31 LECITHIN/SPHINGOMYELIN RATIO IN THE HYPOPHARYNGEAL ASPIRATE OF NEWBORN INFANTS

P.A. Barr†, P.A. Jenkins† and J.D. Baum Department of Paediatrics, University of Oxford, The John Radcliffe Hospital, Oxford, U.K.

Lecithin/Sphingomyelin /L/S/ ratio was measured in the hypopharyngeal aspirate of 41 newborn infants. In the 20 infants without respiratory distress the L/S ratiowithin 24 hours from birth ranged from 1.5 to 5.8 with a mean value of 3.3. In the 6 infants with "transient tachypnoea of the newborn" the L/S ratio ranged from 2.0 to 6.7 with a mean value of 3.8. In the 15 infants with idiopathic respiratory distress syndrome the L/S ratio ranged from 0.9 to 2.1 with a mean value of 1.41. In 14 of these infants the L/S ratio within 24 hoursfrom birth was 1.7 or less. The one infant with a higher ratio and severe respiratory distress will be described in detail. Serial hypopharyngeal aspirate L/S ratios were performed in the infants with idiopathic respiratory distress syndrome. There was a possible trend towards the earlier attainment of an L/S ratio of 2.0 in the infants who received continuous distending airway pressure compared with infants who did not receive this therapy.

32 LEUCOCYTE MIGRATION INHIBITION FACTOR /LIF/ IN NEWBORNS, NORMAL CHILDREN AND CHILDREN WITH IMMUNE DEFICIENCY

S. Levin and T. Hahn† Pediatric Research Department, Kaplan Hospital, Rehovot, Israel.

LIF is one of several effector substances secreted by immuno-competent T-cell lymphocytes when stimulated by appropriate antigens or mitogens. Using a simple, sensitive, rapid and reproducable agarose-cell droplet assay, lymphocytes and PMN leucocytes from healthy and sick children were tested for LIF activity. It was shown that it is the T-cell that produces LIF, and that the newborn has competent LIF producing lymphocytes to PHA. Normally spontaneous leucocyte migration occurs, but in the newborn is less than in older children. Results of this study indicate that the T-cell population is heterogenous. Children with B system deficiency have normal PPD and PHA induced LIF production, whilst children with ataxia-telangiectasis have deficient PPD LIF activity and lownormal PHA LIF activity. On the other hand cases with Down's syndrome have markedly deficient PHA LIF activity but good PPD activity. Children receiving steroids lose much of their ability to produce LIF to PPD but not to PHA. This study indicates that LIF assay is a useful test of T-cell function.

33 COMPUTER ANALYSIS OF CAPNOGRAMS BY AUTOMATIC ON-LINE DATA RECORDING

L. Murányi and I. Szekeres† Paediatric Department, University of Szeged, Hungary.

Author's earlier studies - with Geubelle - proved that the slope of the expiratory CO_2 curve indicates disturbance of gas exchange following obstructive respiratory disturbance. A diagnostic and clinical pharmacological method based on the above observation was reported, with which in particular children younger than 6 years can be well examined during quiet breathing. A procedure for automatic evaluation of the capnograms is now reported. Simultaneous with analog recording of the curves, an automatic digital data-treating apparatus records the data of the capnogram on punched-tape in on-line mode, and provides them with notations serving as the basis of the programme. Calculation is performed by central computer. Data evaluated are: slopes of ascending part /t_1/ and plateau /t_2/ of capnogram; their quotient; end-expiratory CO_2 concentration; duration of expiration; breathing rate; numbers of recorded and evaluated curves; and percentage of changes. The programme selects curves distorted by artifacts. During 2 years, 1500 examinations have been made with the apparatus. The computer-analyzed t_1/t_2 capnogram data for 90 healthy children/=65. S.D.$\pm$ 18 agreed with data earlier reported.

34 CONTINUOUS MONITORING OF ARTERIAL OXYGEN TENSION USING A CATHETER-TIP POLAROGRAPHIC ELECTRODE IN INFANTS

M. Conway†, G.M. Durbin†, N. McIntosh†, D. Parker†, E.O.R. Reynolds and L. Soutter† Depts of Medical Physics and Paediatrics, University College Hospital, London, England.

A new PO_2 electrode mounted in the tip of a 5F umbilical artery catheter was used in 36 newborn infants with severe respiratory illnesses 28 of whom survivied. 37 electrodes were used. The median age at insertion was 4 /range 1/2-122/ hr. 3 electrodes failed to work and they were removed or replaced, and 2 could not be properly evaluated. 32 electrodes functioned satisfactorily after a onepoint calibration against blood sampled through the catheter. 22 did not need recalibration until they were removed after 10-109 /mean 88/ hr. 4 of the remaining 10 electrodes were recalibrated once after 33-97 hr and then functioned until removed 15-55 hr later; and the other 6 electrodes failed after 32-105 /mean 49/ hr. Complications were few. 356 arterial blood samples obtained after the initial calibration and before any recalibration was required gave a correlation coefficient of 0.93 /$p < 0.0001$/ against independent system /Radiometer Type E5046 O_2 electrode/.We conclude that the catheter-tip electrode is a safe and reliable instrument for continuously recording PaO_2 in infants.

35 ARTIFICIAL VENTILATION IN YOUNG CHILDREN; EXPERIMENTAL EVALUATION OF RESPIRATORS

Z. Rondio† and M. Rawicz†/Intr. by K. Bozkowa/ Department of Anaesthesiology, The National Research Institute of Mother and Child, Warsaw, Poland.

Our clinical experience is based on the use Keuskamp's respirator and its function was compared with an experimental model. Using a mechanical lung-thorax analogue, normal and abnormal elastic and airway resistances have been simulated under controlled laboratory circumstances. Calculation of the ventilatory parameters were carried out using a pneumotachograph, electromanometer andpulmorecorder. The following data were determined: inspiratory and expiratory flow rates, ventilatory volumes and respiratory pressures.The method needed to achieve optimal ventilation in different circumstances may be easily demonstrated and explained. The most difficult practical problem is the maintenance of sufficient ventilation for younger children with respiratory pathology. Very often prolonged decrease of compliance and increase resistance are observed. High inspiratory pressure restricted the effective tidal volume and decreased alveolar ventilation. The flowpattern during inspiration should be selected between constant, decelerating and sine-wave. Volume and timecycling devices are less dependent on lung characteristics than pressure cycling mechanism.

36 ISOLATION OF LYSOSOMES FROM SKIN FIBROBLASTS OF NORMAL AND CYSTINOTIC INVIDUALS

E. Harms† and W.A. Kroll†/Intr. by H. Bickel/ University Children's Hospital, Heidelberg, F.R.G.

The biochemical lesion in cystinotic cells resulting in lysosomal storage of cystine is not yet known. The lysosomal metabolism of cystine should be investigated in isolated lysosomes. In whole unfractionated cells, the cystine metabolism was found to be unchanged /Patrick 1962, Schneider et al. 1967/.
Human skin fibroblasts were cultured in large scale /2 x 10^8 to 1 x 10^9 cells in one batch/. After differential centrifugation free-flow electrophoresis according to the method of Hannig et al. was used for isolating native lysosomes from these fibroblasts.The purity of lysosomal fractions was controlled by electron microscopy and by measuring enzyme markers for lysosomes, mitochondria and peroxisomes. The activity of enzymes involved in cystine reduction in cystinotic lysosomes was compared to that in normal lysosomes /cystine-glutathione-transhydrogenase, glutathione-reductase/.