Paediatric Pathology Society

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Hirschsprung's disease: diagnosis by suction biopsy and staining for cholinesterase activity. B D Lake. The Hospital for Sick Children, Great Ormond Street, London.

The demonstration of cholinesterase-positive nerve fibres in suction rectal biopsies is a useful and reliable method for the diagnosis of Hirschsprung's disease. The method of staining is important as earlier techniques give pale results which are difficult to interpret. The Karnovsky and Roots's direct method, followed by treatment with p-phenylene diamine and osmication, gives a dense reaction that is precise and readily visible. An increase in numbers of cholinesterase-positive nerves in the lamina propria and muscularis mucosae is generally found in cases of Hirschsprung's disease. Experience during a 5-year period shows that there is a variety of patterns of staining which may in some instances reflect the extent of the aganglionic segment. In other cases the density of nerve fibres bears no relation to the severity of the disease. An increase in numbers of nerve fibres in the lamina propria in conditions other than Hirschsprung's disease, difficulties in being sure of the level of the biopsy, and the occasional pronounced increase in lymphoid tissue makes quantitative assay potentially unreliable. Microscopical assessment must remain the method of choice.


During a 2-year period, 372 rectal mucosal biopsies were obtained from 150 children and young adults aged between 6 days and 28 years. Each case presented with a history of chronic constipation and the biopsy was taken to exclude Hirschsprung's disease. Sections of the biopsies were stained histochemically for acetylcholinesterase using the Karnovsky and Roots's modification of the method originally described by Koelle and Friedenwald, and samples of 116 of the biopsies were assayed biochemically for acetylcholinesterase activity. The histochemical findings were compared with the biochemical activity of the enzyme.


Early stimulation of the immune mechanism of small newborn infants. P K Kalpaktsoglou, A Chioti, G Ioannidou, A Kondyli, C Padiatellis, and B Ioakimidou. Marika Eliadi Maternity Hospital, Athens, Greece

We examined whether an early stimulation of the immune mechanism of small newborn infants with a simple antigen might help to promote a better defence against infection. For this purpose we studied 52 newborn infants with birthweights <2001 g. The number of white blood cells, the absolute number of lymphocytes, the serum levels of the immunoglobulins IgG, IgA, IgM, and the number of spontaneous E-rosettes and rosettes formed by the in vitro stimulation of lymphocytes with PHA or autologous serum, were measured every 15 days. Tetanus antigen was used for immune stimulation. 0.5 ml was administered subcutaneously on days 2 and 4. The results suggest that early immunisation in small newborn infants may play an important role in a reduced morbidity, in a better function of the immune mechanism, and in a normal growth.

Defects of the spinal cord: relationship between position of the lesion and embryogenetic mechanisms. Richard J Dryden. Argyll

The part of the neural tube that establishes the spinal cord has a composite origin. There are two main processes: folding and closure of the neural plate, and canalisation of a solid caudal extension known as the medullary cord. The transition between these primary and secondary modes of neural tube formation is gradual and occurs in the future lumbosacral region of the spinal cord. It is proposed that defects such as spina bifida and diplomyelia should be interpreted with regard to their position in view of this complex pattern of neural tube development. Evidence from studies of chick embryos was presented to illustrate the early morphology of defects in different regions of the neural tube.

An unsatisfactory case of α-aminoadipic aciduria. R J Pollitt, MRC Unit for Metabolic Studies in Psychiatry, Middlewood Hospital, Sheffield

Histometrical study of the fetal zone in the anencephalic adrenal gland in early pregnancy. E S Gray and D R Abramovich. Medical School, Aberdeen University, Aberdeen

The adrenal glands of 12 anencephalic and 17 normal fetuses <21 weeks were examined using the point counting technique. The volume of the adrenal gland occupied by the fetal zone in anencephaly was 57% compared with 76% in the controls. This difference is highly significant and shows that pronounced involution of the fetal zone occurs earlier than previously accepted (20 weeks). This finding is important because of its implication that the fetal adrenal gland is dependent on an intact hypothalamic-pituitary axis from a very early age.

Fetal Farber's disease—the first prenatal diagnosis. P F Benson, A H Fensom, H W Moser, A Moser, and H V Dulaney. Paediatric Research Unit, Guy's Hospital Medical School, London

Testosterone levels and sex hormone binding globulin capacities in serum of the diabetic child. B T Rudd and P H W Rayner. Institute of Child Health, and Department of Clinical Endocrinology, Birmingham, and Midland Hospital for Women, Birmingham

Boys with diabetes mellitus may show delayed pubertal development. Serum androgens (SA), mainly testosterone, and sex hormone binding (SHBG) capacities, were measured in the sera of 58 diabetic boys and related to indices of maturation including age (CA), bone age (BA), and Tanner rating. Average androgen concentrations rose progressively with CA and BA (P<0.001). SHBG capacities fell in parallel with increasing BA and SA concentrations. Nine patients had low SHBG capacities, suggesting poor binding. 12 patients had retarded BA which, in all but 2, coincided with SHBG capacities in the prepubertal range. The SA of the older boys in this group were lower than expected for their CA. The data suggest that retarded BA in some male diabetics is related to poor androgen production.

Electron microscopy of fine-needle aspiration biopsy in the preoperative diagnosis of a tumour of a 4-year-old girl. H Nordgren and M Åkerman. Central Hospital, Eskilstuna, and University Hospital, Lund, Sweden


Problems of the interpretation of endocardial thickening. G Batcup. Children's Hospital, Sheffield

Towards a synthetic surfactant; physiological and morphological effects of dry and emulsified surfactant preparations. G Grossmann, C Morley, B Lachmann, R Nilsson, and B Robertson. Karolinska Institutet, Stockholm, Sweden

Morphometry of tracheobronchial mucous glands in cystic fibrosis using the 'magiscan'. M F Kamal, M Lendon, and H B Marsden. University of Manchester, and Royal Manchester Children's Hospital, Manchester

In children with cystic fibrosis it is still controversial whether the disease per se is responsible for mucous gland hypertrophy and hyperplasia or whether it is a sequel to repeated respiratory tract infection. A morphometric study of tracheobronchial mucous glands was performed in order to resolve this matter. The material came from the necropsy files of local paediatric pathology departments and comprised 37 proved cases of cystic fibrosis, with and without respiratory infection, and 38 age-matched controls. The 'magiscan', a modified automatic image analyser, was used to measure the area of tracheal mucous glands and the luminal circumference of the airways. Pen drawings of the magnified outlines of
the mucous glands and the internal circumference of the trachea were obtained by using the camera lucida and slide monitor and these were then automatically quantified by the 'magiscan'. The results were converted into a ratio termed the Glandular Index and defined as the glandular cross-sectional area per unit length of the luminal circumference. It was found that the mean Glandular Index of patients with cystic fibrosis was significantly greater than that of controls, irrespective of superimposed infection. The 'magiscan' is a faster and more accurate instrument than other manual morphometric methods.

Aorto—left ventricular tunnel. A A M Gibson. Department of Pathology, Royal Hospital for Sick Children, Glasgow

Histopathological findings in carotid bodies in cases of congenital malformations of heart. A Abramovici, I Rosenbaum, and E Liban. Sackler School of Medicine, Tel-Aviv University, Israel

It is well established that various hypoxic conditions induce hyperplasia of the carotid body (CB). However, little is known about histological changes of the CB induced by certain congenital malformations of heart (CMH). This study dealt with quantitative and qualitative histological analyses of 52 human CBs, comprising 43 CMH and 9 controls, of which 4 had pulmonary lesions. The age groups ranged from one day to 7 years with an equal sex ratio. Serial histological sections stained routinely with haematoxylin and eosin and connective tissue stains were examined at various levels. The different cell populations in a given microscopic field were counted and statistically analysed. Carotid bodies of CMH cases showed hyperplasia of the chemoreceptor cells (type 1) and perilobular fibrosis progressing with age, whereas the interstitial cells (type 2) remained unaffected. The hyperplasia was particularly pronounced among older cyanotic children, suggesting an insidious stimulatory effect of hypoxaemia on CB chemoreceptors. Intralobular blood vessels were dilated and congested in almost all CMH patients. However, contrary to the above findings, the entity of hypoplastic left ventricle syndrome showed hypoplasia of the CB mainly affecting the type 1 cells. This finding can be explained as a repercussion of secondary underdevelopment of the ventral aorta and of its 3rd and 4th arches on the CB primordia. Various surgical repairs did not change the natural course of CB lesions induced by CMH.

Takayasu's arteritis—a study of 16 necropsy cases. G Rose and C Sinclair-Smith. University of Cape Town, South Africa

16 patients with Takayasu's (idiopathic) arteritis (7 girls, 9 boys) constituted 0.09% of necropsies during a 26-year period. Systemic hypertension was present in 14 patients and 8 had fatal complications related to the hypertension. All portions of the aorta as well as its major branches were affected in the 16 patients. Thrombi were scanty but intimal fibrous plaques and multiple aneurysms were common. These patients showed the unusual presence of segmental involvement of major epicardial coronary arteries, with coronary aneurysm formation in 2 of them. Occlusion of the aneurysm of thrombus led to a left ventricular infarct in an 11-year-old girl. 13 patients showed evidence of residual or active inflammation. Coexistent tuberculosis, distant from the arterial lesions, was present in 37.5% of our patients. One patient showed healed pulmonary arteritis. The aetiology of the disease remains obscure. Strict criteria should be used to differentiate specific forms of arteritis—for example, rheumatic aortitis from Takayasu's arteritis.


The aortic endothelial linings from three 17-week human fetuses were examined by scanning EM. Endothelial orientation and morphology correlated closely with previously described blood flow patterns. Clearly defined alterations both of morphology and orientation were present at areas of known disturbed blood flow—such as beyond the aortic valve, within the aortic sinus, and at arterial orifices. As some of these areas are also associated with atheromatous deposition in the adult, the possibility that endothelial changes might be an atherogenic factor was considered.

Cardiovascular anomalies in a 7-week-old embryo of a woman treated with chlorimipramine. A Abramovici, I Abramovici, G Kalman, and E Liban. Sackler School of Medicine, Tel-Aviv University, Israel


We have shown that true lung hypoplasia occurs after withdrawal of amniotic fluid in the fetal rat. We
now present data indicating that fetal paralysis reduces lung weight still further. Rat fetuses (Sprague-Dawley) were paralysed by subcutaneous injections of tubocurarine at laparotomy (2 mg/kg) on days 18, 19, and 20 of gestation, the fetuses being clearly identified through the thin-walled uterus. Paired littermate controls were divided in two groups: one received 3 injections of physiological saline and the other group was manipulated but not injected. Sequential determinations showed that the curare levels in the control groups were insignificant. All fetal sacs subjected to puncture (needle 27-5) had less extraembryonic fluid until term, presumably as a result of prolonged leakage. Newborn lung weights and lung/body ratios were much lower in the paralysed animals. Most experimental fetuses displayed a spectrum of malformations closely resembling the recently described syndrome of camptodactyly, multiple ankyloses, facial anomalies, and pulmonary hypoplasia, with in addition, a striking pterygium coli.

Newborn ferret. An experiment model for viral infection as a cause of sudden infant death? D I Rushton, M H Collie, C Sweet, and H Smith. Birmingham Maternity Hospital, Birmingham

Morphology of undifferentiated sarcomatous nephroblastoma, rhabdomyosarcomatoid pattern: a light and electron microscopical study. J Briner and H Walt. University of Zurich, Switzerland

Eight mesoblastic nephromas from South Africa. R O C Kaschula. University of Cape Town, South Africa

Eight congenital mesoblastic nephromas were analysed from the Children's Tumour Registry. The most common initial symptom was abdominal distension with a palpable renal mass but one patient presented with haematuria. Complete surgical removal was not possible in one child, and he and two others were given cytotoxic treatment. One premature infant died before resection could be effected and another died shortly after surgery without receiving cytotoxics. All the tumours were large, weighing up to 1412 g, and extension beyond the renal capsule was present in 4, while another was removed in pieces. Histologically, 5 showed diffuse hypercellularity and 2 showed areas of focal hypercellularity. The mitotic rate in the hypercellular areas was 9 times that of the bland fibromyxomatous areas. All tumours showed significant extramedullary haematopoiesis with focal myxoid regions. Features of dysplastic renal development, including islands of cartilage, were seen in the 2 with focal hypercellularity. Among the 5 tumours that were diffusely hypercellular, mitoses were present in renal tubules 'included' in the tumour in three. The study suggests that among the mesoblastic nephromas being encountered in South Africa there seems to be a high incidence of 'grey zone lesions' in the spectrum between benign-appearing mesoblastic nephroma and sarcomatous nephroblastomas.

Analysis of urinary phenolic-acids in the diagnosis of catecholamine-secreting tumours. M J Bennett. Children's Hospital, Sheffield

Ivemark's syndrome—5 cases, 3 from one family. J P Elema, A Anders, and J de Koning. University of Groningen, Holland

Fine structural observations on renal polycystosis induced in the newborn rat by prednisolone tertiary butyl acetate. J S Dixon, R G Lendon, and J A Reid. Medical School, University of Manchester, Manchester

Previous studies have reported histological observations on cysts induced in rat kidneys by prednisolone tertiary butyl acetate (PTBA) and the present study reports fine structural observations. Sprague-Dawley rats were injected IM on the first day of extrauterine life with 66 mg/kg PTBA, while control animals received an equivalent volume of isotonic saline. Control and drug-injected rats were killed in pairs on days 2–12 and portions of the renal cortex and medulla processed for EM. Tubular dilatation was observed as early as day 2 and affected proximal and distal tubules as well as collecting ducts. Many of the cells of the dilated portions were characterised by swollen mitochondria and numerous dense lysosomes, while other cells had clearly undergone necrosis and were subsequently sloughed off into the lumen. The basement membrane surrounding many of the tubular dilations had become thickened and was observed to split in some instances. Some dilated tubules exhibited cells which appeared unaltered in the early postinjection period, and it is concluded that lysosomal activity or cell death, or both, probably occurs as a secondary consequence of drug-induced tubular dilatation and does not represent the primary anomaly.

Fetal liver disease. A clue to the genesis of hepatic fibrosis. D I Rushton, Birmingham Maternity Hospital, Birmingham
Hepatic and renal calcification in the newborn. W F Knox and A J Barson. St Mary's Hospital, Manchester

Although the most common cause of soft tissue calcification in the newborn is intrauterine peritonitis secondary to intestinal obstruction, 7 cases were found at necropsy without intestinal disease being present. Focal hepatic calcification was seen histologically in 6 of these, and renal calcification in 3. Calcification was detected in the necropsy x-ray in 4 cases. All the pregnancies had been abnormal in some respect and resulted in stillbirth or death on the first postnatal day. Six infants were born at or before 30 weeks' gestation and some were markedly light for dates. The hepatic calcification occurred both on the surface and deep within the parenchyma, and in two cases it was confined to the walls of intrahepatic vessels. In all 3 infants with renal calcification deposits were confined to the cortex. Two of these were twins, one of whom had multiple malformations with a normal karyotype. The other twin also had renal calcification. The aetiology of this soft tissue calcification is not known but blood-borne intrauterine infection which has resolved before birth seems a likely explanation for at least some of these cases.

Fatal milk aspiration in term infants—a problem in the neonatal nursery? E S Gray and N J Balch. Medical School, Aberdeen University

Kernicterus in a special care baby unit. A J Barson and D G Sims. St Mary's Hospital, Manchester

There had been no case of kernicterus in the special care baby unit at this hospital until 1977, one year after the introduction of mechanical ventilation and the development of intensive care for ill premature infants. During the last 2 years 9 cases of kernicterus unassociated with rhesus haemolytic disease have been detected in just over 200 neonatal necropsies. Four cases were in inborn infants, representing in 1978 an incidence of 0.7 per 1000 births. Five cases occurred in infants referred for treatment from outside. Six infants were 30 weeks’ gestation or less. Survival ranged from 39 hours to 7 days. The highest bilirubin concentration recorded was 426 mmol/l, but in 5 infants no estimation exceeded 200 mmol/l. Most infants were clinically jaundiced, 3 had exchange transfusions and 4 had phototherapy. No infant had symptoms characteristic of kernicterus. Out of 6 infants with respiratory distress syndrome, 2 had yellow-stained hyaline membranes. Symptom-less kernicterus with relatively low levels of serum bilirubin in premature infants dying from other causes has been reported in other units and appears to be an increasing complication of neonatal intensive care.

Plasma alkaline ribonuclease and its relation to nitrogen metabolism in low birthweight infants. P H Scott. Selly Oak Hospital, Birmingham

Plasma alkaline ribonuclease activity correlated significantly with nitrogen retention in a group of low birthweight infants during the third week of life. High levels of activity were associated with a need to conserve nitrogen and in these infants this was probably due to high rates of growth. High alkaline ribonuclease activity also tended to be associated with low plasma essential amino-acids. In an infant who, due to a metabolic abnormality, was placed on a low protein intake, a relationship was demonstrated between protein intake and plasma alkaline ribonuclease activity. This was compared with plasma transferrin, amino-acid ratios, and urinary urea excretion. It is concluded that the measurement of plasma alkaline ribonuclease activity provides a sensitive indication of nitrogen metabolism in low birthweight infants.

The epidemiology of cot deaths in Australia. A L Williams. Royal Children's Hospital, Melbourne, Australia

Morphological studies in congenital heart defects during open heart surgery. B Wozniewicz. Institute of Paediatrics, Warsaw, Poland

Symposium on fetal alcohol syndrome
Clinical experience with children of alcoholic mothers. K-G Sabel, Göteborg
The fetal alcohol syndrome. A morphological and chemical appraisal in an acute rat model. G Altshuler, Oklahoma
Detecting heavy drinkers and their children. R Murray, London
Problem drinkers in antenatal clinics. P Woolf, Manchester