

Proceedings of the British Cardiac Society

THE FIFTIETH ANNUAL GENERAL MEETING of the British Cardiac Society was held in the Arts Tower, University of Sheffield, on Wednesday and Thursday, 14 and 15 April 1971. The President, SIR JOHN McMICHAEL, took the Chair at 9.00 a.m. during Private Business before handing over to the Chairman, T. E. GUMPERT.

Private Business

1 The Minutes of the Annual General Meeting having been published in the Journal (1971, 33, 142-151) were taken as read and confirmed.

2 The Treasurer reported that the income of the Society was now £1,988.9.9, which was derived from £135.14.9 in investment interest and £1,853.5.- in members' subscriptions. By 1972, the full membership of the Society would be reached, and unless it was decided to enlarge the Society, the income would be constant at £1,890 per annum.

Expenditure in the last year was £1,307.10.9., consisting of £279.7.4. on meetings; £548.4.6. on secretarial assistance; £182.12.- on printing and stationery; £189.6.- on subscriptions to other societies, International Society of Cardiology, European Society of Cardiology, etc.; £82.19.11. on sundry general expenses; and £25.4.- to the Society's Auditor. The cost of meetings was £14.12.8. less than in 1969, but secretarial assistance was up by £47.4.6., and printing and stationery by £79.12.-.

Despite the steadily increasing cost of running the Society with its developing activities, it had been possible to maintain a steady excess of income over expenditure each year, and it was hoped that this would continue, especially in view of the new investment policy.

The Congress Fund had been merged with the General Fund, and on the recommendation of the Finance Subcommittee, new investments had been made. The Treasurer expressed his thanks to Michael Oliver, Marquis, and Emanuel for their advice. Since the Society was able to meet its commitments from subscriptions without calling upon investment income it was felt essential to invest the General Fund in

maximum growth stock to ensure appreciating assets of the Society as a buttress against inflation. Accordingly, after seeking Broker's advice, the following reinvestments were made:

Conversion Stock 1971 and 1974 was sold, and the proceeds, plus £500 from the General Fund, invested in -

950 Charifund Units @ £170.2.- and 1,620 Scotexempt Growth @ £106.5.-, to a total of £1,758.

The donation from the VI World Congress of £10,000 was invested in equities designed for maximum growth also, as follows -

700 de Beers Consolidated Mines @ 232p.

390 Barclays Bank @ 415p.

440 Shell Transport & Trading Ordinary @ 333p.

600 Rio Tinto Zinc @ 245½p.

2,750 Witan Investment Trust 25p. Ordinary @ 72½p.

The interest from the investments would help to defray increased costs of running the Society in future years, while the principal should afford a sound financial backing for the Society. When the financial commitments for next year have been evaluated, it should be possible to invest more from the General Fund.

The capital of the Thomas Lewis Lecture Fund was reinvested in Bass Charrington 8½ per cent Debenture Stock 1987-92, which should yield £107 per annum instead of the £60.17.- currently. The stock was chosen primarily for maximum interest rates in order to provide an increased sum to pay the biennial lecture fees and expenses.

3 The following resignations on retirement were accepted -
Hosford and Pearson.

4 Sir John McMichael was re-elected *President* of the Society.

5 Malcolm Towers was elected *Treasurer* of the Society on retirement from this office of John Goodwin.

6 The following two new *Members of Council* were elected in place of Michael Oliver and Lawson McDonald: Johnson and Hollman.

Seiple was co-opted to the Council to represent the Scottish members, under Rule 21.

7 Jean Lequime of Brussels and C. K. Friedberg of New York were elected *Honorary Members* of the Society.

8 Donald Fredrickson of the National Institutes of Health, Bethesda, U.S.A., and Z. Fejfar of the World Health Organization were elected *Corresponding Members*.

9 The following new *Ordinary Members* were elected: Allen Keith Brown, Lancaster; Michael James Godman, Edinburgh; John Andrew Kennedy, Glasgow; Dennis Michael Krikler, London; Andrew Ross Lorimer, Glasgow; Fergus James Macartney, Leeds; Brian Maurer, London; Patricia Morton, Belfast; Rosemary L. Radley-Smith, London; Peter Carew Reynell, Bradford; Owen Conor Ward, Dublin; Alan Kenneth Yates (SM), London; and from Overseas Membership: L. A. G. Davidson.

10 Gerald S. Humphreys of Jamaica was elected to *Overseas Membership*; Segal and Binnion were elected from *Ordinary Membership*, and the following were re-elected: Hywel Davies, Fulton, Harries, Parry, Rahimtoola, Resnekov, Seymour, Somers, and Wilson.

11 The Secretary reported that there were 9 vacancies before the total of 300 *Ordinary Members* was reached. The age composition of the Society suggested that there would be a considerable number of retirements in the next few years, and it was agreed to make no alteration to the Rules with regard to the total number of members at this time.

12 The Autumn Meeting of the Society would be held at the Royal College of Physicians on 4 and 5 November 1971.

13 The Annual General Meeting in 1972 would be held in Dublin on Thursday, 23 March.

14 Goodwin said that the Report of the Cardiology Committee of the Royal College of Physicians of London on the Career Structure in Cardiology had been passed by the Comitia of the College and by the Council of the Society and that copies had been circulated to all members. Following this the report had

been sent by the College to the *British Medical Journal*, *The Lancet*, the Department of Health and Social Security, and *The Times*.

15 Goodwin reported that the Royal Colleges of the United Kingdom and Ireland, and the Association of Professional Heads of Departments of Medicine and Paediatrics had set up a Joint Committee on Higher Medical Training. This Committee would be advised by Specialist Advisory Committees representing each specialty. The Specialist Advisory Committee on Cardiology consisted of Gray and Hamish Watson (nominated by the Joint Committee) and Ball, Walter Somerville, Whitaker, and Goodwin (nominated by the British Cardiac Society). Goodwin had convened a meeting of the Committee after the Scientific Session on Thursday, 15 April, when the training requirements for cardiologists would be discussed in the light of the recommendations of the Cardiology Committee of the Royal College of Physicians of London and the Cardiology Committee of the Scottish Colleges. Goodwin said that the Society should be kept in touch with all the Committee's decisions and asked for any views to be expressed to him as Convenor of the Committee.

The President pointed out that it was important to avoid too rigid criteria for accreditation or registration of specialists being laid down so that promising people with an unorthodox approach to cardiology should not be excluded. Melville Arnott said that one of the purposes of accreditation might be to anticipate the needs of the European Economic Council if Britain went into the Common Market.

16 The memorandum on the relation of the British Cardiac Society to both the European and International Societies of Cardiology, circulated by Council, was discussed in detail, and Oliver and Watson reported on the activities of the International Society of Cardiology. It was agreed that the objectives of the Society were worth supporting. Disquiet was expressed over the international bodies, particularly the lack of audited accounts, but it was agreed that the British Cardiac Society should continue its membership in an effort to improve the arrangements.

17 Davison reported on negotiations he had had, in conjunction with Oram, with the Society of Cardiological Technicians, regarding the pay and conditions of their members. It was reported

that the Unions involved had agreed an interim pay increase of approximately 12 per cent linked with an understanding that cardiological technicians' pay scales would be related to those of medical physics technicians within six months. It was thought desirable to press for special recognition of the needs for an adequate salary scale for the less well-trained cardiographers who were responsible for most routine work in hospitals, and also for appropriate provision for an adequate career structure at the upper end of the salary scale for fully-trained technicians in supervisory posts. Davison reported that he and Oram were seeking an interview with the Minister to press for urgent implementation of these requirements prior to the full application of the Zuckerman Report.

18 The Secretary reported that members could take either the *British Heart Journal* or *Cardiovascular Research* in the combined subscription, now £8-50 per annum; but notice of any change from one journal to the other must be given before 1 June each year, as explained in the notice recently circulated.

The Society dined together at Ranmoor House, in the University, the principal guest being Professor Sir Charles Stuart-Harris, C.B.E. The President, Sir John McMichael, paid tribute to each member of the Organizing Committee of the VI World Congress of Cardiology, and a special presentation from the Society was made to Shillingford in recognition of his work as Chairman of the Organizing Committee of the Congress. Gumpert thanked the local organizers.

Addressing a medical meeting: effect on heart rate, electrocardiogram, plasma catecholamines, free fatty acids, and triglycerides

Walter Somerville, Peter Taggart, and Malcolm Carruthers (both introduced)

Many persons when speaking before an audience experience a rapid forceful beating of the heart – often described as 'nerves' by the layman. To investigate the behaviour of the heart under these circumstances, observations have been made to find out the effect of addressing a medical meeting on the heart rate, electrocardiogram, plasma catecholamines, free fatty acids, triglycerides, and cholesterol.

Immediately before speaking, the heart rate increased to 100-120, reached 150-170 while speaking and fell to 120

during question time. Electrocardiographic changes consisting of flattening of T waves and depression of ST were commonly recorded during the maximum tachycardia, subsiding to the pre-speaking pattern with the subsidence of the tachycardia.

Plasma catecholamines (noradrenaline and adrenaline) were usually raised at the end of the address, sometimes to double the resting level. Noradrenaline accounted for the greater part of the increase. Free fatty acid levels were invariably raised immediately after speaking and, in some subjects, immediately before the address. There was a more gradual rise in triglycerides, reaching a peak one hour after speaking. Cholesterol levels were normal and showed no change throughout.

Failure of high blood free fatty acid concentrations to provoke ventricular arrhythmias in experimental coronary artery occlusion

L. H. Opie, R. Norris, A. Holland, P. Owen (last three introduced), and M. Thomas

In patients with acute myocardial infarction, the highest blood free fatty acid values are associated with the highest incidence of serious arrhythmias. We re-examined the possible toxicity of high plasma free fatty acid concentrations in experimental coronary artery occlusion. The anterior descending artery or one of its branches was ligated in 27 open-chested dogs. In 15 dogs ligation was followed by administration of heparin-Intralipid. In 6 experiments, heparin-Intralipid was infused both before and after arterial ligation. In 6 experiments, multiple ventricular ectopic beats after initial arterial ligation were provoked by further ligation or by intermittent infusions of adrenaline (about 1.2 µg/kg/min); plasma free fatty acid levels were then rapidly raised and kept high by continued heparin-Intralipid administration. In no case was it clear that high plasma free fatty acid concentrations (mean: 5000 µEq/l.) provoked or exaggerated ectopic activity even though the site and size of arterial ligation, multiple ligations, and adrenaline infusion were designed to lead to arrhythmias. Of all 27 dogs, ventricular tachycardia or fibrillation occurred in only 3. Our experiments therefore argue against the importance of the role of high plasma FFA concentrations or the administration of heparin in the genesis of serious arrhythmias after coronary artery occlusion.

Effect of prolonged exercise on myocardial metabolism in man

B. W. Lassers, L. Kaijser, M. Wahlqvist, and L. A. Carlson (last three introduced)

Coronary sinus catheterization with measurement of arterial-coronary sinus concentration differences of various substrates and calculation of oxygen extraction ratios was used to study the effect of 2 hours of supine leg exercise at an average work load of 500 kp m/min on myocardial metabolism in 15 healthy fasting men. A continuous infusion of albumin-bound ³H-palmitate was given to provide a tracer for the plasma free fatty acids. Chemical and isotope measurements were made at rest and during the final minutes of exercise.

Exercise produced a significant fall in the average arterial concentration of glucose, large increases in the concentrations of lactate, pyruvate, free fatty acid, and free glycerol but no significant change in plasma triglyceride concentration. Coronary sinus oxygen saturation fell significantly.

Prolonged exercise produced no significant change in the myocardial RQ. There was a fall in the oxygen extraction ratio for glucose and a rise in that for lactate, with little change in the total ratios for carbohydrate substrates. The oxygen extraction ratios for plasma triglyceride did not change significantly. The free fatty acid oxygen extraction ratio calculated from isotopic measurements fell significantly. Thus, during prolonged exercise in the fasting state, the principal plasma energy substrate, as estimated by the oxygen extraction ratio, was lipid, though its contribution relative to plasma carbohydrate fell. Exercise was also accompanied by a highly significant release of free glycerol into the coronary sinus suggesting hydrolysis of considerable amounts of cardiac triglyceride.

Effects of transient occlusion of coronary circulation on catecholamine and electrolyte gradients in human atrium

Peter Taggart, J. D. H. Slater, M. E. Carruthers (all introduced by Walter Somerville), and I. K. McMillan

One, two, or three atrial biopsies were taken from each of a group of 14 patients undergoing cardiopulmonary bypass operations with intermittent occlusion of the coronary circulation at various times during the procedure. The biop-

sies have been analysed for noradrenaline, adrenaline, sodium, potassium, chloride, total H₂O, and extracellular fluid volume.

The expected loss of intracellular potassium (K_i) and gain of intracellular sodium (Na_i) were found to be linearly related to the length of occlusion. The Na_i gain was less than the K_i loss. The extracellular fluid volume increased considerably with a corresponding decrease in intracellular fluid. A significant relation was seen between loss of K_i and loss of tissue catecholamines, with rising plasma catecholamine levels.

The accumulation of K_o during the occlusive period, which is not washed away, together with the net loss of intracellular crystalloid, may be responsible for the redistribution of water. Such an oedematous state may be reached when areas of muscle become resistant to reperfusion for purely mechanical reasons, and a vicious circle is established. The consequences in terms of theoretical membrane potential and action potential characteristics, arrhythmias, the low output syndrome, and possible similarities in ischaemic heart disease are discussed.

Surface mapping of the RS-T segment in acute myocardial infarction and effect of beta-blockade

D. S. Reid, L. J. Pelides (both introduced), M. Thomas, and J. P. Shillingford

Electrocardiograms were recorded from 72 standard points on the surface of the chest of patients with acute myocardial infarction. These records allowed the construction of surface maps of the deviation of the RS-T segment from the isoelectric line. Such surface maps were drawn at regular intervals during the course of the patient's acute illness and during convalescence. With the aid of these two-dimensional maps, the natural history of the evolution of the RS-T segment in acute myocardial infarction was described more completely than the standard electrocardiogram allows. Different patterns of evolution were found and in some instances an ischaemic area was identified when the standard electrocardiogram was normal. The effects on the RS-T segment of the beta-blocking drug practolol were studied. After an intravenous injection of 10-20 mg practolol, the area and the maximum height of the RS-T segment elevation were reduced. We conclude that practolol interferes with the ST segment elevation associated with acute myocardial

infarction in man. Therefore possible therapeutic benefit to the ischaemic myocardium should be considered.

Beta-blockade in experimental myocardial ischaemia: metabolic and electrocardiographic effects

M. Thomas, R. Norris (introduced), L. Opie, G. Shulman and P. Owen (both introduced)

The effects of beta-blocking drugs on electrocardiographic and metabolic changes in acutely ischaemic myocardium were investigated in greyhound dogs. Plasma potassium, inorganic phosphate, glucose, free fatty acids, and blood lactate and pyruvate were measured in arterial, coronary sinus, and local coronary venous blood before and after coronary artery ligation. The effects of beta-blocking drugs on the metabolic parameters were compared with the effects on ST segment elevation shown by epicardial electrocardiogram leads over the ischaemic area.

In other experiments, blood flow through the anterior descending coronary artery and the great coronary vein was measured with electromagnetic flow meters before and during constriction of the anterior descending coronary artery. Arteriovenous differences for lactate and haemoglobin oxygen saturation could therefore be used to quantify lactate output and oxygen utilization by the ischaemic myocardium.

Propranolol, practolol, and other beta-blocking drugs were shown to limit epicardial ST segment elevation. However, discharge of potassium, inorganic phosphate, and lactate from the ischaemic area into local coronary venous blood indicated severe myocardial metabolic damage. The data therefore question the use of epicardial ST segment elevation as sole index of the severity of ischaemic damage in these circumstances.

Clinical significance of minor abnormalities of ST segment and T wave

David Short

Abnormalities of the ST segment or T wave, too slight to be included in the Minnesota Code, are frequently encountered in patients with suspected coronary disease. Thus, there were 272 such cases among 1000 electrocardiograms recorded in the course of an

electrocardiogram reporting service for family doctors in Aberdeen. Such abnormalities are widely considered to be of little significance. To test this impression, the case records of 250 patients with similar electrocardiograms, examined personally by the author, were analysed. They were selected from approximately 3000 patients with suspected cardiovascular disease, seen initially either at outpatient or domiciliary consultation. 158 (63%) were found to have convincing evidence of coronary heart disease, either acute or chronic (in a number of cases this diagnosis was not established for days or weeks after the electrocardiogram showing the minor abnormality); 44 (17.5%) had left ventricular hypertrophy; 32 (13%) had miscellaneous conditions such as acute benign myocarditis or paroxysmal tachycardia; and in 16 (6.5%) the diagnosis was uncertain.

Minor abnormalities of the ST segment and T wave must, therefore, be regarded as strong evidence of heart disease.

Dermatoglyphs in congenital heart disease

T. J. David (introduced by D. W. Barritt)

A previous study of finger and palm prints (dermatoglyphs) in patients with congenital heart disease has shown that certain fingerprint patterns are associated with familial cases of congenital heart disease (David, 1969). A further study has resulted in the finding of an association between a rare specific midline palmar dermatoglyphic abnormality, a double proximal axial triradius (DPAT), and two congenital malformations of midline structures, ventricular septal defect and Meckel's diverticulum.

	No. of patients	No. with DPAT	% patients with DPAT
Ventricular septal defect	63	8	12.7
Atrial septal defect	60	1	1.7
Other congenital heart disease	210	0	0
Meckel's diverticulum	23	3	13.0
Other congenital malformations	52	0	0
Controls	1059	5	0.47

None of the patients with ventricular septal defect were known to have a Meckel's diverticulum. A DPAT was found to be associated only with ventricular septal defect and Meckel's diverticulum, and the only common factor

to these malformations is that they involve midline structures (cardiac septum and small intestine). It is thought that this finding may give a clue to the nature of the embryonic disturbance in these two defects.

Reference

David, T. J. (1969). Fingerprints in congenital heart disease. *Bristol Medico-Chirurgical Journal*, **84**, 167.

Presentation and natural history of Eisenmenger syndrome

Katherine A. Hallidie-Smith,
R. Tortoledo (introduced), and
J. F. Goodwin

Forty patients diagnosed as having the Eisenmenger syndrome have been investigated at Hammersmith Hospital over the past 13 years, the diagnostic criteria being based on those of Wood (1958). The anatomical diagnoses were ventricular septal defect (24), atrial septal defect (6), persistent ductus arteriosus (7), truncus arteriosus (2), and total anomalous pulmonary venous drainage (1). The earliest age of confident diagnosis of Eisenmenger syndrome was 3 years (ventricular septal defect) and the oldest 44 years (atrial septal defect).

The characteristic presentation of patients with ventricular septal defect was with symptoms of a high pulmonary blood flow in infancy with a relatively normal early childhood. Those with persistent ductus arteriosus became short of breath in early life while those with atrial septal defect presented in adult life with arrhythmias, headaches, syncope, chest pain, and haemoptysis, which were common to all groups.

The patients were relatively unrestricted by their symptoms until shortly before death and were able to undertake a wide range of occupations. Two had live babies with one maternal death. 10 patients have died at a mean age of 37 years. Persistent ductus arteriosus carried the worst prognosis, 6 of the 7 patients having died; and ventricular septal defect the best, accounting for only 1 death in 24 patients.

This analysis suggests that the Eisenmenger syndrome is not present at birth, develops later, and that the prognosis, though severe, permits survival in reasonable health to near middle age in many.

Reference

Wood, P. (1958). The Eisenmenger syndrome; or pulmonary hypertension with reversed central shunt. *British Medical Journal*, **2**, 701.

Auscultatory and phonocardiographic findings in Ebstein's anomaly: correlation of first heart sound with ultrasonic records of tricuspid valve movement

Thomas L. Crews, *Ronald B. Pridie*,
Ramsey Benham (all introduced), and
Aubrey Leatham

Heart sounds and murmurs have been analysed by multichannel phonocardiography in 10 patients with Ebstein's disease.

Remarkably wide splitting of the first sound was heard and recorded in every case and attributed to electrical and mechanical delay of the tricuspid component of the first sound. Wide splitting of the second sound in 4 patients was attributed to delay of the pulmonary component from right bundle-branch block; in the remaining 6 patients P2 could not be recorded presumably because of low pulmonary artery pressure. A high frequency diastolic sound was heard and recorded from the lower left sternal edge in 5 patients and attributed to opening of the tricuspid valve. Ventricular filling sounds, pansystolic and atrial systolic murmurs were present in most cases.

Ultrasonic echograms were made in 6 of the 10 patients and it was possible to record from both the mitral and tricuspid valves in each case. Simultaneous records of valve movements, the phonocardiogram, and electrocardiogram were obtained in 3 subjects. In every case tricuspid closure was much later than mitral and coincided exactly with the delayed component of the first heart sound.

Thus abnormally wide splitting of the first sound proved to be the most constant auscultatory sign of Ebstein's disease and was shown to coincide exactly with greatly delayed closure of the tricuspid valve as displayed by ultrasonics.

Palliative treatment of transposition of great arteries

Michael Tynan (introduced by
R. E. Bonham Carter)

Eighty infants with transposition of the great arteries had balloon atrial septostomy: 50 were under 1 month of age. There were no incidental cardiac injuries. The hospital mortality rate of 24 per cent (19 deaths) and the late mortality rate of 20 per cent (16 deaths) include deaths following additional palliative operations for associated cardiovascular lesions. Calculated survival

rates were 75 per cent at 6 months of age and 49 per cent at 2½ years of age. Arterial oxygen saturation: preoperatively 2 populations were identified with mean values of 35 and 45 per cent respectively; immediately after balloon atrial septostomy only one population was identified, with a mean value of 65 per cent (75 cases, SD 14). Late investigation in 57 cases revealed a fall in the mean arterial oxygen saturation from 65 to 59 per cent (SD 10). This difference was significant, $P < 0.02$.

These results will be compared to the results of surgical septostomy showing that balloon atrial septostomy provided a short-term advantage in survival, but the long-term results were similar for both forms of treatment. It is suggested that the best prospect for survival in transposition of the great arteries is given when balloon atrial septostomy is followed by early total correction.

Results of 'inflow correction' for transposition of great arteries

Eoin Aberdeen (introduced), R. E. Bonham Carter, G. R. Graham, J. F. N. Taylor, M. J. Tynan, and D. J. Waterston (last three introduced)

The results of inflow correction for transposition of the great arteries in 112 consecutive patients were presented. The increased operative risk when this lesion is accompanied by ventricular septal defect, pulmonary stenosis, or by banding of the pulmonary artery was demonstrated.

The immediate and possible long-term problems after inflow correction were viewed in the light of observations made in the postoperative period.

Blood velocity measurements in aortic regurgitation using heated thin film and ultrasonic techniques

D. S. Tunstall Pedoe (introduced by P. Sleight)

Direct measurement of the regurgitant fraction of left ventricular output in aortic regurgitation is possible only at the time of valve surgery using cuff electromagnetic flow meters or by specialized angiographic techniques.

Early attempts to measure the amount of reverse flow velocity using velocity catheters in the ascending aorta in 7 patients were unsuccessful because of the turbulent eddies in the flow and lack of knowledge of the velocity profiles close to the valve.

A transcutaneous directional Doppler Ultrasound Flowmeter with a stable flow zero (SOPHIA 135) has been used to measure blood velocities in the most

central accessible artery, the subclavian. A characteristic velocity trace showing excessive reverse flow has been found in all of more than 25 patients with aortic regurgitation so far examined, and the grading of the severity of the regurgitation from the Doppler record has correlated well with radiographic assessment even in the presence of mitral valve disease.

Serial records can be obtained, and though the technique displays the blood flow velocity rather than the volumetric flow, these preliminary results suggest that this non-invasive technique may be a valuable method of assessing the degree of aortic regurgitation.

Replacement of aortic valve with unsupported fascia lata: report on technique and results in 43 cases

D. N. Ross, A. K. Yates and J. E. C. Wright (both introduced)

The prosthetic valves in current use have certain disadvantages. For this reason it has been the policy of the authors to pursue a research and development programme for valve replacement with biological tissue.

The good long-term results achieved by Åke Senning led to the use of fascia lata as a cusp substitute. However, the results proved disappointing when used mounted on a rigid frame. The present valve was designed to be inserted in the aortic position easily and reliably, but without the disadvantage of a metal support.

Research by A. K. Yates involving detailed anatomical measurements of the aortic root and cusps in the human heart established that there was a significant correlation between the aortic root diameter, aortic sinus diameter, and mean commissure height.

As a result of this, two designs of unsupported fascial valves have been used and both will be described. During the past year 43 aortic valves have been replaced using this technique.

The majority of cases were reinvestigated by cardiac catheterization and angiocardiology after operation.

Comparison of clinical and haemodynamic results of mitral valve replacement with fascia lata grafts and Starr-Edwards prosthesis

S. H. Taylor, M. Galvin, P. A. Majid, J. B. Stoker (last three introduced), R. J. Linden, W. Whitaker, D. R. Smith, M. I. Ionescu, D. A. Watson (introduced), and G. H. Wooler

A randomized trial of the results of mitral valve replacement with two types of prosthesis was designed. After preoperative haemodynamic investigation, patients with isolated mitral valve disease unsuitable for valvotomy were referred by random selection to one of two surgical teams, one of whom practised frame-supported fascia lata and the other cage-ball prosthesis replacement of the mitral valve. All patients were reviewed six months after operation and the first nine patients in each group without evidence of regurgitation through or around the artificial valve were restudied.

All patients claimed improvement in exercise capacity after both types of valve replacement. There were no consistent changes in radiological heart size, or in the electrocardiogram.

Haemodynamic studies showed no statistically significant change in heart rate, stroke volume, or cardiac output either at rest or during exercise after valve replacement with either prosthesis. After fascia lata graft replacement there was a significant reduction in the pulmonary arterial and wedge pressures and pulmonary vascular resistance both at rest and during exercise, though all three variables remained high during exertion. After replacement of the mitral valve with cage-ball Starr-Edwards prosthesis, there was a reduction in both pulmonary pressures in 6 of the 9 patients at rest and during exercise, particularly in those in whom the pressures were highest, but the mean changes in the group as a whole were not statistically significant.

It is concluded that while both types of valve appear to offer a considerable symptomatic benefit the full-flow type of valve affords the best haemodynamic result. However, even these valves offer only partial haemodynamic remission in that the stroke volume and cardiac output are still impaired and pulmonary pressures remain considerably raised after operation, particularly during exercise. Evidence is presented which suggests that continued obstruction at the mitral orifice probably plays an important role in the continued haemodynamic impairment after fascia lata replacement.

Pulmonary autograft for aortic valve disease; late haemodynamic results

G. Gregory Sachs (introduced), Jane Somerville, Richard Emanuel, Lawson McDonald, and Donald Ross

The first 43 survivors who had pulmonary autograft replacement for severe

aortic valve disease between July 1967 and October 1969 have been studied 14 to 43 months later. In all, the removed pulmonary valve was replaced by a stored aortic or pulmonary homograft.

Patients were aged 13–56 years and were not placed on long-term anticoagulants nor was there evidence of systemic or pulmonary emboli. 36 of the 43 were symptomatic before operation and 29 have maintained improvement; 5 were unchanged and 2 deteriorated due to gross aortic regurgitation; one of these has died and the other had reoperation.

Of the 43, 27 have been studied by right and left heart catheterization. Systolic gradients across the aortic valve (autograft) were rare and when present were not above 10 mmHg. Resting systolic gradients across the right ventricular outflow tract (homograft) were present in 14, varying from 5–25 mmHg in 12, and from 40–60 mmHg in 2.

Mild angiographic pulmonary (homograft) regurgitation was common but was severe in only 2. Angiographic aortic (autograft) regurgitation was trivial in 14, moderate in 9, and severe in 4. There was no late onset of important aortic regurgitation and in those who were shown to have this, it was usually present early in the postoperative period. Pulmonary autograft valve function appeared to be well maintained over a 3-year period.

Development of autonomic neural responses in human heart

D. J. Coltart, B. A. Spilker, and S. J. Meldrum (all introduced by J. Hamer)

Human foetal myocardium seems a suitable tissue for electrophysiological studies, since it provides normal myocardium which should show a specific human response. To date, study of the human cardiac action potential has been restricted to records obtained *in situ* during cardiac surgery with flexible microelectrodes, and *in vitro* using small pieces of excised atrium or ventricle. These studies are limited since the heart is often hypothermic for operative reasons and usually damaged by rheumatic fever or other diseases.

We have studied the electrophysiological responses of 17 hearts excised from human foetuses of between 12 to 22 weeks gestation using a microelectrode technique. Inotropic dose-response relationships were determined to cholinergic and adrenergic agents.

The action potential of the foetal myocardium shows widespread pace-

maker activity which is found only in the sinoatrial node and Purkinje tissue of the adult heart. The inotropic response to carbamyl choline develops before any electrophysiological event appears. The foetal tissue is less sensitive than the adult myocardium in its contractile response to both cholinergic and adrenergic agents. A gradual maturation of the contractile response to nervous stimulation in the foetal myocardium is evident as gestation progresses.

Measurements of sinus impulse conduction from electrogram of bundle of His

S. Bekheit, J. G. Murtagh, P. Morton (all introduced), and E. Fletcher

A catheter technique for recording bundle of His activity using an electrode catheter introduced percutaneously into the femoral vein is described.

The results of measurements of sinus impulse conduction in 20 patients from the bundle of His electrogram will be presented. They illustrate that the PR interval of the surface electrocardiogram represents the delay in transmission of the sinus impulse in the atrium, AV node, and between the bundle of His and the ventricles. Slight variation in the PR interval of the standard electrocardiogram occurred, but the conduction time from the bundle of His to the onset of ventricular septal activation (HV interval) remained constant.

It is concluded that in normal sinus conduction changes in the PR interval always take place above the bundle of His. The technique of obtaining the bundle of His electrogram is simple and reliable. It should be of practical value in defining the mechanism of conduction disturbances above and below the bundle of His and provide a basis for the introduction of new nomenclature of deflections due to electrical activity in the conducting tissues.

Analysis of heart block and arrhythmias by bundle of His electrograms

Charles Smithen (introduced) and Edgar Sowton

Bipolar electrograms of cardiac activity in the bundle of His have been recorded in a series of patients with normal atrioventricular conduction, in patients with complete heart block and in patients

with rapid supraventricular tachycardias.

Measurements were made of the following intervals: P-His interval representing atrial and AV nodal conduction; His-Q interval representing the intraventricular conduction time and His-S interval representing the total intraventricular conduction.

Increasing prolongation of the P-His interval was produced by atrial pacing in ten patients, the mean P-His interval increasing from 153 msec at 90 beats/min to 198 msec at 120 beats/min ($P < 0.01$). This represents proximal block since there was no change in the His-S interval.

In patients with complete heart block the P-His interval was normal, signifying that the block was intraventricular and not in the AV node. A normal P-His interval with a prolonged His-Q interval was found with right bundle-branch block and left anterior hemiblock, indicating delayed conduction down the left posterior bundle only.

The technique was used to differentiate re-entry tachycardia in a patient with antegrade but no retrograde conduction through the His bundle, from an ectopic atrial tachycardia with normal conduction through the bundle of His as found in other patients. The use of His bundle recordings provides an effective method of differentiating dysrhythmias including aberrant conduction and ventricular ectopic beats.

Expectation of life of pacemaker with note on discovery of mechanism of battery failure

J. G. Davies (introduced by Aubrey Leatham)

The most important function of a pacemaker follow-up clinic is to estimate unit power and hence to predict the time for the unit to be changed. Premature failures have been investigated in great detail to decide whether they are random, or follow a uniform pattern, and units which are removed, but still have useful life, are allowed to continue functioning in a warm humid environment (water bath at 37°C).

Over the past 30 months Devices Fixed Rate TF units have proved reliable, and the figures are given.

There have been instances, however, of loss of power, though not of pacing, sufficient to require replacement of the unit. The cause has been found to be failure of a single battery cell and it has not been confined to Devices units. It

was found that tension stresses in the encapsulating medium had led to separation of the battery top plate and the formation of a secondary cell with reversed polarity reducing the voltage from 5 to 3.5 volts. Construction of the batteries has now been altered.

Experience with inductively coupled pacemaker between February 1960 and February 1970

D. O. Williams (introduced by L. D. Abrams)

Since February 1960 more than 300 patients with complete heart block or other arrhythmias have been treated with the inductively coupled pacemaker. This communication presents certain aspects of the treatment of 260 patients by this method during the first ten years. The advantages of rate control and immunity of the apparatus from outside electrical interference are discussed. Figures are presented to show the relative freedom from repeated operations which this method allows.

The mortality, with special reference to the difference between those patients with stable complete heart block and other arrhythmias, is described.

Conversion of atrial flutter or tachycardia to atrial fibrillation by rapid atrial stimulation

D. A. Chamberlain, D. J. Coltart, and H. A. Ead (last two introduced)

Rapid atrial stimulation has been used in 8 patients in an attempt to convert atrial flutter or atrial tachycardia to atrial fibrillation. A bipolar electrode was introduced to high right atrium in 6 patients; in the remaining 2 patients who developed arrhythmias after cardiac operations, pacing wires had been sutured to an atrium at operation. A pacemaker capable of delivering 600 impulses/min at up to 20 mA was used in 6 patients. Electrograms showed atrial 'capture' by stimuli delivered at a frequency greater than the spontaneous rate. Speeding or slowing the pacemaker resulted in atrial fibrillation in 4 instances. In 2 patients a stimulator providing 3000 impulses/min at 10 mA produced atrial fibrillation. Thus the rhythm was successfully changed in 6 of 8 cases, and in 4 of these sinus rhythm supervened spontaneously within 3 days. Ventricular rate is usually more easily controlled in atrial fibrillation than in flutter or atrial tachycardia, and in some

circumstances fibrillation is more stable than sinus rhythm. Rapid atrial stimulation should, therefore, be considered for the treatment of refractory or recurrent supraventricular arrhythmias.

Symptomless myocarditis and myalgia in viral and *Mycoplasma pneumoniae* infections

David Lewes and David J. Rainford (introduced)

Of 17 patients with proved viral (influenza A, Echo 9 and 30) or *Mycoplasma pneumoniae* infections, 6 showed electrocardiographic evidence of symptomless myocarditis which was invariably associated with myalgia. Myalgia is an important symptom presaging myocarditis and is an indication for an early electrocardiogram in all suspected viral infections, even in the absence of cardiac symptoms or signs. *M. pneumoniae* myocarditis is reported for the first time. Cardiographic signs, chiefly over the right ventricle, persisting for 2 to 14 days and occasionally for months, may closely mimic coronary artery disease or septal cardiac infarction. Correct electrocardiographic interpretation is essential if unwarranted cardiac invalidism is to be avoided, particularly in those patients with an indefinite history of infection and in those with protracted abnormalities in the electrocardiogram.

Mobile coronary care service with non-medical staffing

Gerard Gearty, Noel Hickey (introduced), and Ristead Mulcahy

This communication reports the experience of a mobile coronary service operating in Dublin for the past 3 years. Two ambulances are available to service five metropolitan hospitals on a rota basis. The ambulances are staffed by crews who are specially trained in cardiorespiratory resuscitation and external defibrillation. No doctor or nurse travels with the ambulance.

This communication records the experience of specially trained lay personnel in achieving successful resuscitation. Among the first 2500 subjects carried by the mobile service, 80 per cent suffered from acute coronary heart disease, left ventricular failure, or life-threatening arrhythmias. Nineteen cases of primary ventricular fibrillation were successfully resuscitated by the ambulance crew.

It is suggested that trained non-medical ambulance personnel can suc-

cessfully deal with cardiac arrest in a prehospital mobile coronary care system.

Details of organization and of the first 3 years' results are presented.

'Fascicular' block in acute myocardial infarction

M. J. Godman, B. Alpert (both introduced), and D. G. Julian

The intraventricular conduction system can be considered as functioning via three fascicles – the right bundle-branch and the two main subdivisions of the left bundle. The concepts of 'fascicular block' and 'hemiblock' have been used in this study to analyse and document the features of 296 cases of intraventricular conduction disturbances in acute myocardial infarction. The electrocardiographic features of hemiblock and different degrees of fascicular block are reviewed as well as the frequency of the different patterns.

Interruption of conduction in one fascicle was the first abnormality noted in 214 patients, of whom 125 had left anterior hemiblock and 54 left posterior hemiblock; 34 patients from this group subsequently developed electrocardiographic features of bifascicular block and 19 patients trifascicular block.

Of 161 patients with unifascicular block, 8 developed complete heart block but were not noted to develop bifascicular or trifascicular block. Ninety-five patients were observed to have bifascicular block, either as their first conduction abnormality or after unifascicular block; 25 in this group developed complete heart block. A further 40 patients had features of trifascicular block as their first conduction abnormality, or after unifascicular or bifascicular block and of these 23 progressed to complete heart block.

The variation in the course of these different conduction disorders and in particular the relative frequency of progression to complete heart block is emphasized.

Changes in QRS complex after aortic valve replacement

W. R. Ginks and F. Follath (both introduced by J. F. Goodwin)

The electrocardiograms of 50 patients after isolated aortic valve replacement were examined. Two main types of post-operative QRS changes were found.

In the first instance, 13 patients developed intraventricular conduction defects. Of these trifascicular block was found in 2 patients; the first developed complete heart block during operation which later changed to left bundle-branch block and then to left anterior hemiblock; the second patient had left bundle-branch block before operation which changed to right bundle-branch block with left anterior hemiblock after valve replacement. Bifascicular block developed in a further 2 patients: normal intraventricular conduction changing to right bundle-branch block with left anterior hemiblock in one and normal intraventricular conduction changing to left bundle-branch block in the other. However, left anterior hemiblock occurring as an isolated lesion was the most frequent finding.

The other prominent abnormality of the QRS complex after operation was the appearance of abnormal Q waves suggesting inferior wall infarction in 8 patients and anterior wall infarction in one.

Intraventricular conduction defects were interpreted as evidence of involvement of the conducting system during removal of the abnormal valve whereas uneven myocardial blood flow during coronary perfusion was thought to be responsible for the appearance of abnormal Q waves.

With the exception of the patient with transient complete heart block and the patient with anterior wall infarction, no haemodynamic complications were observed and the postoperative course was not different from those without electrocardiographic changes.

Assessment of ventricular damage following after myocardial infarction

Robert Nagle

218 consecutive patients with proved myocardial infarction were studied during the first few days of their illness in order to record signs of severe cardiac damage and cardiac aneurysm. 153 of them attended a follow-up clinic when they were re-examined and a good correlation was found between the presence of such signs at the two different stages of the disease.

Patients with severe cardiac damage who had disabling symptoms were further investigated by cardiac catheterization and ventriculography. A film shows the different kinds of abnormal muscle function observed and these are related

to physical signs, symptoms, and the possibilities of surgical treatment.

The studies suggest that it is possible to identify, at an early stage in the illness, those patients who are liable to suffer from muscle damage later on, but they show that ventriculography is essential for an accurate assessment of the extent of the damage.

Measurement of left ventricular volumes in man by echocardiography - comparison with biplane angiographs

D. G. Gibson

In order to assess the place of echocardiography in measuring left ventricular dimensions in man, a direct comparison has been made between values obtained in this way and those derived from biplane Elema angiograms in 50 patients undergoing diagnostic cardiac catheterization. The internal dimension of the left ventricle was measured from the posterior surface of the interventricular septum to the posterior wall of the left ventricle, with the transducer at the left sternal edge in the 4th interspace. There was close correlation between the left ventricular volume determined angiographically by the method of Arvidsson and the cube of the internal dimension ($r=0.91$, $P<0.001$), and also between values of ejection fraction obtained by the two methods ($r=0.82$, $P<0.001$). The specificity and sensitivity of the method in assessing left ventricular volume has been compared with thermodilution in a similar group of patients, left ventricular angiograms being the reference standard in both. It appears that echocardiography is a satisfactory method of measuring left ventricular volumes and ejection fraction in man.

Heart rate response to certain physiological manoeuvres: proposed measure of degree of beta-receptor blockade

J. D. Fitzgerald (introduced),
D. J. Rowlands, *G. Howitt*, and
E. T. L. Davies (introduced)

Since available beta-adrenergic blocking agents are competitive antagonists, it is important to be able to test whether sufficient drug has been given to block endogenous catecholamines. For clinical use the test should be simple, non-invasive and reproducible.

The heart rate increases associated with the following manoeuvres were investigated: (1) assuming an upright position, (2) sustained hand grip, (3) mild exercise, (4) maximal exercise, (5) voluntary hyperventilation, (6) Valsalva's manoeuvre, (7) taking glyceryl trinitrate. Six normal subjects were studied: the electrocardiogram was monitored continuously, sustained hand grip, voluntary hyperventilation, and Valsalva's manoeuvre were carried out sitting, exercise was performed on a cycle ergometer. Trinitrin (0.5 mg) was taken standing. Four control responses were obtained to each manoeuvre; the manoeuvres were repeated during treatment with propranolol at two dose levels (60 and 240 mg daily). In every case measurements were taken before and after atropine (2.5 mg i.v.).

Sympathetic stimulation was a major factor in the tachycardia associated with (i) taking trinitrin, (ii) standing, (iii) Valsalva's manoeuvre. The trinitrin tachycardia was due only to increases in sympathetic activity since the increment was unaffected by atropinization. This reflex may be used to determine the degree of beta-adrenergic blockade.

Effects of propranolol, oxprenolol, and practolol on denervated dog heart

J. D. Harry, *C. T. Kappagoda* (both introduced), *R. J. Linden*, and
H. M. Snow (introduced)

It has been reported that some beta-adrenoreceptor blocking agents depress the heart by an action other than beta-receptor blockade. In the denervated dog heart we have determined the effect of propranolol, oxprenolol, and practolol on the relation between the chronotropic and inotropic effects induced by isoprenaline.

In 5 dogs in the presence of propranolol (0.04-0.8 mg/kg) for a heart rate of 180 beats/min induced by isoprenaline, dP/dt max measured 8200 mmHg/sec and in its absence 9800 mmHg/sec. For oxprenolol (0.04-0.32 mg/kg) in 4 dogs at a heart rate of 180 beats/min, dP/dt max measured 6300 mmHg/sec compared with 8000 in its absence. In 4 dogs in the presence of practolol (0.4-2.0 mg/kg), at a heart rate of 180 beats/min dP/dt max measured 8200 mmHg/sec compared with 9000 in its absence. Thus each of these beta-blocking drugs had qualitatively the same action. Further there was no evidence of an action of these drugs other than beta-blockade.

An explanation of the results may be that adrenergic receptors in the sinoatrial node behave differently from those in cardiac muscle.

Assessment of beta-adrenergic blocking and non-specific properties of propranolol

D. J. Coltart (introduced by J. Hamer)

Racemic propranolol possesses both beta-adrenergic blocking and non-specific properties. Beta-adrenergic blockade can be shown by competitive inhibition of the effects of isoprenaline infusion or sympathetic stimulation on heart rate and force of contraction. Non-specific effects of propranolol are not due to competitive inhibition of catecholamines and are demonstrated either as local anaesthetic activity, myocardial depression, or electrophysiologically by a reduction in rate of depolarization. The latter has provided the most sensitive measurement *in vitro* of non-specific activity. The concentration of propranolol needed to demonstrate both beta-adrenergic blocking and non-specific properties has been assessed in man.

The concentration of racemic propranolol producing a significant reduction in rate of depolarization has been demonstrated by a microelectrode technique on the isolated human myocardial cell. This concentration (10 µg/ml) is much greater than the plasma propranolol level associated with complete suppression of the tachycardia induced by strenuous exercise (100 ng/ml) and with therapeutic suppression of ventricular ectopic beats.

These findings suggest that the non-specific properties of propranolol are of little clinical significance.

Role of peripheral vascular system in control of cardiac output, demonstrated by use of selective beta-adrenergic stimulating and blocking agents

D. G. Gibson and J. Hamer

With the development of selective beta-adrenergic blocking and stimulating drugs, it has become possible to distinguish cardiac and peripheral vascular components of the overall haemodynamic response to beta-adrenergic blockade in intact man. Intravenous practolol, which has little peripheral

action, causes a significant reduction in heart rate, little change in cardiac output, and a significant increase in stroke volume, with no change or a reduction in left ventricular end-diastolic pressure and depression of left ventricular contractile state. Intravenous salbutamol, which has little cardiac effect, is associated with an increase in cardiac output in the absence of positive inotropic effect. These results show that, under the conditions of study, it is not heart rate or the inotropic state of the left ventricle that determines the cardiac output. The changes in output found in these studies are probably due to variations in venous return mediated by changes in peripheral vascular tone. Changes in cardiac output due to non-selective drugs such as propranolol or isoprenaline are therefore likely to be due to their peripheral rather than to their cardiac effects.

Effect of cardioselective beta-adrenergic blockade in patients with abnormal left ventricular function

J. Graber, P. K. Khanna, M. J. Raphael (all introduced), *R. E. Steiner, and M. M. Webb-Peploe*

The relation between left ventricular end-diastolic pressure (LVEDP), left ventricular end-diastolic volume (LVEDV), and left ventricular stroke work index (LWSWI) have been established at cardiac catheterization before and after intravenous administration of the cardioselective beta-blocking agent practolol (I.C.I. 50172) in doses of 0.3 mg/kg body weight. LVEDV was measured by (1) simultaneous indocyanine green dye dilution and thermodilution curves recorded from left femoral artery and aortic root respectively following diastolic injection of a mixture of green dye and cold saline into the left ventricle; and (2) single-plane cineangiograms carried out in the right anterior oblique position. LWSWI was calculated from stroke index (indocyanine green dye dilution in 15 patients and Fick's method in 6 patients), and planimetric integration of the left ventricular pressure pulse during the ejection phase.

To date 21 patients have been studied: 5 patients with normal left ventricular function, 4 patients with congestive cardiomyopathy, 6 patients with hypertrophic cardiomyopathy, and 6 patients with coronary artery disease. In 2 patients with impaired LV function due to severe coronary artery disease practolol caused a considerable further reduction in LWSWI, but in the remain-

ing patients the drug had little effect on LWSWI. In the patients with normal ventricular function, and in those with congestive cardiomyopathy and coronary artery disease, practolol caused an increase in LVEDV with either no change or a rise in LVEDP. In the 6 patients with hypertrophic obstructive cardiomyopathy, practolol caused either no change or an increase in LVEDV with a fall in LVEDP in 5 and no change in LVEDP in the sixth.

These data suggest: (1) That in hypertrophic obstructive cardiomyopathy but not in other forms of heart disease, antagonism of the cardiac beta-receptors causes an increase in LV diastolic distensibility and (2) that caution should be exercised in the administration of practolol to patients with impaired LV function due to severe coronary artery disease.

Comparison of pulmonary artery diastolic and left ventricular end-diastolic pressures in patients with ischaemic heart disease

R. Balcon, E. D. Bennett (introduced), and *G. E. Sowton*

The use of bedside flow-guided catheterization techniques in patients with acute myocardial infarction has prompted many workers to investigate the relation between pulmonary artery diastolic and left ventricular end-diastolic pressures. A good correlation has not always been found but patients have fallen into a number of different aetiological groups and the point taken for measurement has also varied. This communication reports the results in a group of 15 patients with ischaemic heart disease. Measurements were made at the pre 'a' point when experimental studies have shown there is little or no flow between the pulmonary artery and the left ventricle and thus pressure at the two sites is equal. An 'a' wave could be seen in all records and in 14 of the 15 patients one was found in the pulmonary artery trace. The pulmonary artery diastolic pressure ranged from 0 to 31 mmHg and the left ventricular end-diastolic from 0-30 mmHg. The correlation coefficient for 300 comparisons (20 in each patient) was 0.95. The greatest pressure difference was 5 mmHg, and this occurred in only 2.5 per cent of comparisons. The difference was 2 mmHg or less in 80 per cent. It is concluded that pulmonary artery diastolic pressure correlates well with left ventricular end-diastolic over a wide pressure range in patients with ischaemic heart disease.

Comparison of pulmonary wedge pressure measured by the flow directed Swan-Ganz catheter with left atrial pressure

G. A. Batson, K. P. Chandrasekhar, Y. Payas, and D. F. Rickards (all introduced by D. Verel)

Wedge pulmonary capillary pressure recorded by the Swan-Ganz catheter has been compared with left atrial pressure measured by simultaneous transseptal puncture. Difficulties encountered with the technique have included occasional failure to enter the superior vena cava. The quality of wedge tracing obtained is dependent upon the degree of inflation of the balloon. Good agreement between the two techniques is usual. The use of the Swan-Ganz catheter in the outpatient assessment of mitral valvotomy is described.

Dietary pulmonary hypertension

D. Heath

In a minority of cases the cause of pulmonary hypertension is obscure. This small group consists of classical primary pulmonary hypertension and pulmonary veno-occlusive disease. In recent years it has been shown that pulmonary hypertension may be produced in rats by dietary means.

The substances incriminated in this respect so far have all been pyrrolizidine

alkaloids. Monocrotaline, contained in the leguminous plant *Crotalaria spectabilis*, induces in rats pulmonary hypertension, hypertensive pulmonary vascular disease, and complex changes in the lung parenchyma. So does fulvine, which is contained in the plant *Crotalaria fulva* which gives rise to veno-occlusive disease of the liver in man in the West Indies. The pyrrolizidine alkaloids of the ragwort plant, *Senecio jacoboea*, which is on sale in Liverpool in 'Health Stores' will also produce cor pulmonale and pulmonary vascular disease in rats.

A recent epidemic of primary pulmonary hypertension in Germany, Switzerland, and Austria has been ascribed to the ingestion of the slimming drug Aminorex fumarate ('Mencil'). So far we have been unable to produce cor pulmonale or hypertensive pulmonary vascular disease with this drug in rats, dogs, or monkeys.

Comparison of streptokinase and heparin in treatment of isolated acute massive pulmonary embolism

G. A. H. Miller, G. C. Sutton, I. H. Kerr (introduced), R. V. Gibson, and M. Honey

In 23 patients massive pulmonary embolism was proven by arteriography. In

all, embolism occurred between 2 and 48 hours previously. No patient had pre-existing cardiorespiratory disease. 15 patients were treated with streptokinase and 8 with heparin infused into the pulmonary artery. Both groups were comparable in terms of factors (e.g. age, duration of embolism, history of circulatory arrest or syncope, history of premonitory emboli and probable age of thrombus) which might influence prognosis or resolution rate. Haemodynamic and arteriographic findings did not differ significantly in the two groups. After a 72-hour treatment period repeat catheterization and arteriography permitted objective assessment of response to therapy. After treatment patients treated with streptokinase had significantly lower values for pulmonary artery systolic pressure, total pulmonary resistance, and angiographic severity than did those treated with heparin. Patients treated with streptokinase showed significant improvement in all haemodynamic variables measured; in heparin-treated patients significant improvement was limited to arterial oxygen saturation and right ventricular end-diastolic pressure. No patient died, but treatment had to be changed because of clinical deterioration in two heparin-treated patients. Complications of streptokinase therapy were limited to bleeding from cut-down or operation sites.