Neonatal Society

Meeting held on 8 February 1979 at the Institute of Child Health, London

Prophylaxis of neonatal jaundice with maternal antipyrine treatment. L. Friedman and P. J. Lewis. Clinical Pharmacology Unit, Queen Charlotte’s Maternity Hospital, London.

Neonatal jaundice is common and its incidence is thought to have increased recently. Both epidural anaesthesia and oxytocin administration during labour increase neonatal bilirubin concentrations (Friedman et al., 1978). Neonatal jaundice results from immaturity of the hepatic enzyme system which glucuronates bilirubin. Glucuronidation may be induced in the fetus by exposure to inducing agents and phenobarbitone treatment of pregnant women has been shown to be effective in reducing neonatal jaundice. However, phenobarbitone is sedative and rarely used. Antipyrine, an antipyretic known to induce glucuronyl transferase in adults, is without sedative properties (Orme et al., 1974).

Pregnant women were recruited during the 38th week of pregnancy and allocated at random and double blind to placebo or antipyrine (300 mg daily). Babies who satisfied the protocol were seen on the 4th day after birth and total serum bilirubin concentrations measured.

90 women were recruited; 48 completed the protocol, 24 in each group. The mean (± SEM) bilirubin concentration was 111·5 ± 13·5 μmol/l/100 ml (6·5 ± 0·8 mg/100 ml) on placebo and 62·6 ± 11·2 μmol/l/100 ml (3·7 ± 0·6 mg/100 ml) on antipyrine (P<0·005). The mean birthweights were 3·419 kg on placebo and 3·432 kg on antipyrine. Mothers in both groups took an average of 15·5 tablets. No adverse effects were noted.

We suggest that brief perinatal exposure of the mature fetus to antipyrine reduces neonatal bilirubin concentrations. The mechanism is presumed to be induction of glucuronyl transferase in the fetal liver.

Follow-up study of babies exposed to betamethasone before birth. A. M. Butterfill and D. R. Harvey. Queen Charlotte’s Maternity Hospital, London.

It has been shown that glucocorticoids given to mothers in premature labour can reduce the incidence of respiratory distress syndrome (RDS) in their babies, but animal experiments suggest that glucocorticoids may have adverse effects on growth and mental development which could outweigh the benefits. We therefore attempted to study the growth and development of 120 babies born during a controlled trial in which mothers in premature labour (at 26–37 weeks’ gestation) received either betamethasone (4 mg 8-hourly × 6) or a placebo.

12 babies died, 6 from each group, and 3 were not traced. Limited information was available about 17 babies; one from the betamethasone group was severely retarded, but the others were thought to be normal. The remaining 88 children were examined once, in detail, between ages one and 4 years. The two groups (41 whose mothers received betamethasone and 47 controls) were well-matched for length of gestation (26–42 weeks), socioeconomic group, age at follow-up, and other perinatal and social factors which could affect development. There were 5 cases of RDS in the betamethasone group and 8 in the controls. At follow-up no child was developmentally retarded or suffered major handicap. Minor abnormalities and defects of vision and hearing were present equally in the two groups. There was no difference between the groups in height and weight. There was no difference in the general quotient of the Griffiths’s Mental Development Scales, but the betamethasone group had lower scores on the performance scale (106, control 113, P = 0·05).

Neurological examination of children who were small-for-dates babies. D. R. Harvey and S. M. Wallis. Queen Charlotte’s Maternity Hospital, London.

Small-for-dates babies are more likely to have neurological abnormalities and learning problems in childhood than babies of normal birthweights (Dobbing et al., 1971). There is evidence that animals
are clumsy if their brain growth is impaired during a phase of development equivalent to that of the human brain in the latter half of pregnancy (Fitzhardinge and Steven, 1972; Neligan et al., 1976).

We followed up a group of small-for-dates babies whose antenatal growth was documented with serial ultrasonic cephalometry. All were term, singleton births, with no significant neonatal problems. 20 of the children were selected for study; 10 had slow head growth starting before 26 weeks’ menstrual age, and 10 had normal head growth before birth. The groups were matched for age and sex. They were seen at a mean age of 6 years and examined for evidence of minor neurological dysfunction using the technique described by Touwen and Prechtl (1970). Those children whose head growth began to slow before 26 weeks’ menstrual age, had lower overall scores on neurological examination with impairment of co-ordination and balance. They also performed poorly in a test constructing matchstick shapes.

References


The effects of feeding, asphyxia, and hypoxia on the oxygen tension of cerebral venous blood. R. M. Gardiner. Physiological Laboratory, University of Cambridge.

Validation of oesophageal balloon measurements in infants. C. S. Beardsmore, P. Helms, and J. Stocks. Department of Paediatrics and Neonatal Medicine, Hammersmith Hospital, and Respiratory Unit, The Hospital for Sick Children, London.

Oesophageal balloons are often used to measure transpulmonary pressure changes in infants in order to calculate their pulmonary resistance (Rp) and dynamic compliance (Cdyn). In adults, numerous problems associated with the use of oesophageal balloons have been reported, but little work has been done to validate the use of this technique in infants (Dinwiddie and Russell, 1972; Milner et al., 1978). Previous work shows that measurements of Rp are considerably less accurate and less reproducible than those of airways resistance (Raw) measured by plethysmography (Stocks, 1977).

In an attempt to determine why these discrepancies occur, we performed detailed in vitro and in vivo experiments to assess which factor might affect the reliability of oesophageal balloon recordings. Variations in the dimensions, wall thickness, and volume of air within the balloons were all found to affect critically their pressure volume characteristics. These factors caused significant variations in the measured values of Rp and Cdyn obtained from individual babies.

Recommendations are made for the ideal internal working volume and physical characteristics of oesophageal balloons for the measurement of transpulmonary pressure changes in infants.

References


Effect of nasogastric tubes on nasal resistance during infancy. J. Stocks. Department of Paediatrics and Neonatal Medicine, Hammersmith Hospital, London. To be published in full in the Archives, 1980, 55, in press.

Blood pressure in the first 6 weeks of life. A. Earley, P. Fayers, and M. de Swiet. Department of Paediatrics, Cardiothoracic Institute, and MRC Tuberculosis and Chest Diseases Unit, Brompton Hospital, London.

Previous studies show that BP increases greatly at some time between ages 4 days and 6 weeks and then it remains constant until age 6 years (de Swiet et al., 1976, 1979). However, the precise age at which this rise takes place is uncertain. Systolic BP has therefore been measured using the Parks Doppler system in 100 normal newborn infants, on alternate days during the first 10 days of life, and then at weekly intervals to age 6 weeks.

BP rose from 68 ± 11 mmHg at 2 days to 78 ± 12 mmHg at 6 weeks (after adjustment for level of
consciousness). However, most of this rise (9 mmHg) took place during the first 14 days.

If, as has been suggested from animal studies (Klopfenstein and Rudolph, 1978), the cardiac output/kg body weight decreases in the first 6 weeks of life, then the concurrent rise in BP indicates that peripheral vascular resistance increases very markedly in the neonatal period.

References


Congenital complete heart block in the newborn associated with maternal systemic lupus erythematosus and other connective tissue disorders. J. D. Hardy, S. Solomon, G. S. Banwell, R. Beach, V. Wright, and F. M. Howard. Departments of Paediatrics and Obstetrics, Princess Alexandra Hospital, Harlow, Department of Paediatrics, Brompton Hospital and Royal Free Hospital, London, and the Rheumatism Research Unit, School of Medicine, Leeds. Published in full in the Archives, 1979, 54, 7–13.

Aspects of perinatal transcutaneous PO₂ monitoring. F. E. Hytten and M. O’Connor (introduced by I. R. McFadyen). Division of Perinatal Medicine, Clinical Research Centre, Northwick Park Hospital, Middlesex.

A preliminary series of fetal intrapartum applications of the Draeger Transoxode is reported. 23 primigravidae and 7 multiparae were studied for periods ranging from 30 minutes to 12 hours (mean 3·8 hours). Two-thirds of patients had lumbar epidural analgesia before application of the electrode at a cervical dilatation of at least 4 cm (mean 6·4).

In 9 infants, modifications to the Huch technique of intrapartum application allowed us to record fetal transcutaneous PO₂ (FtcPO₂) both during delivery and for a maximum of 25 minutes postnataally.

Comparisons were made between the FtcPO₂ and the PO₂ in fetal scalp blood samples in 26 instances, and with umbilical arterial PO₂ in 12 cases where the electrode remained in place until delivery. The correlation with PO₂ in fetal blood samples shows a mean 27·5% underestimation by the TcPO₂ technique. However the reliability of measuring true Po₂ using the Saling technique must remain in doubt. The correlation with cord artery PO₂ was also poor, TcPO₂ values frequently underestimating systemic arterial PO₂. Factors such as local scalp circulatory stasis, the ‘diving reflex’, and pressure effects on the Transoxode may be responsible for the poor correlations at this stage.

Normal levels in uncomplicated labours are being evaluated. It is hoped then to proceed with correlations between FtcPO₂ and other parameters indicating fetal distress.

Increased concentrations of hypoxanthine and xanthine in meconium-stained amniotic fluid. R. A. Harkness, R. J. Simmonds, M. O’Connor, and F. E. Hytten. Division of Perinatal Medicine, Clinical Research Centre, Northwick Park Hospital, Middlesex.

Meconium staining of amniotic fluid is used as an indication of fetal distress. We found that concentrations of the oxypurines, hypoxanthine and xanthine, in meconium-stained amniotic fluid are generally higher than in ‘normal’ amniotic fluid at 38–40 weeks’ gestation, both sets of samples being from patients who were not in labour. These increases cannot be directly due to meconium, since hypoxanthine and xanthine concentrations in meconium were similar to those in amniotic fluid. The concentration of urate in meconium-stained amniotic fluid was not raised and that of uridine did not show a clear increase. Serial estimations of hypoxanthine and xanthine in amniotic fluid showed that there is a tendency for concentrations to rise during labour.

The basis for this investigation was that failure to maintain intracellular ATP concentrations is associated with release of hypoxanthine into extracellular fluid. The usual cause of such failure is hypoxia. Therefore estimates of hypoxanthine in extracellular fluids could provide a cumulative measure of hypoxic damage. The increase in concentrations of hypoxanthine and xanthine in the extracellular amniotic fluid when it is meconium-stained suggests this probably occurs in the perinatal period. The results support the hypothesis that fetal hypoxia has occurred in pregnancies with meconium-stained amniotic fluid.

Fetal motor activity was assessed by real time ultrasound scanning. All observed movements were punched directly on to computer tape. The beginning and end of each movement was recorded so as to measure the amount of time the fetus was moving in each observation period. The number of fetal movements was also calculated and expressed as the mean/30-min observation period.

In 20 pregnant women of 32-42 weeks' gestation, the 4 components of fetal motor activity (head, trunk, arms, legs) were each computed, using two real time scanners, and correlated with the maternal subjective assessment of fetal activity. It was established that fetal trunk movements (FTM) correlated strongly with total fetal motor activity, especially in those movements described as major. Thus FTM could be used to establish normal parameters of fetal motor activity in the 3rd trimester.

In 21 normal pregnancies 24-hour profiles were obtained, by recording for 1 hour in 3, providing a total of 168 hours for analysis. The mean percentage incidence of FTM was 18%, with a mean of 29 moves/30-min observation period. There was a well-defined circadian variation (day/night = 16/22%) which was the reverse of that for fetal respiratory movements (day/night = 37/23%). The variation in both parameters was wide but the total activity (breathing plus FTM) rarely fell below 10% in any 30-min study period.

Cross-sectional day-time data from 100 normal pregnancies between 28 weeks' gestation and term suggest that the mean number of moves/30-min period was inversely related to gestational age, although the percentage incidence of FTM (mean ± SD = 18 ± 10%) was constant throughout the 3rd trimester.

FTM was also studied in 20 pregnancies complicated by intrauterine growth retardation and 25 pregnancies complicated by maternal diabetes mellitus. Preliminary data from the latter group suggest that maternal hypoglycaemia may stimulate fetal motor activity.

Correspondence

Epididymo-orchitis in Kawasaki disease

Sir,

We were interested to read the report by Morgan and Lynch of a case of Kawasaki disease (Archives, 1978, 63, 916). We wish to report a hitherto unrecorded finding occurring during the course of this condition.

A 6-year-old boy was admitted to hospital because of a possible abscess in the left posterior cervical area. He had a pyrexia of 38·5°C. A confluent erythematous rash was present on his trunk and limbs, being more pronounced on the palms and soles. The left testis was slightly tender and enlarged. He had a strawberry tongue, and the veins of the bulbar conjunctiva were noted to be very prominent. The temperature returned to normal after 5 days and he then developed pain and swelling of the right wrist. At the same time there was a striking desquamation of the skin on the palmar aspect of his finger tips. The nail bed was not affected. The testicular tenderness which had been noted on admission became more marked during the next 3 days. Both testicle and epididymis became moderately enlarged. The skin of the scrotum was red and mildly oedematous. Symptomatic treatment only was offered, and after a week the testis and epididymis had returned to normal. At follow-up 6 weeks later no physical abnormalities were present.

This case fulfils the main criteria for diagnosis of Kawasaki disease suggested by Tanaka et al. (1976). There have been some less common associated findings in this condition. One of these is sterile leucocyturia, which was present in our case. It is almost certain that this is due to urethritis, as suprapubic aspiration carried out in the presence of pyuria in a number of these cases has shown normal bladder urine (Melish et al., 1976). However, testicular involvement has not thus far been described. It is likely that the inflammation in our case started in the urethra and progressed via the vas to involve the epididymis and testis.

Reference


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