

A NEW METHOD OF TESTING MITRAL VALVE FLOW CHARACTERISTICS

JOHN WRIGHT This has been evolved with a modified pulse duplicator and the use of a hot film probe for measuring velocity, direction, and turbulence. Many of the commercially available mitral valve prostheses are being investigated for their flow characteristics. In addition, efficiency is being examined and some unusual findings point to the possibility of a hydraulic ram effect in the normal mitral valve that allows opening to commence before the end of ventricular systole.

TRIAL OF A NEW ANTI-MYXOVIRUS COMPOUND

J. E. STARK Two hundred and sixty-four male students living in a hall of residence volunteered to take part in the trial and were randomly allocated into two groups. One group received a synthetic isoquinoline derivative (UK. 2371) daily in divided doses and the other group received identical placebo tablets.

During the five weeks of the trial tablets were distributed daily and volunteers were asked to return any tablets which had not been taken. As an additional guide to tablet acceptance a small quantity of isoniazid was incorporated into some active and placebo tablets and urine samples collected at appropriate times were tested for isoniazid derivatives.

Volunteers were questioned each week about their health and were asked to report all respiratory and other illnesses. All respiratory illnesses were fully investigated for virus and mycoplasma infections. Full toxicity studies were carried out.

The preliminary findings are reported with particular reference to (1) protection against acute respiratory illness provided by the drug; (2) assessment of the novel isoniazid marker system; and (3) the factors affecting acceptance of medication by volunteers.

MYCOPLASMA PNEUMONIAE

M. C. JONES A retrospective study was made of 100 cases of infection with *Mycoplasma pneumoniae* notified through the Public Health Laboratory four-weekly review during 1967-68, and diagnosed by isolation or complement fixation studies. The mode of presentation, physical, radiological and haematological findings, complications, treatment, and progress are reported.

The results are also presented of an investigation into the isolation rate of *Mycoplasma* species (including *pneumoniae*, *hominis*, *orale*, and *salvarium*) from the nasopharynx of patients admitted to hospital with acute exacerbations of asthma, bronchitis or bronchiectasis and from the nasopharynx and bronchial tree of patients submitted to bronchoscopy.

BLOOD LEUCOCYTES DURING EXERCISE IN TUBERCULOUS PATIENTS AFTER GASTRECTOMY

AKE HANNIGREN and TORE STRANDELL An increased incidence of tuberculosis in patients with gastrectomy has been found in repeated studies. A correlation

between tuberculosis and poor nutrition in patients with the dumping syndrome has been found. It has been suggested that patients suffering from gastric insufficiency have an impaired immunological defence expressed as absence of leucocytosis in febrile infections. The number of leucocytes in the blood at rest, however, is not representative of the total number of leucocytes in the body. During stress, such as after adrenaline injection or during exercise, high leucocyte counts in blood have been recorded and this has been attributed to a redistribution of leucocytes from other parts of the body.

The leucocyte count was determined at rest and during a 30-minute exercise period in gastrectomized and non-gastrectomized patients with pulmonary tuberculosis. The increase with exercise of polynuclear and of the total number of leucocytes was less ($P < 0.05$) in the gastrectomized group. No relationship of significance could be observed between different absorption tests and the increase of leucocytes. The number of leucocytes at rest and during exercise was correlated ($P < 0.05$) with the concentration of gamma globulin and tuberculin reactivity: those with weak reactivity and low gamma globulin concentration had low leucocyte counts.

HEAT LOSS DURING THORACOTOMY

J. A. DYDE and H. F. LUNN A heat debt incurred during an operation necessitates an increase in metabolic rate after operation. Moreover the strict avoidance of a heat debt during and after operation greatly reduces the usual 'metabolic response to trauma'.

We measured the heat debt incurred during thoracotomy, first with no particular measures taken to prevent heat loss and, secondly, using a heat-reflecting aluminium foil blanket wrapped around the lower half of the patient.

Our method of measuring heat loss was adapted from that of Burton and Benzinger. Deep body, calf, forearm, and abdominal skin temperatures were measured. From these readings the average body temperature and the change in heat content were calculated.

Our results are of interest for several reasons:

1. The average heat debt without precautions against heat loss was 20 Kals per hour. This involves a doubling of the metabolic rate to repay the debt.
2. The average heat loss when the blanket was used was 4 Kals per hour.
3. If the blanket was used when the ambient temperature was 23° C. or above, many patients gained heat.
4. It appears that, if a heat debt is incurred and peripheral vasoconstriction results, the rise in deep body temperature commonly seen after trauma is exaggerated.
5. When the patient was in heat balance and the skin was vasodilated, urine was usually secreted in satisfactory amounts and the circulating blood volume was easier to assess.

THE GLOMUS PULMONALE

Outline of the Problem

DONALD HEATH The existence of glomic tissue in close association with the pulmonary trunk and small pulmonary veins, in man and animals. Its possible chemo-

receptor function and importance in states of chronic hypoxia.

Microanatomy of Glomic Tissue of the Pulmonary Trunk

C. W. EDWARDS The microanatomical structure and cytology of glomic tissue of the pulmonary trunk in man and animals.

Peripheral Glomic Tissue within the Lung

H. SPENCER The microanatomical structure of glomic tissue around small pulmonary veins. Possible functional significance. Intrapulmonary chemodectomas.

The Concept of a 'Glomus Pulmonale'

V. E. KRAHL The concept of a glomus of the sixth branchial arch. Its possible functional significance.

Vascularization of the So-called 'Glomus Pulmonale'

A. E. BECKER A demonstration that the glomus pulmonale is supplied by the intertruncal branch of the left coronary artery and not by a branch of the pulmonary trunk. The hypothesis that glomic tissue of the pulmonary trunk does not represent a true glomus pulmonale and does not have a true pulmonary chemoreceptor function.

Physiological Evidence for and against the Presence of a Pulmonary Chemoreceptor

HELEN DUKE

The symposium is supported by demonstrations.

REGULATION OF CEREBRAL BLOOD FLOW IN CHRONIC RESPIRATORY INSUFFICIENCY

BARBRO EKSTRÖM-JODAL and EGIL HÄGGENDAL Acute changes in the arterial carbon dioxide tension and oxygen saturation have marked effects on the resistance of the cerebral blood vessels so that hypocapnia causes vasoconstriction while hypercapnia and hypoxia cause vasodilatation. In conditions with long-standing alterations in the arterial blood gas situation, however, there has been evidence of normalization of the cerebral blood flow and simultaneously a return of the cerebrospinal fluid pH towards normal values. This investigation has been performed in patients with chronic respiratory insufficiency. The cerebral blood flow, arterial and cerebral venous blood gases and cerebrospinal fluid composition have been studied during several consecutive days in patients with an exacerbation of the disease and in patients who have been in a 'steady state' in relation to blood gases for a long time. In both groups the blood gas situation has been acutely changed by hyperventilation or inhalation of different gas mixtures.

The cerebral blood flow has been measured with a modified Kety-technique, *i.e.*, a saturation technique using ^{133}Xe as the indicator. Acute changes in cerebral blood flow have been estimated from the arteriovenous oxygen difference.

PARTICLE DEPOSITION IN THE LUNGS OF CHILDREN

D. C. F. MUIR, A. HISLCP and LYNNE REID There is no method at present whereby the site of particle deposition in the lungs of human subjects can be determined directly. Our best estimates are based on considerations of the size of the particles and on the dimensions of the airways. Three authors (Findeisen, 1935; Landahl, 1950; and Beekmans, 1965) have attempted an analysis of this type. Airborne infections and allergic reactions are common in children and inhalation therapy is widely used in the treatment of children with respiratory disorders. It is thus important to obtain some idea of the manner in which inhaled particles are handled by the lungs of children. In this paper an attempt is made to understand the particle deposition pattern as a function of age using the mathematical approach developed by Landahl (1950) for determining the probability of deposition in different regions of the lung.

PROLONGED SURVIVAL AFTER HUMAN LUNG TRANSPLANTATION

P. VERMEIRE AND COLLEAGUES (BELGIUM) Homotransplantation of one lung was carried out in a 23-year-old man suffering from acute silicosis in November 1968. This patient has survived until the time of writing. His progress and present state will be described on behalf of the team responsible for the operation, which was carried out at the Akademisch Ziekenhuis, Gent. The members of the team are F. Barbier, P. Vermeire, F. De Rom, J. Versieck, S. Ringoir, J. Tasson, H. Lamont, and R. Verbeke.

SOME RADIOLOGICAL STUDIES OF THE PULMONARY CIRCULATION

Pulmonary Air Embolism: Physiological Aspects

ERIK BERGLUND and STAFFAN JOSEPHSON Pulmonary air embolism was followed by acute pulmonary arterial hypertension starting within 5 seconds and reversing totally within 15 minutes. Pulmonary blood flow fell by 0-52% and reversed to control level within one minute.

The role of vasoconstriction in the increased vascular resistance was evaluated. Air was injected into only one lung with the dog in the lateral position. In five dogs 17 air injections (0.5-2 ml/kg. body weight) were performed. The PA pressure rose from an average of 18 mm. Hg to 35 mm. Hg, which is much more than on unilateral PA block. Thus a substantial part of the pressure rise is caused by vasoconstriction. This interpretation was confirmed by injecting air into a previously occluded pulmonary artery: a similar pressor response occurred in 20 of 36 experiments. We believe that this is due to a nervous reflex, but neither vagotomy nor alpha or beta receptor blocking prevents the pressure rise.

During embolization the arterial oxygen saturation falls. Like the pressor response, the saturation change is reversible. On unilateral air injection into a previously