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PROCEEDINGS OF THE THORACIC SOCIETY

A joint meeting of the British Cardiac Society and the Thoracic Society was held on March 2 and 3 at the Postgraduate Medical School of London. The meeting was composed of two symposia and a number of short papers. Summaries follow.

SYMPOSIUM ON DISORDERS OF THE PULMONARY CIRCULATION

PATHOLOGY

D. HEATH discussed the histological changes of pulmonary hypertension. Normally pulmonary arteries are thin-walled, but they show increased medial thickness in the presence of pulmonary hypertension. This is brought about by both vasoconstriction and the development of circular and longitudinal muscle. Not all thick-walled pulmonary arteries are hypertensive; many animals have a muscular pulmonary vasculature. One should be cautious in the assessment of "medial hypertrophy" when the lungs of such animals are employed in experiments on the pulmonary circulation and subsequently studied histologically. Vessels exposed to hypertension next show cellular, fibrous, and finally fibroelastic thickening of the intima. Generalized and localized dilatation of the pulmonary vascular tree follows. The localized dilatation lesions may be vein-like branches of hypertrophied arteries, plexiform or angiomatoid lesions. These are all acquired and not congenital manifestations. Finally, acute and healing stages of necrotizing arteritis occur. Various types of bronchopulmonary anastomoses occur in the hypertensive lung.

THROMBO-EMBOLIC DISORDERS

J. F. GOODWIN said that thrombotic occlusion of the large pulmonary arteries is more common in the presence of established pulmonary vascular disease but can occur in its absence. The thrombosis usually arises from a previous embolism but can occur *in situ*.

The features of this condition are briefly mentioned with reference to 23 cases already published.[1]

Pulmonary hypertension frequently complicates thrombo-embolic pulmonary vascular disease. Two groups of patients are seen: those with signs of pulmonary embolism or infarction and with occlusion of the large pulmonary arteries; and those without such symptoms who have obliteration of the minute pulmonary arteries, producing a syndrome resembling idiopathic pulmonary hypertension, but without overt signs of pulmonary embolism or infarction.

The clinical picture and the results of radiographic, cardiographic, and angiographic investigations were described together with other special investigations of pulmonary function in 16 patients.

The importance of early diagnosis and anticoagulant treatment was stressed.

[1] Ball, K. P., Goodwin, J. F., and Harrison, C. V. (1956). *Circulation*, **14**, 766.

CONGENITAL VASCULAR ABNORMALITIES OF THE LUNGS

J. N. PATTINSON said that there are many types of congenital vascular abnormality of the lung, and these vary in their clinical significance. The anomalies may be classified under four headings: (1) abnormalities affecting the pulmonary arteries; (2) abnormalities affecting the pulmonary veins; (3) abnormalities involving both the pulmonary arteries and pulmonary veins; and (4) anomalous arterial supply to the lung. This classification merely indicates the site of the major abnormality.

With the introduction of new diagnostic methods, cardiac catheterization and angiocardiography and the more widespread use of these techniques, it has become apparent that these congenital vascular anomalies are by no means rare. Surgery has much to offer in the treatment of many of these cases. It is therefore important that the haemodynamic significance and the detailed anatomy of these anomalies should be demonstrated before operation.

The radiological investigation of the following abnormalities was discussed: congenital absence of the right or left pulmonary artery; peripheral pulmonary stenosis; and pulmonary arterio-venous malformations.

PHYSIOLOGICAL INVESTIGATION OF THE PULMONARY CIRCULATION

PHILIP HUGH-JONES stated that the human pulmonary circulation was first assessed clinically with help from the cardiograph and chest radiograph. Then cardiac catheterization allowed direct measurement of pulmonary pressures, and the injection of radio-opaque material showed regional pulmonary blood distribution; bronchospirometry enabled the blood-flow through the two lungs to be assessed by comparing their oxygen uptake; and dye-dilution curves gave estimates of central blood volume and shunts where blood by-passed the lungs.

He then described four new methods: whole-body plethysmography to study gas uptake in lung capillaries; radioactive gases (^{15}O, $C^{15}O_2$, ^{133}Xe, and ^{85}Kr) to show topographical variations in pulmonary blood flow and demonstrate by-pass shunts; continuous gas-analysis at bronchoscopy to measure changes in blood flow to individual lobes or segments; and analysis of expired gas to detect ventilated but unperfused lung caused by pulmonary emboli.

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PHARMACOLOGY

P. HARRIS said that the pulmonary circulation differs greatly from the systemic in both structure and physiology. The action of what smooth muscle does exist in the vessels of the lungs is often overwhelmed by purely mechanical alterations in their calibre. Hence, in studying the effects of drugs on the pulmonary circulation, it is first necessary to make adequate allowance for its mechanical properties. Having made such allowances, there is evidence that hypoxia can constrict and acetylcholine dilate the vessels of the normal lung. The occurrence of pathological pulmonary hypertension associated with medial hypertrophy of the muscular pulmonary arteries may make the action of drugs more apparent.

CLINICAL ASPECTS OF PULMONARY HYPERTENSION

WILLIAM EVANS considered there was need to adopt a definition of pulmonary hypertension independent of pressure values gained by cardiac catheterization, for reliance on these would lead to the same confusion as existed in the case of systemic hypertension. Pulmonary hypertension should be known as a state of persistent elevation of the pulmonary arterial blood pressure sufficient to cause hypertrophy of the right ventricle with characteristic clinical, electrocardiographic, and radiological signs.

The condition, although found in association with other clinical states, presents at root the same constant mechanism, namely, obstruction within and never outside the pulmonary circulation. The commonest cause of this is intimal proliferation within the lesser pulmonary arteries which forms over congenital defects of their medial coats.

Whenever pulmonary hypertension occurs alongside congenital cardiac shunts or mitral stenosis, the clinical signs which characterize these become greatly modified and their diagnosis correspondingly more difficult.

HAEMODYNAMIC EFFECTS OF ARTIFICIAL CARDIAC PACEMAKING IN PATIENTS WITH COMPLETE HEART BLOCK

W. A. HUDSON gave the results in 12 patients between the ages of 21 and 71 who had been studied. Arteriosclerotic heart block was present in 10 patients.

Artificial cardiac pacemaking was achieved by passing a catheter electrode into the right ventricle. Resting direct Fick cardiac outputs, pulmonary arterial and wedge pressures, and brachial arterial pressures were measured at idioventricular rhythm and at three or four pacemade heart rates between 50 and 100. Exercise studies were performd in ten of the patients.

At rest, cardiac indices were low (mean 2.2 l./min./sq. m.) at idioventricular rhythm (mean rate 36), and were maximal (mean 3.0 l./min./sq. m.) at pacemade rates between 70 and 80 (mean 73 beats/min.). Mean pulmonary arterial (mean 29 mm. Hg) and wedge (mean 22 mm. Hg) pressures were raised at idioventricular rhythm and were unchanged by pacemaking.

On exercise, cardiac indices at idioventricular rhythm (mean rate 39) rose (mean 3 l./min./sq. m.) mainly due to stroke indices increases (from 64 to 78 ml./sq. m./beat mean). At a mean pacemade rate of 78, cardiac indices on exercise were increased (mean 4.1 l./min./sq. m.). Pulmonary arterial and wedge pressures on exercise rose to the same level at idioventricular rhythm and during pacemaking.

It was concluded that the low cardiac output at rest and the impaired increase in cardiac output on exercise due to the idioventricular bradycardia of complete heart block can be corrected by artificial cardiac pacemaking.

CLINICAL ASPECTS

L. D. ABRAMS discussed the indications for long-term artificial cardiac pacemaking. The principles and technique of inductive coupled pacemaking were briefly described and its advantages compared with methods using leads through the skin or the implantation of a complete pacemaker. Experience with the use of this method in 22 patients suffering from complete heart block of non-surgical origin over the past two years was described.

UNIVENTRICULAR ASYSTOLE AFTER MYOCARDIAL INFARCTION

H. R. S. HARLEY reported two cases of death after myocardial infarction in which asystole of one ventricle was associated with rhythmical contraction of its fellow. Experimental arrest of one ventricle was produced in a series of rabbits by injecting air into the marginal vein of the ear, and was illustrated by a film made from two experiments.

The mechanism of univentricular asystole was discussed.

Several questions were posed and discussed. How often does isolated asystole or impaired contraction of one ventricle occur? How often is it a cause of fatal cardiac arrest? Is such a mechanism responsible for clinical syndromes such as acute pulmonary oedema?

OPERATION ALTIPLANO

A. JOHN ROBERTSON had described in a previous communication the ways in which over 120 men had acquired stannosis, benign pneumoconiosis due to tin oxide; one was by inhaling dust when bags of Bolivian ore concentrate were emptied in Liverpool. A visit was made to Bolivia in search of the men who filled these bags, and seven mines at altitudes of 13,000 to 17,000 feet were inspected. Illustrations were shown of the people, mountains, llamas, and mines, and some effects of altitude were briefly discussed. Ten men with stannosis were found in a 2,000-mile survey of the Altiplano region of Bolivia.

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THE PHYSICIAN'S APPRAISAL OF THE SURGICAL TREATMENT OF AORTIC STENOSIS

WALTER SOMERVILLE said that two different groups of patients are concerned in the surgical treatment of aortic stenosis. In the first two decades, severe aortic stenosis is a lethal condition and surgical correction under direct vision is imperative ; the present mortality is acceptable and the results are usually satisfactory. In certain patients over 40 years, aortic stenosis can produce cardiac enlargement without symptoms and allow normal life expectancy ; in others, symptoms develop with a comparable degree of cardiac enlargement. Operation is essential in these patients. Earlier operative mortality figures sometimes gave an over-optimistic view of the success of surgical treatment. New techniques including prosthetic cusp replacement under direct vision give promising short-term results. The prognosis beyond two years is unknown. When heart failure is present, these techniques still carry a prohibitive mortality: closed transventricular aortic valvotomy in these patients offers reasonable prospect of improvement.

SYMPOSIUM ON ANTIBIOTIC POLICY IN HOSPITALS

THE PROBLEM OF CARRIERS OF *Staphylococcus aureus*

R. BLOWERS said that symptomless carriers are of little less importance than septic lesions in the spread of "hospital staphylococci." Efforts to prevent staphylococcal acquisition and to reduce carriage rates among hospital patients and staff thus seem justified.

The most tried method of control is the application of antibiotics to the commonest carriage site, the nose. Despite some successes, this is not consistently effective. Moreover, its continuous use by an entire hospital population is virtually impracticable. An environmental aerial spray of methicillin is apparently more effective, but its possible dangers are still insufficiently studied.

Though they are sometimes needed for treatment of individual carriers, there seems no place for antibiotics in the *routine* control of staphylococcal carriage. More promising methods seem to be the use of hexachlorophene soaps, and, more fundamentally, the design and ventilation of hospitals to reduce aerial transfer of staphylococci.

A CONTROLLED TRIAL OF PENICILLIN FOR THE PREVENTION OF INFECTION AFTER THORACIC SURGERY

K. M. CITRON described a study of 176 patients undergoing thoracic surgery. They were randomly divided into two groups, one in which each patient received penicillin, 2 million units twice daily, starting the day before operation and continuing to the fourteenth post-operative day, and a control group.

The incidences of wound, pleural space, and lung infections were investigated, and it was found that in the penicillin group there was a reduction in space infections and especially lung infections due to staphylococci and also in infections in which staphylococci were not isolated, but differences between the two groups, though suggestive, did not attain statistical significance.

Differences in the numbers of deaths due to infection were considerable (12 in the control group and one in the penicillin group) and statistically significant, and were attributed to the control of dangerous pulmonary infections in the post-operative period, particularly in middle-aged bronchitics. It was concluded that penicillin prophylaxis has no disadvantage and its routine use considerably reduces the mortality after thoracic surgery.

ANTIBIOTIC POLICY AND DRUG-RESISTANT STAPHYLOCOCCI

MARY BARBER said that drug-resistant staphylococci have reached their present position of predominance in hospitals as a result of the widespread use of antibiotics in wards where cross-infection was taking place, so that strains were in fact being passaged from patient to patient in the presence of antibiotics. In order to reverse the situation in which our hospitals have become breeding grounds for more and more strains of *Staph. aureus* resistant to more and more antibiotics, it is necessary to control both cross-infection and the use of antibiotics.

With this end in view a controlled antibiotic policy, including restriction in the use of penicillin and double chemotherapy, was introduced into a large general hospital six months after the introduction of anti-cross-infection measures, the most important of which was the isolation in single-bedded wards of all patients with multiple resistant staphylococcal infection. Following the introduction of this policy the percentage of staphylococcal infections in the hospital sensitive to antibiotics showed a significant increase.

THE FIRST SIX HUNDRED

HERBERT SLOAN reported that 600 patients had undergone repair of cardiac defects with the use of extracorporeal circulation at the University of Michigan Medical Center. The mortality rate in 311 patients with uncomplicated intracardiac defects was less than 1%. One hundred and eighty of these patients with uncomplicated defects were operated upon consecutively without a death.

An extracorporeal circulation has been developed which employs gravity drainage, a rotating disc oxygenator, roller pumps, and a heat exchanger. The use of moderate, whole-body hypothermia (28–30° C.) has facilitated the repair of intracardiac lesions. Flow rates have been sufficient to maintain a mixed venous oxygen saturation of 70% and a mean blood pressure of 80 to 100 mm. Hg. It has been possible to perfuse successfully patients ranging in weight from 6 to 250 lb.

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VASCULAR AND RESPIRATORY ADAPTATIONS IN MARINE MAMMALS

R. J. HARRISON described the diving performance of young common seals (*Phoca vitulina*) investigated while harnessed to a board or freely swimming in tanks, at sea, or in a pressure chamber. Two-year-old animals can dive for up to 30 minutes to depths of up to 96 m. Throughout the dive a bradycardia occurs from about 120 to as low as 4 beats per minute, but rises slowly as the dive progresses. It is believed that a striated caval sphincter occludes the venous return during the dive, and the parts played by the sphincter and the phrenic and vagal nerves and other vascular and pulmonary modifications have been investigated experimentally in seals and other marine mammals.

IODIDE GOITRE IN ASTHMATIC PATIENTS

T. B. BEGG described a study of 21 asthmatic patients who, after taking iodopyrine powders (Felsol) for years, developed goitre and hypothyroidism, either alone or in combination. Seven recovered after iodide medication ceased; three had the goitre excised; others improved with L-thyroxine or thyroid extract.

Nine affected patients were found when a questionnaire about Felsol powders and thyroid disorders was sent to 600 asthmatics. This represents a 20% incidence among regular iodopyrine consumers.

Tests of thyroid metabolism in this iodide goitre syndrome are reported and pathogenesis is discussed.

The syndrome is not rare and probably arises in normal thyroids.

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