PROCEEDINGS OF THE BRITISH CARDIAC SOCIETY

The Autumn Meeting of the British Cardiac Society was held at the School of Pharmacy, London, on Friday, October 25, 1963. The President, Evan Bedford, took the Chair at 9.15 a.m. during Private Business before handing over to the Chairman, Ian Hill.

PRIVATE BUSINESS

1. The Minutes of the Annual General Meeting having been published in the Journal (1963, 25, 691) were taken as read and confirmed.

2. The Treasurer reported that the Society's finances continued to prosper, the current account holding £714, and the Congress Fund £921. This Fund could be used to help to defray the cost of future Congresses held in this country, to pay the expenses of distinguished members of other societies who were invited to attend the British Cardiac Society's meetings, and to provide financial assistance for Congresses in other ways as directed by the Council. The Society's investments stood at £671.

3. British Heart Foundation. The President reported that the Public Appeal had been launched on June 11, 1963, at a Press Conference which was well attended and had been followed by good publicity. So far, £1,377,098 had been subscribed, much of it under 7-year covenants, and the Finance Committee had authorized an expenditure of up to £100,000 per annum for the next three years. October was therefore an historic occasion when, after having worked so long and so hard to raise funds, the Foundation was able to make its first grants in support of research in Cardiology. The Science Committee had considered 75 applications, and recommended 34 grants amounting to a total of £183,630 over the next few years, of which £95,555 will be distributed in the first year; of this, £43,935 was for items of equipment and will therefore be non-recurring.

Major-General Vivian Street had been appointed Appeal Director and Dr. Frank Green, late scientific secretary to the Wellcome Trust, had been engaged as part-time adviser to the Scientific Committee and had already been of great help in assessing the applications for grants.

It was now clear that the objective of £3½ million must be a long-term project, and the time had come when all members of the Society could help the Appeal. Suitable laymen might be approached to help local appeals, in the same way as had been done in London, and general practitioners, solicitors, trustees, and so forth might all be of help in bringing the Foundation to the notice of charitable bodies and those interested in diseases of the heart.

4. The 1964 Annual General Meeting will be held at Oxford on Thursday, April 9, under the Chairmanship of Allison.

5. Future meetings abroad are to be held as follows.

IV European Congress of Cardiology to be held in Prague from August 17 to 22, 1964.
III Asian-Pacific Congress of Cardiology to be held at Tokyo from May 10 to 14, 1964.
VII Inter-American Congress of Cardiology to be held at Montreal from June 14 to 19, 1964.
V World Congress of Cardiology to be held at New Delhi in 1966.

The Society dined together at the Cafe Royal with Bedford in the Chair. Dr. Frank Green dined with the Society as its guest.

HOMOLOGOUS AORTIC VALVE TRANSPLANTATION IN THE DOG

By C. M. Duran and A. J. Gunning (introduced by Grant Lee)

Prosthetic valves of various shapes and materials have been used to replace the diseased aortic valve. The variety of types employed is an indication that none of them has yet given a satisfactory result. We have described a method to replace the diseased valve with a total aortic valve homograft placed below the
coronary orifices. Following this technique a number of patients have been operated on successfully
However the macroscopic and microscopic changes occurring in these transplants are hardly known.

This experimental work was undertaken to determine the behaviour of homologous transplanted valves
in the dog. For technical reasons the valves were placed in the descending aorta just distal to the left sub-
clavian artery. After sacrifice of the animals the valves showed a varying amount of thickening and re-
traction of the cusps.

In a second series of experiments, a work load was placed on the transplant by producing incompetence
of the host's aortic valve. The grafted cusps in this series were thin and mobile in all specimens taken
between a few days and one year. The histological aspects of these transplants were described.

AORTIC VALVE HOMOGRAFT REPLACEMENT
By Donald Ross and Hywel Davies (introduced by Baker)

Homograft replacement of the aortic valve has been carried out in 18 patients at Guy's Hospital. The
results of the operation were given, and the clinical progress of the surviving patients described, including
complete study in one, nine months after operation. The problems, practical and immunological, are dis-
cussed, and our current view presented of the place of this procedure in the treatment of aortic valve disease.

A TEN TO FIFTEEN YEAR FOLLOW-UP OF THE BLALOCK-TAUSSSIG ANASTOMOSIS FOR TETRALOGY OF FALLOT
By A. M. Harris, N. Segel (introduced), and J. M. Bishop

Thirty patients with Fallot's tetralogy who have had a Blalock-Taussig operation performed ten or more
years ago have been studied clinically and haemodynamically. Of these, 67 per cent have survived, are clin-
ically improved, and are leading relatively normal lives. In a group of untreated patients followed for the
same period 25 per cent have survived.

A difference in upper limb size in some of these patients is described. The Blalock-Taussig operation
has a low mortality and the results are good. Since the mortality for total correction of Fallot's tetralogy is
still high, the former operation is to be preferred, at least in childhood. Two patients who developed pul-
monary hypertension are described.

PRESSURE FLOW RELATIONS AND INTRACARDIAC VENTURI EFFECTS IN FALLOT'S TETRALOGY
Hamish Watson, A. M. Breckenridge (introduced), and K. G. Lowe

Recent studies of pressure flow relationships in isolated pulmonary valvular stenosis have shown that they
conform to certain well-known physical laws (Watson et al., 1960; Watson and Lowe, 1963). A better un-
derstanding of right ventricular function under these circumstances has prompted a study of pressure flow
relations in Fallot's tetralogy. With this combination of lesions, the situation is more complex, since both
pressure and flow are influenced not only by maldevelopment of the infundibulum, but also by the presence
of the defect in the interventricular septum. An analysis of the pressure pulse patterns and their correlation
with simultaneously recorded intracardiac electrograms has led to a much clearer concept of the hemo-
dynamic effects of obstruction to the outflow of blood from the right side of the heart in this condition, and
demonstrated the occurrence of true intracardiac Venturi effects.

EPICARDIAL EXCITATION IN VENTRAL ATRIAL SEPTAL DEFECT (ASD I)
By J. P. Roos and D. Durrer (introduced by Professor Snellen, Leiden)

Electrocardiogram and vectorcardiogram in ventral atrial septal defect have a characteristic pattern with
anti-clockwise rotation and position of the QRS loop above the horizontal line. No satisfactory explanation
of this phenomenon has so far been given.

In 3 patients with ventral ASD epicardial excitation was explored during operation. It was found that
the excitation pattern of the postero-basal region is changed. In normal hearts this area is activated late in
the cardiac cycle (70–90 msec. after beginning of cavity potential), while in ASD of the secundum type early
excitation is found (25–30 msec. after the reference). This may be explained by a dorsal displacement of the
atrio-ventricular node and crux sinistrem and an abnormal branching pattern of the left bundle with short
offshoots to the postero-basal area.

We tried to reproduce this excitation pattern in the dog. By shortening of excitation of the postero-basal
region during normal beats it was possible to register vectorcardiograms with QRS loop above the horizontal
line and anti-clockwise rotation and epicardial complexes similar to those registered during operation.
CONVERSION OF ATRIAL FIBRILLATION TO SINUS RHYTHM BY DIRECT-CURRENT SHOCK

By S. Oram, J. P. H. Davies, I. Weinbren, and P. Taggart (introduced)

The indications for treating arrhythmias by drugs or electrical means are discussed. The history of electrical termination of arrhythmias is reviewed and direct-current shock is compared with alternating current. An account of the results of conversion of chronic atrial fibrillation of varied aetiology to sinus rhythm by direct-current shock is given, including the effect on cardiac function. Comparison with drug therapy is made and indications for electrical defibrillation discussed. Problems associated with electrical conversion to sinus rhythm are reviewed. In particular an attempt is made to analyse features associated with relapse to atrial fibrillation, and the place of quinidine prophylactically is assessed.

DIRECT-CURRENT COUNTERSHOCK IN THE TREATMENT OF DRUG-RESISTANT ARRHYTHMIAS

K. O'Brien (introduced), L. Resnekov, and Lawson McDonald

Past experience with alternating-current countershock for arrhythmias at the time of operation and in emergency situations, including failure to respond to medical treatment, led us to explore the use of Lown's method of direct-current countershock. It was considered initially desirable to confine this form of therapy to arrhythmias that had failed to respond to treatment with drugs, and it is these cases that were reported. Direct-current electrical countershock, using Lown's cardioverter (American Optical Co.), was applied to patients with arrhythmias occurring in association with rheumatic, congenital, and ischaemic heart disease, also with cardiomyopathies. The method was successful in most cases, and findings before and after treatment are described. The indications and contraindications for direct-current countershock are considered, and details of the energy used, anticoagulant preparation, anaesthesia, and complementary drug therapy given. Depolarization with direct current develops less energy and is therefore less likely to damage the myocardium than depolarization with alternating current. It is usually successful where drugs have failed, and its safety and effectiveness may make it the initial treatment of choice.

THE RISKS OF ARTIFICIAL PACEMAKING

By Edgar Sowton (introduced by Leatham)

This communication is based on experience with 75 patients. The death rate among patients with a pacemaker was five times as high in those who returned to sinus rhythm as in those who remained in heart block. Ventricular fibrillation triggered by the pacemaker is suggested as an explanation, and evidence from 6 patients with proven ventricular fibrillation supports this view. The risk was very high in the early post-operative period, and methods of dealing with the problem are suggested.

Syndromes resulting from sudden loss of pacing, pacemaker failure at very fast rates, infection at the electrodes, malposition of an electrode catheter, and electrolytic destruction of tissues are described, together with their management.

EARLY DAYS IN WESTMORELAND STREET

By Robert Marshall

Published in full, this number p. 140

THE DIASTOLIC MOVEMENTS OF THE APEX OF THE LEFT VENTRICLE

By P. G. F. Nixon

The movement or displacement of the skin overlying the apex of the left ventricle has been recorded simultaneously with the phonocardiogram and the left atrial or ventricular pressure pulse; and Mackenzie's (1902) observations have been confirmed. The diastolic movements are of particular interest because they may be recorded easily at the bedside. They indicate the time at which the mitral valve opens and the mitral annulus ascends; they identify the phases of rapid and slow ventricular filling, diastasis, and atrial systole; and they enable the phonocardiographer to distinguish between the opening snap and the third and fourth heart sounds.

In mitral disease the various patterns of ventricular filling give a characteristic appearance to the tracings of slight obstruction, severe obstruction, the mixed lesion, and severe regurgitation. In aortic stenosis a normal "a" wave suggests that surgical treatment need not yet be considered. In aortic regurgitation a large inward movement at the time of the mitral annular ascent suggests the presence of severe coincidental mitral regurgitation—a lesion that otherwise might remain undetected. In hypertensive and ischaemic disease the
third and fourth sounds can be distinguished, and a giant “a” wave may reveal the presence of serious disorder when the atrial gallop is too close to the first sound to be heard.

THE INCIDENCE OF CORONARY ARTERY CALCIFICATION DETECTED DURING LIFE
By P. L. Kapur, Patricia Morley, E. Samuel (all introduced), and M. F. Oliver

Fluoroscopy using an intensification system and radiography using tomography and high milliamperage spot films have been used to determine the incidence of calcification in the coronary arteries of 250 patients with ischaemic heart disease and 250 controls matched for age and sex.

There was significantly more coronary calcification at all ages in patients with ischaemic heart disease when compared with these without overt heart disease, although 24 per cent of these had calcification of one or more coronary arteries. The incidence of calcified coronary arteries increased with age in both groups. Of patients with ischemic heart disease, 45 per cent had detectable calcification in a coronary artery: this figure increased to 58 per cent when hypercholesterolemia was also present and to 77 per cent when hypertension coexisted with ischaemic heart disease. There was no relation between the mode of clinical presentation or between the duration and history of ischaemic heart disease and the presence or extent of calcification of the coronary arteries.

It is evident from post-mortem radiography of hearts that the incidence of calcification in coronary arteries detected during life is an underestimate. It is believed that the calcification in the coronary arteries is intimal and not medial in site and that it represents advanced atheroma, although not necessarily stenotic lesions. Detection of calcification in a coronary artery reduced the indications for coronary angiography and has on occasions proved to be of diagnostic value.

THE ACUTE EFFECTS OF SMOKING ON MYOCARDIAL PERFORMANCE IN PATIENTS WITH CORONARY ARTERIAL DISEASE
By Brian Pentecost (introduced) and John Shillingford

The effect of cigarette smoking on the cardiac output and stroke volume and on the blood pressure and heart rate has been measured in 14 normal subjects, 5 patients with angina, and 14 patients after myocardial infarction. Normal men and those with angina in the absence of infarction behave similarly with an increase in pulse rate, mean pressure, stroke volume, and cardiac output. Some patients among the post-myocardial infarction group showed a fall in stroke volume and cardiac output while smoking. Two of these patients had recently reduced their smoking because of dyspnoea; and one of them experienced dyspnoea during the smoking test.

This work was carried out to give the answer to the question of whether smoking has any immediate ill effect on the heart following myocardial infarction.

THE PULMONARY CAPILLARY BED IN MITRAL STENOSIS
By John Hamer

The volume of blood in the pulmonary capillary bed can be estimated from the rate of absorption of inhaled gases. Both carbon monoxide and oxygen combine avidly with haemoglobin, but the rate of uptake of carbon monoxide in the lungs is reduced by high concentrations of oxygen as the two gases compete for the haemoglobin in the pulmonary capillary red cells. The extent of this competitive effect depends on the amount of blood in contact with the pulmonary alveoli, and can therefore be used to calculate the pulmonary capillary blood volume. The technique also gives an estimate of the resistance to the movement of respiratory gases from the alveoli to the capillaries.

The pulmonary capillary volume was measured in 25 patients with mitral stenosis. Although unusually large values were obtained in some cases, most results were in the normal range. Many of the patients showed evidence of interference with the passage of gases across the alveolar-capillary membrane. Comparison with the findings at cardiac catheterization showed that the capillary volume was more closely correlated with the pulmonary blood flow than with the left atrial pressure or the pulmonary vascular resistance.

These findings suggest that the raised left atrial pressure in mitral stenosis produces some increase in the volume of the pulmonary capillaries, but in many cases there are other factors tending to reduce the size of the capillary bed. The changes in the alveolar-capillary membrane are consistent with the effects of interstitial pulmonary edema.
**BRITISH CARDIAC SOCIETY**

**THE METABOLIC RESPONSE TO CARDIAC SURGERY**

By W. F. Walker, Arlene Watt (both introduced), and D. M. Douglas

It has been assumed that the response following open-heart surgery with use of extracorporeal circulation (E.C.C.) was the same as after any cardiac operation. Our own experience led us to doubt this. The problem was therefore studied by carrying out full metabolic balances in two groups of patients in parallel. The first group of five patients had cardiac operations not involving the use of E.C.C.; the second did. The results in the two groups were subjected to statistical analysis.

The patients on E.C.C. showed a greater loss of potassium, nitrogen, and phosphorus. There was much loss of sodium in the first two days after operation with a negative sodium balance. The urinary output of sodium and nitrogen differed at the 1 per cent and 5 per cent levels of significance respectively.

While the nitrogen loss might be due to a greater amount of trauma involved, this could not be so for sodium which would have been conserved. The factors concerning the urinary sodium output were analysed and a statistically significant difference in aldosterone secretion, as represented by the Na:K ratio, was noted. This was thought to reflect the great care taken in restoring the blood volume in the patients with E.C.C. The effect of similar monitoring of patients on the urinary sodium output was observed in 4 other patients following major non-cardiac operations. The results suggest that careful monitoring of patients may be partly responsible for the difference in sodium output.

**SYMPATHECTOMY IN ANGINA PECTORIS**

By G. W. Hayward and D. A. Chamberlain (introduced)

Upper thoracic sympathectomy was originally performed in patients with severe angina to alleviate refractory pain by cutting the sensory pathways travelling with the sympathetic fibres. An objection to the operation has been that it removes the warning signal of pain, allowing the heart to be subjected to dangerous degrees of ischaemia on exercise. This risk was assessed by measuring effort tolerance on a treadmill and recording the effort electrocardiograms of 8 patients before and after sympathectomy. Effort tolerance was increased at least twofold in 6 of them, and there was a corresponding delay or abolition in the ischemic changes on the effort electrocardiogram. When changes did occur comparable to those that accompanied pain before sympathectomy, the patients experienced discomfort and stopped walking.

Six patients were also tested after treatment with pronethalol, a beta sympathetic blocking drug. All were able to walk further than they could after a placebo, and in three of them the increase in effort tolerance was 50 per cent or more.

The objective improvement after sympathetic ablation is due principally to the reduction in tachycardia and the oxygen-wasting increase in contractility that are the normal responses to excitement and exercise.