

tion of the heart, and particularly of the right ventricle, when the heart is in its correct central position.

If during intra-uterine life the heart is not central and during development lies to the left side, leaving the mediastinum empty, there will be no positive force to elevate the sternum, but rather a negative pressure which will suck it in.

The ribs and sternum ossify early, but the costal cartilages and costochondral joints remain mobile and supple until late adolescence. If during this period of growth the heart is not central, the sternum will be sucked in during each inspiration, and overgrowth of the costal cartilages will take place to fill the empty mediastinum.

The operation consists of excising the deformed cartilages and suturing the heart into its central position, thus correcting the deformity.

LUNG SCANNING USING XENON

I. K. BROWN, A. SEATON, and D. GAZIANO The use of poorly soluble radio-active gases such as xenon-133 and nitrogen-13 in the measurement of regional ventilation and perfusion of the lungs is now well established. Equipment for the monitoring, recording, and display of radioactivity is readily available, but a suitable stand to carry the scintillation counters is not. A stand which can be simply modified to provide fixed or moving scans with the patient in the vertical, horizontal or intermediate positions is now described. Results obtained in normal subjects and in patients with mitral disease and chronic airways obstruction illustrate its use in practice. Patients with mitral disease were studied in the vertical position, and the relationship between pulmonary vascular resistance and the deflection of perfusion to the upper lung regions is reported. In patients with airways obstruction, the horizontal position was adopted in order to detect any reduction of upper zone perfusion, since this would not be apparent in the vertical position. An impairment of both ventilation and perfusion to the upper lung regions was found in patients with emphysema but not in those with chronic bronchitis and cor pulmonale.

LUNG SCANNING IN BRONCHIAL CARCINOMA

R. H. SECKER WALKER and J. L. PROVAN Scintillation scanning of the lungs provides a safe and effective way of demonstrating pulmonary arterial perfusion. In the last two years more than 600 lung scans have been performed and the results in more than 130 patients scanned for suspected carcinoma of the bronchus are reviewed.

A detailed analysis has been made of those patients who underwent thoracotomy. The lung scans have been compared to the chest radiographs, bronchoscopy findings, spirometry results, and the nature of the tumours. Mechanisms of the defects in perfusion and the value of

lung scanning in determining the extent of surgery, and in particular whether a neoplasm is inoperable or not, are discussed.

SURGICAL CORRECTION OF AORTIC COARCTATION IN CHILDREN

B. J. BICKFORD One hundred and four children under the age of 15 were operated upon for coarctation of the aorta at the Royal Liverpool Children's Hospital. There were 73 boys and 31 girls. Twenty-four had operations in the first year of life because of dyspnoea, feeding difficulties or congestive cardiac failure. Thirteen of these infants were less than 2 months old at operation. Mortality in infancy was 17% and, although operation was life-saving, 40% appeared to have some residual stenosis at follow-up. Half of the older patients were between 4 and 8 years old at operation; the mortality in this non-infant group was 6%. A graft was used five times and a plastic repair on eight occasions. One graft thrombosed three years later and was replaced. Reactionary hypertension was observed after operation in 40% of patients but was over 200 mm. Hg in only eight of these. Reduction of blood pressure was rather greater in the infants (average from 175 to 125 mm. Hg) than in the older children (average from 150 to 120 mm. Hg). Persistent hypertension was found at follow-up in seven of the non-infant cases; three of these probably have some residual stenosis. Post-operative abdominal complications occurred in nine cases; these were severe in three cases and fatal in one.

PULMONARY ARTERIO-VEINUS FISTULA

B. P. MOORE Forty cases of pulmonary arterio-venous fistula have been collected from various centres. The chief features of the analysis of the 22 males and 18 females in this series are:

1. Telangiectasis is almost invariably accompanied by epistaxis.
2. The left lower lobe of the lung is the one most commonly affected.
3. Single fistulae were found in 27 cases and multiple fistulae in 13, of which only five were female.
4. Particular attention was paid to the complications of the primary condition and to associated disorders. Females were more prone to serious complications than males. Two patients developed massive haemothorax from intrapleural rupture, one in the fifth and the other in the eighth month of pregnancy.

Although the number is very small, this suggests that pregnancy may be a strong indication for operative treatment of the condition.

EXERCISE RESPONSE IN PATIENTS WITH SARCOIDOSIS AND INTERSTITIAL LUNG DISEASE

R. A. CLARK Shepard has pointed out that the relationship between oxygen uptake, arterial oxygen saturation,

and oxygen transfer factor may limit exercise capacity in disease. This relationship has been explored in 11 normal subjects, 18 patients with sarcoidosis, and eight patients with interstitial lung disease by varying the inspired O_2 concentration at standard work loads and following the arterial O_2 saturation by means of an ear oximeter.

In normal subjects the relationship between inspired PO_2 or alveolar PO_2 and arterial saturation is a curve of increasing steepness at lower O_2 pressures. In all but one of the patients with sarcoidosis a curve indistinguishable from normal was found. The radiographic appearances in these patients ranged from hilar gland enlargement to diffuse changes in the lungs. In all the patients with interstitial disease, the curve was displaced to the right, and it was possible in six patients to determine the increase in inspired PO_2 necessary to maintain the resting O_2 saturation unchanged.

This procedure may provide the basis for a simple bloodless test for the detection of the onset of impairment of oxygen transfer in disease.

HYPERVENTILATION OF PREGNANCY

J. E. UTTING and E. T. FADL In pregnancy, and more especially in labour, there is a considerable hypocapnia due to active pulmonary hyperventilation. There is, however, a concomitant metabolic acidosis, and arterial blood pH usually lies within the limits of normality for the non-pregnant state.

Though there is general agreement in the literature that blood lactic acid concentrations rise in hypocapnia

and alkalosis there is no agreement on the degree of this rise nor on the mechanism of its production. Pregnancy and labour provide a unique opportunity to study this problem, since there is prolonged hypocapnia without alkalaemia in a physiological context.

In this study blood lactate concentration has been measured in samples of arterialized venous blood using an enzymatic method in pregnant patients, some of whom were in labour, and these values were compared with those from volunteers engaging in active hyperventilation for short periods.

The results indicate that the physiological hypocapnia of pregnancy is accompanied by near normal concentration of lactic acid and confirms suggestions that the respiratory muscles are unlikely to be a major source of this acid.

INTRA-BRONCHIAL COLOUR PHOTOGRAPHY

P. STRADLING The time needed to ensure the best conditions for photography is considerably longer than is usually taken for routine bronchoscopy. Therefore, under general anaesthesia with relaxation, special methods of ventilation must be used to ensure oxygenation and low CO_2 levels. Some methods used at present to achieve satisfactory photography and adequate ventilation are critically discussed together with suggestions for future improvement. The paper is illustrated by photographs of endo-bronchial anatomy and pathology to demonstrate their teaching value.