and 8 showed evidence of severe partial villous atrophy or subtotal villous atrophy. 10 kept a strict gluten-free diet (GFD), but 12 admitted to frequent dietary lapses. Those on a strict GFD generally had normal biopsies (8/10) while 9 of 12 with regular dietary lapses had abnormal jejunal biopsies. Blood folate and 1-hour xylose levels failed to detect those with persisting mucosal abnormalities. It is advised that close liaison be maintained with a dietitian, and as continued gluten ingestion may be harmful, that repeated intestinal biopsies should be obtained to identify those with confirmed histological abnormalities.

Lactose malabsorption assessed by hydrogen breath testing in acute gastroenteritis. A. J. Gardiner, M. J. Tarlow, I. Sutherland, and H. G. Sammons. Department of Paediatrics and Child Health, University of Birmingham, and Department of Clinical Chemistry, East Birmingham Hospital.

Lactose intolerance is described as an important feature of acute gastroenteritis. Its frequency in infant gastroenteritis in Western society is unclear, although it appears to be of major significance in developing countries (Lifshitz et al., 1971).

Hydrogen breath testing has been validated in adults as a technique for diagnosing sugar malabsorption (Newcomer et al., 1975). After a sugar load, bacteria in the terminal ileum and colon metabolise unabsorbed sugar, releasing hydrogen which diffuses through the gut wall and is transported to the lungs, from where it is excreted in the breath. 43 breath tests were performed on 38 infants with clinically diagnosed acute gastroenteritis. The infants were studied at 0-32 days after the onset of the illness, at a time when they were still thought to need hospital treatment. In 9 cases a bacterial or viral pathogen was isolated from the stools.

An initial group of 20 children was given a lactose load of 0.5 g/kg. None of the children had symptoms of lactose intolerance, but 3 showed a rise in breath hydrogen. After this, 18 children were tested with a conventional lactose load of 2 g/kg. One demonstrated an increase in stool frequency, and the stools contained 0.5% reducing substances on Clinitest. Eight of the 16 children showed a rise in breath hydrogen. In none of these was any clinical symptom detected.

We conclude that clinical lactose intolerance is appreciably less common than biochemical evidence of lactose malabsorption in infant gastroenteritis as found on hydrogen breath testing. Our experience suggests that it is of less significance in Birmingham than reports of tropical infant gastroenteritis would suggest. Management regimen in temperate, developed countries should therefore be modified from those used in the tropics.

References

Raised hepatic copper concentration in Indian childhood cirrhosis. M. S. Tanner, B. Portmann, C. F. Mills, and A. P. Mowat. St George's Hospital and King's College Hospital, London, and the Rowett Research Institute, Aberdeen.

Indian childhood cirrhosis (ICC) is a disease of unknown aetiology, usually presenting with abdominal distension in infancy, and rapidly progressing to jaundice, ascites, hepatocellular...
failure, and death. We recently described a new histological feature of the disease, namely prolific coarse orcein-staining granules in both hepatocytes and proximal renal tubular cells, and suggest that these may represent copper-binding protein (Portmann et al., 1978; Tanner et al., 1978).

In a further series of Indian children with liver disease, in whom a clinical and histological diagnosis of ICC was made, 5 had extremely high hepatic copper content (mean 1389 μg/g dry weight; normal <55). 14 children with other hepatic diseases had normal or only slightly raised values, with the exception of one child with cholestasis in whom a value of 292 μg/g was found. We therefore suggest that ICC is caused by a grossly raised hepatic copper concentration, the origin of which may be either an abnormally high copper intake, or an inherited abnormality of copper metabolism similar to Wilson's disease. The fact that ICC is limited in its distribution to the Asian subcontinent suggests the former, an environmental aetiology. In 4 of the 5 cases, the family cooked or stored water in vessels made of brass or bittall (an alloy containing copper).

These results raise the exciting possibility that this almost universally fatal disease may be entirely preventable.

References


Transpyloric feeding, using commercially available silicone tubes (Vygon Ltd), is described in 32 newborn infants undergoing intensive care. 30 babies required assisted ventilation; 2 had undergone surgery for upper small bowel atresia. Gestational age ranged from 26–42 weeks (mean 32). The technique of passage of the tube, and the difficulties encountered are described. Transpyloric tubes were passed on 49 occasions in 28 (94%) babies. 80 x-rays to confirm the tube position were required (1.7/passage, 2.3/infant). Placement of the tube at operation was carried out in 2 babies with small bowel atresia. Attempts to pass the tube were abandoned in 2 infants. The feeding tubes remained in situ for 1–43 days (mean 10).

During the first 7 days of life 20 infants transpylorically fed lost weight (mean 18 g/day). In the others the weight remained static. After 7 days all babies fed by this route gained weight (mean 35 g/day).

The most common complication (39%) was accidental displacement of the tube. Transient diarrhoea (23%) and vomiting (6%) also occurred. Necrotising enterocolitis was suspected clinically in 2 (6%) infants but was not confirmed by x-ray.

How clean does breast milk have to be for feeding raw to babies on SCBU? L. Carroll, M. Osman, and D. P. Davies. Departments of Child Health and Microbiology, Leicester Royal Infirmary.

At present there is considerable debate over the practicalities and safety of feeding pooled raw (unheated) breast milk to babies on special care baby units (SCBU) (British Medical Journal, 1978). Of particular concern is the bacterial contamination which might be allowed. Recently proposed bacterial criteria for feeding raw breast milk were largely empirical (Williamson et al., 1978) and did not take into account the bacterial flora of breast milk which is taken by the normal breast-fed baby. 207 samples of breast milk from 70 mothers were collected in sterile universal containers by a clean-catch method. Each sample was collected between the 4th and 7th days. The mothers were not taking antibiotics nor were they applying antiseptic cream to the breasts. The milk samples were delivered to the laboratory within one hour of collection. Serial dilutions of milk between 10^-1 to 10^-4 were made in nutrient agar (Oxoid) using a semiautomated analyser, and after overnight incubation at 37°C the numbers of colony-forming units per litre (CFU/l) were determined. 170 (82%) samples grew only skin-commensal organisms (coagulase-negative staphylococcus and Streptococcus viridans) in numbers ranging from 10^5–10^10 CFU/l. 13 (6%) grew Staphylococcus aureus, 15 (7%) enterobacteriaceae, 3 (2%) group B streptococcus, and 6 (3%) produced no growth.

A feature of this study is the heavy bacterial contamination of breast milk taken by the normal suckling infant. We propose that milk contaminated by S. aureus, enterobacteriaceae, and group B streptococcus needs to be pasteurised before use, but breast milk containing only skin-commensals organisms in numbers up to 10^10 CFU/l may be given raw.

References

Between January 1969 and May 1974, 11 of 1208 low birthweight infants developed early onset group B streptococcal (GBS) septicemia. All 11 infants were <35 weeks' gestational age and 9 presented with the clinical and x-ray signs of RDS. 10 of the 11 infants died. Antibiotics were given to 3 infants only, but not before age 12 hours. From June 1974 infants <35 weeks gestational age and from January 1977 all infants <2500 g, received systemic penicillin by 2 hours of age after throat, ear, umbilical, rectal, and blood cultures. Penicillin was continued for 10 days if GBS was isolated but was stopped at 48 hours if cultures were negative. Between June 1974 and May 1978, there was one case of septicemia in the 1143 low birthweight infants born during this period but none has died from GBS. These data suggest that systemic penicillin from birth will prevent the mortality from GBS in low birthweight infants ($\chi^2 = 7.65; P = 0.001$).

Follow-up of children of diabetic mothers. Mary Cummins and Mary Norrish. Department of Paediatrics and Neonatal Medicine, Hammersmith Hospital, London.

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Three groups of children whose mothers were diagnosed as having chemical diabetes during pregnancy and who were treated at that time with chlorpropamide 100 mg daily, with insulin, or without the use of drugs, were reviewed to determine if there was any difference between these groups of children recognisable on follow-up, and attributable to the effect of maternal treatment on the fetal islets in terms of physical growth, neurological and intellectual development, and $\beta$-cell function. A control group of 43 healthy children was established for the interpretation of the oral glucose tolerance test used to assess $\beta$-cell function. The growth of these children was normal except for a slight tendency to underweight-for-height in the girls of mothers who received no treatment. No child was seriously handicapped neurologically, although 2 children were mentally retarded and required special schooling, one in the insulin group and one in the no drug group; one child in the chlorpropamide group has bilateral neurosensory deafness. There was no difference found in the intellectual ability of the three groups of children.

There appeared to be a significant impairment in glucose tolerance of children of mothers treated with insulin compared with a control group. This was not explained completely by either the age difference of the children at follow-up or the degree of maternal glucose intolerance in pregnancy. Three of the chlorpropamide group have required treatment for their diabetes.


Serum LH and FSH responses to LHRH (100 $\mu$g IV) were measured in 24 boys with constitutional growth delay. Basal plasma testosterone (T), androstenedione (A), and dehydroepiandrosterone (DHA) were also measured in 16 of these children. Two groups of boys were defined: (1) prepubertal (mean chronological age (CA) 11-8 years, bone age (BA) 9-5 years, height SD score $-3.2$, and mean testicular volume (MTV) 2ml), and (2) early pubertal (mean CA 14-7 years, BA 12-3 years, height SD score $-3.7$, and MTV 3-8 ml).

Peak LH response to LHRH was greater in group 2 (mean 8-7 IU/l) than in group 1 (mean 2-9 IU/l). In 8 out of 9 prepubertal subjects with a bone age of $<10$ years peak LH response was $<2$ IU/l. There was no difference between FSH responses (4-8 and 3-8 IU/l respectively). Basal T levels were low in prepubertal subjects whereas A and DHA increased from a BA of 8 years. These findings suggest firstly, that the LHRH test is of limited value in the diagnosis of gonadotrophin deficiency in the early prepubertal period and, secondly, that a normal temporal relationship of gonadotrophin and adrenal androgen secretion with bone age is present in boys with constitutional growth delay.


The symptoms and medical contacts of 150 infants
surviving acute hospital admission were compared with those of 100 infants dying unexpectedly at home, with histories of major terminal symptoms. Half of each group had been ill for more than 3 days. Specific symptoms (apart from coughing) were relatively rare among home deaths, but both groups generally had nonspecific behavioural changes. The severity of the illness, with physical signs stressed more often than symptoms, determined referral in half the cases admitted after primary care assessment. 31% of these families were considered by the GP to have delayed their consultation. The remaining referrals were partially related to families' inability to cope adequately with their children's illness. Initiative for follow-up had been left to the parents in 94 (87%) of the 108 cases not admitted at first consultation, although 44% of these families already wanted their children admitted. Only 39 of the home deaths had been medically assessed, 17 within 24 hours of death, including two prearranged follow-ups. As parents often sought medical help inappropriately, and 23% of all families expressed hesitation about contacting their doctor, it is suggested that daily professional reassessment should be considered normal practice when infants have major symptoms.

Use of an objective clinical examination in assessing medical students' practical skills in paediatrics. T. Waterson, Ninewells Hospital, Dundee.

The assessment of students' skill at performing certain clinical techniques has always been difficult, as examiners tend to confine themselves to standard areas—such as the detection of signs and the interpretation of data. Despite the widely held view that the ability of junior doctors in such procedures as urine testing and history taking is inadequate, these areas are seldom covered in clinical examinations which are overwhelmingly subjective in their method of appraisal.

This paper describes the results from a type of assessment not previously used in paediatrics, the Objective Structured Clinical Examination (Harden et al., 1975). In this examination students rotate round a number of different stations at each of which they spend 4 minutes and perform a standard procedure—such as taking a limited history, examining one particular area, interpreting x-rays, or testing urine. Alternating stations assess the student's analysis of his findings by multiple-choice questionnaire; examiners also observe the student and mark his performance from a check list at some of the stations. 18 final-year students were assessed in this way and figures are shown from some questions in the examination, of which examples are given. Table 1 shows the results in 4 individual questions and Table 2 correlates these results with those in the examination as a whole. Students' performance in urine examination was particularly poor and the implications for this in improved teaching are discussed.

Table 1 Results (abbreviated) in four questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Mark % (mean ± 1 SD)</th>
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<tbody>
<tr>
<td>A</td>
<td>74 ± 11.7</td>
</tr>
<tr>
<td>B</td>
<td>72 ± 20.1</td>
</tr>
<tr>
<td>C</td>
<td>41 ± 14.5</td>
</tr>
<tr>
<td>D</td>
<td>74 ± 15</td>
</tr>
</tbody>
</table>

Table 2 Correlation of results

<table>
<thead>
<tr>
<th>Question</th>
<th>Mark %</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>74± 11.7</td>
<td>0.66</td>
</tr>
<tr>
<td>B</td>
<td>72</td>
<td>0.47</td>
</tr>
<tr>
<td>C</td>
<td>41</td>
<td>0.003*</td>
</tr>
<tr>
<td>D</td>
<td>74</td>
<td>0.24</td>
</tr>
</tbody>
</table>

A = Examiner's check list on history of vomiting, B = MCQ on history of vomiting, C = MCQ on urine testing, D = MCQ on x-ray interpretation. * Significant at 0.001 level

Students learn best those subjects they know they will be examined on; this technique allows a particular area of clinical performance to be assessed objectively and it is therefore a valuable teaching aid.

Reference