ABSTRACTS

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ATHEROSCLEROSIS


Very low density lipoproteins decreased consistently in serum after 400 Gm. of glucose were taken by mouth during a 4-hour period. These levels were lower than those of fasting controls. All lipid fractions of this lipoprotein were reduced. Percentage reduction was greatest for triglycerides and least for cholesterol. Phospholipids were reduced an intermediary amount.

Oppenheimer


After fat ingestion the increase in serum triglycerides is due entirely to an increase in their concentration in low-density lipoproteins. Cholesterol and phospholipid in this fraction are also increased. The greatest increase was observed 4 hours after fat was taken by mouth. Serum phospholipid was increased after a fatty meal and remained high longer than did the triglycerides. Very low and high-density lipoprotein fractions participated in this increase. The slow return to control values was based on high-density lipoproteins, which remained elevated even though lipemia was no longer present. Serum cholesterol increased only slightly after fat ingestion.

Oppenheimer


The administration of dihydrotachysterol (AT-10) to rats produced Mönckeberg sclerosis-like changes in the arterial system and metastatic calcification in heart, stomach, and muscles. In these experiments, AT-10 was administered to female albino Wistar rats in both gravid and nongravid states. The latter group was found to be moribund and emaciated at the end of the experimental periods. Severe arteriosclerosis and ectopic calcium deposits were observed in various organs. The pregnant animals were found to be in excellent health with little evidence of vascular disease at autopsy. The mechanism whereby pregnancy protects the animals from the toxic effects of AT-10 is unknown. It is suggested that further study of this phenomenon may provide information concerning the factors in pregnancy that afford protection against damage to mesenchymal tissues.

Shuman

BLOOD COAGULATION AND THROMBOEMBOLISM


The effect of alimentary lipaemia on the blood clotting mechanism in vivo was studied in 24
subjects by means of measuring various coagulation factors before and after eating a meal containing 72 to 76 Gm. of animal fat. Postprandially, the Russell viper venom time (which was taken to indicate the activity of lipid coagulation factors) decreased in 22 individuals; the blood clotting time in silicone, the platelet count, and the antihemophilic globulin content decreased in 23; and the Christmas factor activity increased in 23. Dicumarol administration counteracted the acceleration of coagulation in 7 of 9 subjects, an effect attributed to reduction in Christmas factor activity. The possible atherogenic propensity of this enhanced coagulation state is discussed.

ROGERS


In more than 800 routine autopsies, massive thrombosis of all cardiac cavities was found 3 times (in 1 patient with chronic cor pulmonale and in 2 with mitral stenosis). All were in congestive heart failure. The thrombus was of gelatinous consistency, contained red pigment and fibrin, and was in intimate contact with other, organized thrombi. It was probably formed during the last minutes of life.

Lepeschkin


In the first patient, a 30-year-old woman, death due to cerebral thrombosis took place only 4½ months after the appearance of the first symptoms. Autopsy showed fresh and organized thrombi in all branches of the innominate artery without endothelial changes or increased blood coagulation. In the second patient, a 19-year-old woman, the greatly elevated erythrocyte sedimentation rate became much smaller during treatment with Butazolidin. The third patient, a 39-year-old man, showed absence of pulsation in the foot arteries in addition to the aortic arch syndrome, and could therefore have had generalized arterial disease.

Lepeschkin


Of 1,400 patients with mitral disease, 666 received preventive anticoagulant treatment for more than 8 days. The mortality due to thrombosis was only 1.3 per cent among these patients, while it was 6.6 per cent among nontreated persons; thromboembolic complications were 1.2 per cent and 7.1 per cent in the 2 groups. Among 371 persons subjected to mitral commissurotomy, fresh atrial thrombosis was found during the operation 3 times as often in nontreated as in treated patients. The incidence of embolic complications during regularization of atrial fibrillation in 336 persons was 5.7 per cent among the nontreated and only 0.37 per cent among the treated patients. Thrombosis occurred during treatment of right heart failure (720 persons) in 9.4 per cent of the patients without anticoagulant treatment but in only 1.6 per cent of the persons receiving this treatment. Hemorrhages appeared in 4.3 per cent of the treated patients; they were usually benign, but led to death in 0.39 per cent. One additional patient died in heparin shock.

Lepeschkin

CONGENITAL ANOMALIES


The authors demonstrated on 6 examples a method of superposition of roentgenograms of different pathways of cardiac catheters that can be used, in addition to usual procedures, to differentiate complex cardiac malformations. The method proved particularly valuable in excluding, in the presence of large atrial septal defects, an abnormal connection of the pulmonary veins, or to demonstrate its presence in cyanotic cases in addition to a ventricular septal defect or other lesions. Four principal groups of pulmonary venous anomalies were distinguished on the basis of the number and the site of the vessels involved in the transposition. Surgical approaches feasible for each group are described. The best criterion for success of a corrective procedure is the postoperative reduction in the size of the right atrium.

Pick


Hemodynamic data obtained from 71 patients with an interatrial communication were presented. Of these patients, 44 were considered to be examples of uncomplicated atrial septal de-
fect, 13 had associated pulmonary hypertension, 6 had anomalous connection of one or more pulmonary veins, 6 had persistent common atrioventricular canals, and 2 had mitral valve disease. In the patients without pulmonary hypertension the pulmonary blood flow was greatly increased (average 3.3 L/min./M.) due to the presence of left-to-right shunting of considerable degree. In a number of these patients it was demonstrated that of the blood shunted left to right, a greater proportion originated from the right lung than from the left lung. Small right-to-left shunts without hemodynamic significance were shown to exist frequently, and of the blood shunted right to left a greater proportion was of inferior caval than of superior caval origin. In these patients the systemic blood flow was normal. The majority of patients with severe pulmonary hypertension had pulmonary and systemic flows of reduced magnitude. In 2 patients with severe pulmonary hypertension a large pulmonary blood flow was calculated.

Patients with anomalous connection of one or more pulmonary veins or with common atrioventricular canal may show the same fundamental circulatory disorder as patients with an atrial septal defect of the usual type. The frequency and practical importance of each of these lesions are compelling reasons that they be sought and diagnosed preoperatively. Highly suggestive evidence for each of these lesions may be obtained from critical analysis of the oxygen saturation of separate series of samples of blood drawn from different locations in the right ventricle, right atrium and both venae cavae. Differences of some magnitude may exist between samples drawn at random from these sites, but considerable significance may be placed on a difference that is consistently demonstrated. A significant correlation was demonstrated between the pressure gradient across the pulmonary valve frequently found in these patients and the magnitude of the pulmonary blood flow. The gradient did not appear to be associated with a pathologically significant degree of pulmonary stenosis.

MAXWELL


A 9-year-old girl with slight cyanosis and dyspnea showed a split first and accentuated second sound, while the electrocardiogram showed right axis deviation with deep Q and S waves in lead III, tall notched R waves in V, - V, very deep S waves in V, and inversion of the T wave up to V,. Roentgenologically the heart was enlarged to the left, with a prominent right atrium and a long pulmonary conus. Angiocardiography showed long persistence of the dye in all cardiac cavities. Cardiac catheterization disclosed a large oxygen difference between superior vena cava and right atrium; the catheter entered the right upper pulmonary vein. The ether test was positive. During the operation hypothermia and a pump-oxygenator were used. It was found that the 3 upper right pulmonary veins entered the right atrium (1 of them at the origin of the superior vena cava), and that a large atrial septal defect was present. The anterior wall of the right atrium was stitched to the anterior edge of the atrial septal defect, so that the entire pulmonary venous drainage was channeled into the left atrium, leaving enough room for passage of caval blood through the anterior half of the right atrium. The child left the hospital after 3 weeks.

LEPESCHKIN


An 8-year-old girl showed mild cyanosis, electrocardiographic signs of right ventricular hypertrophy with normal P waves, and a loud systolic diastolic murmur with thrill over the entire heart, and wide transmission of the systolic component. The roentgenogram showed "sortie" configuration of the heart, while cardiac catheterization disclosed a systolic gradient of 86 mm. across the pulmonary valve, with increased oxygen saturation in this location. Operation disclosed an abnormal coronary artery having the thickness of a finger, originating in a dilated sinus of Valsalva, showing a meandering course on the anterior heart wall, and terminating in the lumen of the right ventricle immediately beneath the pulmonary valves. The valvular pulmonary stenosis that was found to be present was corrected, but a defect in the ventricular septum proved too large to be repaired. Attempted occlusion of the aberrant aneurysmal coronary artery resulted in immediate cardiac arrest, as a small branch of this artery supplied the ventricular septum. After 4 attempts an idiointertrial rhythm developed, and the operation could be completed. After 10 weeks the child was discharged greatly improved. No instance of the aberrant coronary artery described in this paper has been previously published.

LEPESCHKIN

On the basis of 3 personal cases and a review of the literature, 4 morphologic groups are differentiated. In the first group (8 cases) the anterior and posterior cusps originated at the annulus fibrosus but reached nearly to the ventricular apex; the underlying ventricular wall was trabeculated and only the septal wall was smooth. In the second group (23 cases) the posterior cusp and the posterior part of the medial cusp originated midway toward the ventricular apex; in the third group (11 cases) the entire posterior wall was smooth and atrialized, while in group 4 (6 cases) the entire ventricle except a small portion near the pulmonary ostium was atrialized. The teratogenic period for this anomaly is probably in the 15 to 20 mm. embryonic phase; this period is presumably latest in group 1 and earliest in group 4. The atrophy of the ventricular wall and the persistence of the foramen ovale are considered to be secondary effects of the valvular anomaly. Patients who lived to be 60, and presumably had only slight right atrial hypertension, had a closed foramen. Of the 72 patients with electrocardiograms, 53 showed right bundle-branch block (usually with low R wave in V1-V3, 32 peaked P waves and 16 prolonged P-R intervals. A Wolff-Parkinson-White pattern was found in 3; an accessory A-V connection was found in 1 of these, and also in 1 patient who did not show the pattern.

Lepeschkin

CORONARY ARTERY DISEASE


The present study reports the results and evaluation of serial determinations of plasma fibrinogen, serum glutamic-oxaloacetic transaminase, serum aldolase, the C-reactive protein (CRP) and the erythrocyte sedimentation rate (ESR) in patients with acute myocardial insufficiency as well as in dogs with ligation of the left anterior coronary artery at various levels. With acute myocardial infarction the serum enzymes were observed to reach their peak concentration within 1 to 2 days after onset of symptoms and to return to normal 3 or 4 days later and the maximum fibrinogen concentration was found on the second or third day after coronary occlusion with return to normal levels in 2 or 3 weeks. The maximum blood level of these 3 blood constituents reflected the gravity of the disease and recurrent elevations during the stage of convalescence indicated extension of the area of infarction. The fibrinogen level also reflected a protracted clinical course and indicated such complications as intercurrent pericarditis, heart failure, or pulmonary embolization. The ESR and CRP also attained abnormal values in acute coronary occlusion, but were not found to reflect the severity nor the duration of the disease. In patients with coronary insufficiency or subendocardial necrosis the serum enzymes and fibrinogen concentration remained within normal limits or occasionally were only moderately elevated, but the ESR frequently was considerably elevated. In dogs with experimentally produced myocardial infarction the enzymes reached their peak levels within 24 hours and the fibrinogen within 2 days after operation. A semiquantitative relationship was observed between the extent of myocardial infarction and the maximum concentration of these blood constituents.

Sagall


The author summarizes in this report the clinical significance of the alteration of serum glutamic-oxaloacetic transaminase (SGO-T) and serum lactic dehydrogenase (SLD) associated with myocardial infarction. From 6 to 12 hours following the onset of myocardial infarction there is a rise of 2 to 10 times the activity of these serum enzymes with a maximum elevation within 24 to 48 hours. The peak rise is proportional to the extent of myocardial tissue necrosis. The rise in SGO-T and SLD activity is not influenced by, nor correlated with, shock, blood pressure, heart failure, location of the infarction, anticoagulation, digitalis, quinidine, age, sex, color, body temperature, sedimentation rate, leukocyte count, or urinary output. Myocardial ischemia in the presence of confirmatory electrocardiographic changes without histologic evidence of necrosis does not result in significant elevation of enzyme activity. Although these serum enzymes may be altered in several other specific clinical situations, the serial and quantitative serum enzyme changes observed with acute myocardial infarction are not seen. In the presence of equivocal electrocardiographic findings or in tracings where the classical patterns of myocardial infarction are obscured by other abnormalities, the rise in SGO-T and SLD activity in a clinical setting suggestive of infarction is an especially helpful diagnostic tool.

Sagall

The occurrence of anastomoses between coronary arteries in various animals and in fetal and adult human hearts was systematically studied with the help of a perfusion technic and by radiography following lipiodol injection. Anastomoses could be demonstrated with variable frequency in the hearts of calves, pigs, sheep, horses, and dogs. The diameter of the anastomoses varied from one species to the other but also in the same species. Arteriolar anastomoses were noted in 6 out of 7 hearts of human fetuses and newborns. In 120 normal and diseased adult human hearts anastomoses were found in 80 per cent; and in 7.5 per cent of diameters up to 1 mm. The studied material failed to reveal a higher frequency of intercoronary communications in patients with coronary disease when compared with normal hearts. On the basis of these findings the authors concluded that anastomotically intercoronary anastomoses are congenital and their occurrence has no relation to age or an occlusive coronary lesion. Arteriosclerotic occlusions, while unable to create new intercoronary communications may cause functional hypertrophy of pre-existent anastomotic vessels.

PICK

CONGESTIVE HEART FAILURE


Thirty-eight patients with congestive heart failure due to various types of heart disease were treated by oral administration of acetyldigitoxin. In some patients an initial dose of 2.5 mg. was divided over 3 days and maintained by 0.25 to 0.3 mg. per day; side reactions were present in 25 per cent. In another group in which the initial dose was 2.2 to 2.6 mg. and the maintenance dose 0.15 to 0.2 mg. side reactions occurred in only 15 per cent and were less severe. In both groups they consisted in gastrointestinal disorders and disappeared 1 to 2 days after discontinuation of the drug. Ectopic impulse formation was never induced even with the higher doses and only exceptionally toxic effects appeared before the therapeutic ones. The latter occurred promptly, 16 to 18 hours after the first dose and the average dissipation time was 7 to 8 days. Thus, acetyldigitoxin had a more rapid action when compared with digitoxin, and a more persistent action when compared with lanatoside preparations. Acetyldigitoxin seems particularly indicated for the management of ambulatory patients with congestive heart failure.

PICK

ELECTROCARDIOGRAPHY, VECTORCARDIOGRAPHY, BALLISTOCARDIOGRAPHY, AND OTHER GRAPHIC TECHNICS


In 22 of 415 instances of bundle-branch block the spatial angle formed by the terminal 0.04 second of QRS and the mean T vector (F04-T angle) was found to be 100 degrees or less. Of these cases 16 were right bundle-branch block, 5 left bundle-branch block, and 1 of an indeterminate type. Twenty of the 22 patients had obvious severe cardiac disease and 5 died of their heart disease. The finding of a narrow F04-T angle in bundle-branch block would appear to indicate the presence of severe organic heart disease. Thus, the determination of the F04-T angle may prove to be a valuable diagnostic sign especially in the evaluation of right bundle-branch block.

SAGALL


In 18 patients with mitral stenosis acoustic phenomena were recorded before and following commissurotomy. Accentuation of the first heart sound was present in 12 and absent in 6 patients having a rigid or calcified mitral ostium or mitral regurgitation. A prolongation of the interval between the Q wave of the electrocardiogram and the onset of the first heart sound to 0.09 second or more was found in 7 patients with a very small mitral ostium and only in 1 patient with a relatively wide opening. This interval diminished in all following surgery. An opening snap succeeding after 0.07 second or less the second sound was found in 15 patients, disappeared postoperatively in 8, while in the other, its distance to the second sound became longer (0.84 second in the average). A diastolic rumble of variable intensity was recorded in 15 patients and disappeared practically in all after surgery. An apical systolic murmur of moderate intensity occurred in 6 patients, in 4 attributable to mitral
regurgitation found at operation and became slightly accentuated after the intervention.

**Pick**


Potassium chloride was applied to the epicardium to produce injury currents. Results obtained by a string galvanometer and a condenser coupled amplifier electrocardiograph were different. A string will remain deflected by a direct current as long as it flows. Condenser coupled amplifier machines indicate the same current voltage only for a brief period. Anterior wall injury depresses the base line, T-P, and P-R intervals. The S-T take off is isoelectric.

**Oppenheimer**


Of 350 consecutive cardiac catheterizations in mitral stenosis, 1 ended in death due to perforation of the coronary vein. At the moment of perforation the patient felt retrosternal pain, and a sample from the catheter disclosed a yellow liquid. At this time the catheter in the frontal view seemed to have the normal position in the pulmonary artery, with the tip directed upward. The electrocardiogram showed atrial flutter-fibrillation with right bundle-branch block and elevation of the S-T segment, while the pressure curve showed the same configuration as in the right ventricle. The patient died in shock 12 hours after catheterization. Of 12 catheterizations where the catheter entered the coronary vein the pressure curve showed an atrial type when the tip was near the coronary sinus, but a ventricular type in the 3 instances where it was blocked in a more peripheral vein; in these patients the absolute value of the pressure was at least twice as great in the right ventricle. A curve of ventricular configuration but variable amplitude is therefore a good sign that the catheter is in the coronary vein.

**Lepeschkin**


Using the cube system of Duehosal and Sulzer (electrode location on the right side and the back), the horizontal plane vectorcardiogram was registered at 8 different levels of the thorax, each level corresponding to a different "section" through the electric field of the heart. The levels near the middle of the heart have higher voltage than in more peripheral regions. While differences in the angle of QRS between different sections are relatively slight in normal persons, in those with right ventricular hypertrophy they may reach 90°. These differences concern primarily the terminal portion of the QRS loop, while the initial portion remains stable. The sagittal plane vectorcardiograms can also be subdivided into 8 sections while in the frontal plane only 3 sections can be made. Wire models of the QRS loops in the 19 sections can be combined into 1 solid.

**Lepeschkin**


After experimental bundle-branch block in anesthetized dogs, the wave of excitation was observed to spread uniformly from the contralateral ventricle across the septum to the free wall of the homolateral ventricle. Changes in septal and mural depolarization contribute to QRS changes. Incomplete bundle-branch block appears most satisfactorily explained as caused by damage to the main bundle branch, rather than by interference with the endocardial or myocardial phases of induction.

**Aviado**

A critical investigation is presented concerning the exactness of hemodynamic data determined by cardiac catheterization. Among 65 patients including normal individuals and patients with various types of heart disease all catheterized under "basal conditions," statistically significant differences were found in multiple pressure readings in the pulmonary and systemic circulation, and in double determinations of the oxygen consumption and oxygen saturation of venous and arterial blood samples. Accordingly, inconsistent values were obtained in repeated calculations of cardiac output, of the work of the 2 ventricles and of the resistance in the 2 circulations. The authors, therefore, conclude that hemodynamic data arrived at by cardiac catheterization are merely an expression of transient conditions which, without known cause, may undergo considerable and apparently spontaneous variations exceeding the ranges of errors inherent in the method. In the evaluation of individual figures, much stricter criteria are necessary than applied in usual practice.

Pick

ENDOCARDITIS, MYOCARDITIS, PERICARDITIS


Wassermann complement-fixation, cholesterine Wassermann, Kahn flocculation and occasionally sitolipin serologic tests were performed, frequently repeatedly, in 221 patients having subacute bacterial endocarditis in Helsinki. In 11 of these 1 or more positive reactions were encountered in association with other clinical evidence suggesting the presence of syphilis. This 5 per cent incidence of possible syphilis was nearly twice that of the over-all hospital incidence of syphilis. However, in only 1 instance was the infection proved to occur on a syphilitic valve. In 50 patients 1 or more positive reactions (most commonly in the Kahn test) were found in the absence of other evidence of syphilis, and it was suggested that knowledge of this nonspecific reaction incidence of 23 per cent might be of some help in making the diagnosis of endocarditis lenta.

Rogers


Subacute rheumatic endocarditis with Aschoff's nodules was found in 26.5 per cent, subacute endocarditis with lymphocyte infiltration in 6.1 per cent, and chronic sclerosing endocarditis in 67.2 per cent. There was no relation between the presence of Aschoff's bodies and the clinical or laboratory signs of acute rheumatic disease, the interval since the last attack, or the appearance of the postcommisurotomy syndrome.

Lepeschkin

HYPERTENSION


A desoxy corticosterone acetate (DCA) and salt regime was associated with increased sodium and potassium content of aortic walls in hypertensive rats. DCA and sodium restriction did not produce hypertension. In these animals the chemistry of the aortic wall was not changed.

Oppenheimer

PHARMACOLOGY


The authors studied the effect of chlorpromazine on the action of epinephrine and norepinephrine on blood pressure, blood sugar, and blood potassium. The experiments were performed on 12 dogs anesthetized with chloralose. Atropinisation of the animals before the experiments did not change the results. If chlorpromazine was given in doses that caused a fall in blood pressure following injection of epinephrine (0.6 to 4 mg. per Kg.) it prevented the hyperkalemia caused by epinephrine or even caused a fall of the blood potassium; however, it never modified the hyperglycemia caused by epinephrine, even if very large doses were given. Chlorpromazine diminished the hypertension caused by norepinephrine but did not cause a fall of the blood pressure. The hyperkalemia following injection of norepinephrine was easily suppressed.

Scherf


Because of contradictory statements in the lit-
literature the author investigated the effect of phentolamine (Regitine) on the hypertensive action of stimulation of the peripheral end of the splanchnic nerve and the central end of the vagus nerve of the dog. Furthermore, the action of Regitine on the effect of faradic stimulation of the cervical sympathetic chain on the nictitating membrane of the cat was examined. The dogs were anesthetized with chloralose, the cats with phenobarbital. The authors found that Regitine was a powerful adrenolytic substance; its noradrenolytic effect was less intense. In small doses Regitine potentiated the action of sympathetic stimulation. The vasomotor effect of faradic stimulation of the central end of the vagus was slightly augmented by Regitine. In small doses Regitine diminished the contraction of the nictitating membrane provoked by epinephrine and norepinephrine but it sensitized the membrane to the effect of nervous stimulation. The author points out that these results are not compatible with the present theory of humoral transmission of sympathetic impulses.

**Scherr**

Schmitt, H.: Adrenolytic, Noradrenolytic and Sympathicolytic Action of Dibenzyline. Arch. Int. Pharmacodyn. 109: 263 (Feb.), 1957. The effects of dibenzyline on the action of epinephrine, norepinephrine and stimulation of the sympathetic nerves were investigated in cats and dogs. The animals were anesthetized with chloralose. The arterial blood pressure was registered from the femoral artery with a Ludwig mercury manometer. It was found that dibenzyline (1 to 10 mg. per Kg. intravenously in the dog) caused an inversion of the hypertensive action of epinephrine lasting for 8 to 9 hours. The hypertensive action of norepinephrine, however, was reduced only by 50 per cent. The rise of blood pressure after faradic stimulation of the peripheral end of the splanchnic nerve was not diminished. Dibenzyline diminished the rise of blood pressure produced by occlusion of both carotid arteries readily. Dibenzyline in the dose of 1 mg. per Kg. diminished considerably or even suppressed the contraction of the nictitating membrane of the cat, produced by epinephrine. It was concluded that dibenzyline was a powerful adrenolytic drug; it had less noradrenolytic action. Its activity as a sympathicolytic drug was the weakest. The substance also possessed an inhibiting action on the vasomotor centers.

**Scherr**

Taquiní, A. C., Roncoroni, A. J., Aramendia, P., and Ros, A. M.: Sensitivity of Respiratory Center to Carbon Dioxide in Emphysema and Cor Pulmonale: Effects of Carbonic Anhydrase Inhibition. Am. Heart J. 54: 319 (Sept.), 1957. The authors report in detail the results of a study of pulmonary ventilation and blood gases in normal subjects and patients with chronic cor pulmonale secondary to pulmonary emphysema in acute or chronic respiratory acidosis. The sensitivity of the respiratory center to carbon dioxide was evaluated by the change in ventilation induced by breathing carbon dioxide in air that brings about an acute increase in arterial carbon dioxide. An analysis was made of the factors responsible for this response and the modifications that could be exerted on it by the pharmacologic depletion of blood bicarbonates by means of acetazolamide. It is concluded that acetazolamide should be used cautiously in patients in acute respiratory acidosis since, if hyperventilation is not produced, it will result in a more severe acidosis. In chronic respiratory acidosis acetazolamide seemed a valuable adjunct to the usual therapy.

**Sagall**

Vitenšteinas, G. A.: Certain peculiarities in the Action of Atropine on the Heart. Klin. Med. 35: 48 (May), 1957. Subcutaneous injection of 1 mg. of atropine caused a paradoxical decrease of heart rate in about one third of 50 patients. In 1 patient atrioventricular nodal rhythm at a higher rate appeared. In 1 patient nodal rhythm accelerated at first, and then was transformed into sinus rhythm. One patient with angina pectoris had normal T waves at rest and after exercise, but developed precordial pain and inverted T waves after atropine.

**Lepeschkin**

METABOLIC EFFECTS ON CIRCULATION

Schaub, F.: Cardiac Alterations in Myxedema and Simple Hypothyroidism. Cardiologia 30: 185 (March), 1957. Cardiovascular findings were reviewed in 59 patients with myxedema or hypothyroidism, 18 to 79 years of age and with various etiologies. The leading symptom was dyspnea in myxedema and functional complaints in hypothyroidism. In one third of all patients the heart sounds were distant. Roentgenologically the heart was enlarged with feeble contractions in all myxedematous and in one fourth of the hypothyroid patients. One fourth of the former and one half of the latter did not have bradycardia. Hypertension was noted in the same percentage. One third of the myxedematous patients had evidence of pericardial effusion. Forty-six of the 59 pa-
tients revealed electrocardiographic abnormalities consisting in flattening or inversion of T waves, and small P waves. Low voltage, however, was found in only 10. Atrioventricular conduction delay was rare, but a right ventricular conduction disturbance was diagnosed in 26. In 22 the response to specific therapy could be followed. The cardiovascular findings became normal in 5 and improved in 13.

PHYSICAL SIGNS


In 84 cases of mitral stenosis studied for the occurrence of true ventricular gallop, 5 cases of this type of triple rhythm were discovered and proved by simultaneous phonocardiograms, apex cardiograms, and jugular wave tracings. Four of these patients had associated tricuspid insufficiency and 1 had pure mitral insufficiency without stenosis. The mechanism of this rhythm and its distinction from other forms of triple rhythm are discussed. The author concludes that the discovery of a ventricular gallop rhythm in patients with mitral stenosis should alert one to the likelihood of the existence of other valvular abnormalities.

SAGALL

PHYSIOLOGY


A standard heart-lung preparation was set up using heparinized blood. Epinephrine and norepinephrine were infused into the tube carrying the blood from the venous reservoir to the superior vena cava. Electric stimulation was supplied to the tip of the right atrium by electrodes. The right atrium was stimulated at increasing rates to determine the maximum rate at which all atrial beats were transmitted to the ventricles. Stimulation was continued at higher rates to determine what rate would cause a fall in ventricular rate until it became half the atrial rate. Epinephrine and norepinephrine were then infused into the cannula; the same type of stimulation was carried out. Infusion of epinephrine and norepinephrine raised the maximum rate of stimulation permissible and raised the rate at which stimulation could be maintained until the ventricular rate fell to half the atrial rate. Stimulation at very high rates (750 per minute for 2 minutes) was carried out during the infusion of epinephrine and later norepinephrine. No predicted effect of changing rhythm could be observed. When acetylcholine was injected, atrial flutter occurred. The addition of eserine to the experimental set up, followed by the infusion of epinephrine or norepinephrine caused no change in rhythm. When fibrillation had been produced by stimulation after the infusion of acetylcholine, the addition of epinephrine did not abolish this. The authors' ideas are advanced to explain these phenomenon. It is felt that the action is due to an increase in the duration of the atrial action potential caused by epinephrine.

HARVEY


Infusions of levarterenol (3 to 7.7 mg. per Kg. per minute) in anesthetized dogs with pulmonary artery constriction caused an increase in cardiac output, accompanied by cardiac acceleration and premature ventricular contractions. The difference between such results and those reported by Goldberg and co-worker in man (no increase in output) may be due to the following factors: species difference; modifying action of anesthesia; and larger dose used in dogs.

AVIADO


Hepatectomy had little effect upon blood pressure responses to drugs in most cases. Reactions to drugs and reflexes were approximately normal in the perfused hind leg of these animals. In a smaller number of experiments responses to drugs were reduced. In these latter cases the depressor action of tetraethylammonium chloride was increased and serotonin became depressor. These last findings are a sign of increased neurogenic vasoconstriction. Hepatectomy did not increase responses to drugs concerned with blood vessels.

OPPENHEIMER


Cardiac output per minute, circulating blood volume, and circulation times were determined according to Hamilton's dye-dilution methods in 7 normal men at rest and following graduated exercise on a bicycle ergostat. Considering the over-all circulation, a good correlation was found
between the degree of work and the reduction of the average circulation times or of the ratio of the circulating blood volume to the cardiac output, and the degree of work performed. Differentiation of circulation times for the segments measured revealed that reduction was minor between cubital veins and the ear as well as in the segment of lung capillaries to ear. Correspondingly, an augmentation of the intrathoracic blood volume was found in 4 among 6 cases. This suggests that with normal circulation the blood supply to the lungs is increased by exercise in most instances.

**PICK**


Alterations of venous return to the heart occurring with hyperventilation were investigated with the help of pressure recordings in the right atrium, in the subdiaphragmatic portion of the inferior vena cava, in the stomach, the esophagus, and the peritoneal cavity. It could be shown that hyperventilation reduced venous flow in normal persons by some blocking mechanism developing at the level of the diaphragm. This phenomenon was absent in patients with right heart failure but could be found during ordinary respiration in patients with pulmonary emphysema.

**PICK**


Acute and chronic effects of Diamox are similar when inhibition of renal carbonic anhydrase is the criterion. Rats receiving Diamox in a chronic fashion were observed to have an alkaline urine, low titratable acid and high bicarbonate excretion. These findings depended on sodium Diamox load rather than carbonic anhydrase inhibition. The renal glutaminase enzyme system was activated by chronic use of Diamox. As a result there was an increase of ammonia in an alkaline urine. If sodium was withheld, the effect of Diamox on glutaminase was increased. Long-continued administration of Diamox was observed to be associated with an increase in serum sodium.

**OPPENHEIMER**


In edematous patients equilibration of radiosodium with readily exchangeable sodium requires at least 24 hours. In the ease of radiopotassium the time required for equilibrium was twice as long as for sodium. However, deuterium oxide reached equilibrium in 6 hours.

**OPPENHEIMER**


The test object was the hamster cheek pouch. Vascular responses were proportional to time of exposure to cold. When exposed to freezing for 30 seconds, blood flow stopped in the area of exposure. Arteriolar constriction was not observed in this area, but was very definite in adjacent tissues. Following a thaw, the blood flow increased and many emboli of platelets were seen to originate from the previously frozen site. Sometimes adjacent vessels were the site of thrombus formation. Later flow decreased and came to a halt. Stasis began in veins and all types of vessels were in turn dilated by packed blood cells. The stasis depended on hemoconcentration.

**OPPENHEIMER**


Cold injury in hind legs of hamsters was produced by exposure to pulverized dry ice. If legs were rewarmed rapidly there was more edema, but less tissue necrosis. In controls that were not rewarmed, inositol increased edema with decreased loss of tissue. Rapid rewarming and inositol were synergistic.

**OPPENHEIMER**

PULMONARY DISEASES


In this article the author discusses the significance of the autonomic nerve supply to the lung vasculature. On the basis of clinical observations and some animal experiments he shows that pulmonary embolism is not accompanied by generalized pulmonary vasoconstriction; that pulmonary edema is a secondary phenomenon to changes in the systemic circulation but facilitated by pre-existing disturbances of pulmonary hemodynamics; that the hypoxic reaction is a direct response of the smaller vessels of the pul-
monary circulation to blood unsaturated with oxygen; and that drugs known to influence the autonomic nervous system play little part in the vascular adjustments of the lung. He further points out that the lung vasculature is poorly endowed with sympathetic and parasympathetic nervous supply and the function of even this small supply is not clear.

SAGALL


The authors were able to produce consistently in open chest dogs pulmonary arterial hypertension by ligation of the pulmonary veins. The diastolic pressure rose to 100 per cent of its initial value, while the systolic pressure was modified to a lesser degree and the capillary pressure remained unchanged. This hypertension could be intensified by norepinephrine, abolished by hexamethonium or Regitine and was not influenced by atropinization or bilateral vagotomy. The authors conclude that the mechanism of this type of pulmonary hypertension is a neurogenic reflex mediated by receptors in the walls of the pulmonary veins. The experiments confirm the influence of the sympathetic system in the genesis of functional pulmonary arterial hypertension.

PICK


A pulmonary arterial pressure increase develops when the ventricular ejection force is common to both the pulmonary and the systemic circulations, or when there is interference with the pulmonary venous blood flow, or when there is pulmonary vasculitis or embolism. Primary pulmonary hypertension is a name reserved for that situation where none of the above conditions appears to be the cause for the pulmonary hypertension. A 4-month-old white baby girl was admitted to the Children's Hospital with progressive dyspnea for 2 months, cough for 1 month, and cyanosis for 2 weeks. The physical examination revealed clear lungs but an increased diameter of the chest. A faint blowing systolic murmur was heard in the third and fourth interface on the left. The second pulmonic sound was accentuated. Tachycardia was present. The liver was felt 3 cm. below the right costal margin. X-ray showed prominence of the right atrial and ventricular shadows. The electrocardiogram showed right axis deviation and right ventricular hypertrophy. The initial impression was primary pulmonary hypertension. Cardiac catheterization was performed revealing elevation of pressure in right ventricle and pulmonary artery. The patient died suddenly 2 days after the catheterization. At autopsy microscopic examination of the lungs showed striking thickening of the walls of the pulmonary vessels due to increase in size of the medial layer. There was no fibrosis or necrosis and no endothelial change. Good illustrations of the microscopic sections are presented.

OPPENHEIMER


The patients studied had an unexplained hypofunction of the autonomic nervous system. The symptoms were low blood pressure, hypohydrosis, and impotence. These subjects were observed to have a marked increase in ability to excrete salt and solute-free water when isotonic salt solution was injected intravenously. There was a concomitant increase in glomerular filtration rate and an expansion of extracellular fluid. Vasopressin blocked the increase in excretion of solute-free water. Adrenal steroids, known to be sodium-retaining, did not prevent the increase in sodium excretion. If blood or extracellular fluid volume was rapidly increased or decreased, marked shifts in systemic arterial blood pressure were observed. It is suggested that these patients are unable to maintain circulatory homeostasis and hence are capable of rapid increases in glomerular filtration rate and salt excretion. It is further postulated that, in normal individuals, well-developed autonomic vasoregulatory reflexes act to maintain circulatory homeostasis and as a result rapid increases in glomerular filtration rate and excretion of excess salt are not observed.

ABSTRACTS

RENAL AND ELECTROLYTE EFFECTS ON THE CIRCULATION


Aldosterone excretion was reduced by potassium restriction, but when sodium restriction was added, excretion increased to 6 times. If potassium was restored while sodium deprivation continued there was some additional increase in excretion of aldosterone.

Harvey

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ABSTRACTS


In a pathologic study of the myocardium of potassium-deficient rats, no relationship between the administration of digitalis and the incidence or appearance of lesions due to potassium deficiency could be demonstrated. Digitalis neither protected from nor added to the effects of such a deficiency in so far as the production of recognizable lesions was concerned. It was also concluded that digitalis did not exert any significant influence upon the potassium or sodium content of the heart. Myocardial lesions that could be definitely attributed to the influence of potassium deficiency were not found in any of 74 patients who died of idiopathic uremic colitis. Specific electrocardiographic changes that could be definitely attributed to the effects of either potassium or digitalis were not demonstrated in a small group of rats studied.

Maxwell


Renal biopsies were obtained in 122 pregnant or recently pregnant patients over a 7-year period. Of these, 69 were transperitoneal at the time of cesarean section and 53 were percutaneous. The present report is concerned with the first 71 biopsies including 26 primiparous and 45 multiparous patients. The diagnoses on renal tissues were made without knowledge of the clinical condition. On histologic grounds, a mild change (+) consisted of thickening of basement membrane, fibrillation of endothelial cells, and slight reduction of the capillary lumen. This was found in 1 eclamptic, 3 nephritic, 13 hypertensive, and 4 normal patients. The mild lesion occurred rarely in pre-eclampsia but was frequent in multiparous patients with hypertensive disease. A moderate or severe change (2+ or 3+) consisted of more advanced thickening of basement membrane, fibrils in endothelial cells and narrowing of glomerular capillaries. This change was present in all 11 primiparous patients with pre-eclampsia, in 2 of 3 with eclampsia, and in 5 of 7 with hypertensive disease. It was concluded that this lesion may occur in any type of toxemia of pregnancy and is most common in primiparous patients with pre-eclampsia. There was no evidence that permanent renal damage developed from the lesion. There was also no evidence that the grade 2 or 3 lesions were characteristic of pre-eclampsia, since they were observed in hypertensive patients. It may be assumed that the lesions are a secondary rather than a primary factor in toxemia of pregnancy.


Previous investigations of the authors have shown that a "lytic cocktail" containing chlorpromazine prevented the diuretic effect of surgical stress. Therefore, the effect of chlorpromazine on the antidiuretic action of posterior pituitary extracts and on that of the antidiuretic hormone-mobilizing hormone was studied. Moderate inhibition of the diuretic action in orally water-loaded rats was produced by nicotine or a posterior pituitary preparation. The effect of chlorpromazine on this antidiuretic action was studied on 304 male and female albino rats. The animals, treated with chlorpromazine (1.5 mg. per 100 Gm. of body weight) scarcely moved and hardly responded to external stimuli. Neither nicotine nor pituitary hormone changed this. The water-loaded controls developed a characteristic diuretic response. The above-mentioned dose of chlorpromazine did not alter the diuretic response. When larger doses were used, the results were not uniform. Nicotine caused a characteristic antidiuretic effect. If the above-mentioned dose of chlorpromazine were given besides nicotine a very pronounced antidiuretic effect was observed. The mechanism of this effect could not be determined.

Scherf


The feeding to growing rats of nutritionally adequate diets high in sodium chloride content but low in potassium led to markedly increased urinary excretion of potassium and the development of focal myocardial necrosis characteristic of potassium deficiency. Such lesions did not appear or were minimal in animals fed similar diets low in sodium chloride. The largest weight gains occurred in animals receiving normal amounts of potassium and sodium; and the smallest weight gain occurred in those animals receiving the highest sodium dietary content. Hypertension did not develop in any of the animals. These experiments support the view that ionic imbalance between sodium and potassium,
under conditions of excessive intakes of sodium, may lead to an intracellular displacement of potassium and a subsequent development of cardiac lesions indicative of potassium deficiency. The inference is that a preponderance of sodium ions within the cell may be the determinant of potassium displacement.

MAXWELL


The most striking effect of serotonin on renal hemodynamics is its antiuretic action. The threshold dose of 10 mg. per Kg. per minute (in dogs) results in a significant decrease in urine formation in the absence of any changes in glomerular filtration rate of blood pressure and with only an insignificant increase in renal plasma flow. This strongly suggests an action of this agent to increase the rate of water reabsorption by the renal tubules.

AVIADO

RHEUMATIC FEVER


Adequate roentgenologic data were available in 115 patients. Almost half of these had transient enlargement within the first 3 months after the operation, enlargement was persistent in from 1 to 5 years in 24 per cent; a decrease in size occurred in 22 per cent. In general, decreases in size correspond to the degree of clinical improvement. Increase in size occurred in 78 per cent of the patients clinically improved. Calcification of the mitral valve occurred in 43 per cent of patients with mitral insufficiency and in 10 per cent of patients with mitral stenosis. The incidence of giant left atria was about the same in both. In general, there was fairly good correlation between the grades of prominence of the pulmonary artery trunk, horizontal Kerley “B” lines, and demonstrable pulmonary hypertension during cardiac catheterization. The disappearance of the “B” lines often coincided with clinical improvement.

SCHWEDEL


Poor reproducibility of results with all commonly employed methods is reported. The poor reproducibility is not confined to rheumatic fever.

McKUSICK


Streptolysin O concentrates were administered intramuscularly to 20 children with rheumatic fever. Nonrheumatic children were used as controls. Nonspecific antibody responses were not observed following administration of Streptolysin O. Rheumatic children had higher antibestreptolysin O responses than did normal controls.

OPPENHEIMER

ROENTGENOLOGY


The authors provide a descriptive account of the roentgenographic anatomy of the arteries of the abdomen and pelvis as visualized by means of translumbar aortography. Studies of the collateral circulation in 151 patients with arterial obstruction confirmed previous anatomic descriptions of collateral channels and did not disclose any new anastomoses. Collateral circulation may form from 1 of 3 sources: segmental and parietal arteries, visceral arteries, and opposing arteries. Segmental and parietal arteries include the intercostal, lumbar, inferior epigastric, and deep circumflex iliac arteries, usually with other segmental and parietal arteries on the same side of the body. Visceral arteries include the superior and inferior mesenteric arteries and their branches and the visceral branches of the hypogastric arteries, and supply blood to the lower extremities via the parietal branches of the hypogastric artery, and the obturator, superior, and inferior gluteal arteries. Opposing arteries are the branches of the hypogastric artery, both visceral and parietal, which are capable of anastomosing with their fellows across the midline, and are observed principally in unilateral pelvic artery obstruction.

SCHWEDEL


In an attempt to find a readily applicable method for determining the presence or absence of pulmonary hypertension, the chest x-rays of
105 patients with pure or significantly predominant mitral stenosis in whom pulmonary artery pressures had been measured directly by cardiac catheterization, or by direct puncture of the pulmonary artery at operation, were studied in regard to the width of the right descending pulmonary artery. The authors concluded that in such patients widths of 15 mm. or more are definitely associated with significant pulmonary hypertension, widths of 14 mm. indicate that significant pulmonary hypertension is most likely present and with widths below 14 mm. there is no certainty as to the existence of pulmonary hypertension. Also, no direct linear correlation was found between increased pulmonary artery widths and the degree of pulmonary hypertension.

Sagall


Hereafter, intraosseus injections of radioactive media have been employed mainly in the tibia for the purpose of demonstrating the deep and superficial veins of the lower extremity. The authors describe additional uses of this technic delineating lesions affecting either intraosseous or extraosseous venous patterns. Examples of the former type are bone cysts and neoplasms, osteitis pubis, and fractures. Extraosseous lesions that may be demonstrated by phlebography via adjacent bones are intraspinal and mediastinal tumors. General anesthesia is usually required.

Rogers


The authors report a study of contrast visualization of the ascending and transverse aorta with a technic involving retrograde catheterization of the aorta through the femoral artery and the use of sodium and methylglucamine diacetlyaminotriiodobenzoates (Renografin 76 per cent). In all, 86 injections were made in 18 patients without the need of general anesthesia and without serious reactions or complications. Study of this anatomic area previously by angioangiography has not proved reliable. Also, the danger of brain damage following direct aortography has prevented large scale use of this method. Retrograde thoracic aortography, however, has made it possible to outline the root of the aorta, including the aortic valve, the aortic arch, and its branches, accurately as well as the remainder of the thoracic and abdominal aorta. This procedure has greatly improved the delineation of the vascular nature of masses associated with the root of the aorta, the aortic arch, and the brachiocephalic arteries. Other observations that may be made in certain instances with this method of study include visualization of the coronary, vertebral, and cerebral arteries and the obtaining of hemodynamic data of the left ventricle when the catheter tip has entered the cavity.

Sagall


Translumbar aortography has had a small though significant rate of complications. Mainly these are renal and spinal cord damage (each due to local action of contrast medium), hemorrhage (usually due to multiple punctures or to moving the patient while the needle is in place), thrombosis not of the aorta but of a branch, and embolism of a thrombus or an atheromatous plaque. These difficulties can usually be avoided by employing the following technic. The aorta should be pierced only once, well above its major abdominal branches, with a 17-gage thin-walled needle. Five milliliters of an organic iodide solution is injected and a preliminary roentgenogram is made to ascertain the position of the needle. Then 15 to 25 ml. of the iodide solution are injected manually to produce the aortograms. Aortography is not needed in most patients with abdominal aortic aneurysm or of total aortic occlusion.

Rogers


The authors studied the safety and efficiency of direct cardioangiography and retrograde aortography in dogs. Some of the dogs had been subjected to the surgical production of mitral insufficiency, mitral stenosis, and aortic insufficiency. It was found that normal mitral and aortic valves prevented retrograde reflux of the contrast medium. Mitral insufficiency was clearly shown after injection of the left ventricle, when the contrast medium appeared in the left atrium. Aortic insufficiency resulted in reflux visualization of the left ventricle after injection into the ascending aorta. The combination of mitral stenosis and insufficiency was also demonstrable after injection into the left ventricle. The authors found that the retrograde aortographic technic was safer for left
ventricular injection than the direct puncture technic.

ENZELBERG


Thirty-seven deaths and 98 serious complications occurred in a survey series of 13,207 abdominal aortographies. The mortality rate was 0.28 per cent; serious morbidity in 0.74 per cent. Renal damage from the contrast medium was the most important complication, followed in order of frequency by neurologic, cardiovascular, and gastrointestinal morbidities and mortalities. Hemorrhage and general anesthesia occurred frequently enough to warrant serious consideration; respiratory morbidity occurred less often than renal and neurologic causes.

SCHWEDEL

SURGERY AND CARDIOVASCULAR DISEASE


Seven patients with pure mitral stenosis are reported who underwent mitral surgery at various stages of pregnancy. The feasibility of the operation was demonstrated by the fact that all patients made an uneventful recovery and completed their pregnancy. The indications for commissurotomy during pregnancy are discussed. It is emphasized that the operation may constitute an important therapeutic procedure particularly in countries where termination of pregnancy and sterilization are not practiced. Under such circumstances mitral surgery will significantly contribute to the reduction of the mortality figures from heart disease.

PICK


Of 370 patients with mitral stenosis submitted to commissurotomy, 48 had previously had arterial emboli, and 17 of these had multiple emboli. In 12 of the 48, atrial thrombosis was found during the operation; all of them had atrial fibrillation. In 3 of these embolism occurred during the operation, whereas it occurred in only 3 of the 322 patients without previous embolization. In patients with previous emboli it is recommended to interpose 2 months of anticoagulant treatment between the last embolism and the operation, to flush the atrium and to clamp the carotid arteries temporarily. None of the patients who had previously had emboli developed them during a period averaging 15 months after the operation.

LEPESCHKIN


Abrupt arrest of the circulation, occurring in 34 of 600 heart operations, was due to ventricular fibrillation in 28 and to cardiac arrest in 8. Prophylaxis (including avoidance of intraoperative hypoxia, hypotension, and undue cardiac trauma) was not always possible. Once circulatory arrest is diagnosed, effective treatment must be instituted within 4 minutes if permanent brain or heart damage is to be prevented. First, an adequate airway is established and oxygen is administered. Forceful ventricular massage against the spine or sternum at a rate of 60 to 70 per minute is carried out usually through a fourth left intercostal and pericardial incision. Response is gauged by systolic blood pressure rise to at least 70 mm. Hg. Cardiac tone may be augmented by injecting 1 to 5 ml. of 10 per cent calcium chloride or a 1:10,000 epinephrine solution into the left ventricular cavity. Most cases of cardiac standstill will respond to this treatment, while ventricular fibrillation usually requires in addition defibrillation by electric countershocks. When the spontaneous heart beat has resumed adequately for several minutes, the chest incision is closed with underwater drainage of the pericardium.

ROGERS


Maintenance of the circulation of dogs by means of a pump oxygenator alone for periods of 15 minutes resulted in the development of ventricular fibrillation in all, and death in 90 per cent. The additional retrograde perfusion of the coronary sinus with blood from the pump oxygenator preserved heart action satisfactorily in 15 of 16 dogs for periods up to 20 minutes, although 4 of these animals developed ventricular fibrillation after the reestablishment of normal coronary blood flow. Some physiologic, electrocardiographic, and metabolic data from these studies are presented.

Seven patients are described having direct vision left heart surgery for as long as 16 minutes using the latter technic for circulatory
support. Successful results include the correction of aortic or subaortic stenosis, of combined rheumatic aortic and mitral valvular lesions, and of a sinus of Valsalva rupture into the right ventricle. Three deaths occurred postoperatively. In all patients this method of circulatory maintenance appeared to protect the myocardium against hypoxia and coronary air embolism.

ROGERS


Postoperative arrhythmias and pericarditis were studied in 55 patients who had established normal sinus rhythm prior to thoracic or cardiac surgery. Disturbances in rhythm developed in 20 instances, electrocardiographic evidence of pericarditis in 27, and questionable changes in 3. Concomitant arrhythmia and pericarditis occurred in 10. Atrial flutter or fibrillation was the most common arrhythmia encountered (75 per cent) regardless of type of surgery and was the only disturbance of rhythm occurring after mitral commissurotomy (7 of 13 patients). None of the 4 patients submitted to pulmonary valvulotomy developed arrhythmia. Among the 10 patients who underwent surgery for careenoma of the esophagus, disturbances of rhythm were noted in 7, all of whom died within 1 to 22 days. Most of the disturbances of rhythm occurred within 5 days after operation; late onset, more than 10 days after surgery, suggested serious postoperative complications or reactivation of the rheumatic process. The most important factors in the development of postoperative atrial arrhythmia appeared to be the age of the patient and pre-existing disease of the atrial myocardium. Hypoxemia or vagal irritation may trigger the abnormal mechanism. Surgical pericarditis has an early onset and may follow the usual or an abbreviated electrocardiographic course. Alterations of the electrocardiogram attributable to pericarditis can be anticipated in any patient in whom the pericardial sac is opened.

MAXWELL


Cardiac arrest may occur during surgery in patients who have impairment of myocardial blood supply, chronic respiratory embarrassment, or overdosage of an anesthetic agent. Massive hemorrhage and the vaso vagal reflex may be factors. There are 2 forms of cardiac arrest: ven-

tricular standstill or ventricular fibrillation. It is useful to differentiate these because the treatment is different. Many cases of ventricular standstill will respond to 1 or 2 minutes of cardiac massage alone. If this is not effective, 1 ml. of 1:1000 solution epinephrine hydrochloride is diluted with 9 ml. of saline solution and 2 or 3 ml. of this is injected into the left ventricular cavity while the heart is massaged. This injection may be repeated many times. In congenital heart disease, 2 to 4 ml. of a 10 per cent solution of calcium chloride may be effective. When a heart is in ventricular fibrillation the only consistently effective method of carrying out defibrillation is by electric means (using 130 volts for 0.25 second, or 220 volts for 0.10 second). The authors have not found isoproterenol hydrochloride, calcium gluconate, or barium chloride to be satisfactory cardiac stimulants.

KITCHELL


The correction of aortic valvular insufficiency remains an unsolved problem. A method has been described for the experimental production of an aortic flutter valve in dogs. Evidence of competency of the valve had been obtained by means of direct arterial pressure recordings above and below the valve in association with avulsion of the cardiac aortic valve. The use of autogenous body tissues would be preferable to employment of plastic materials (Hufnagel valve) which have the potential danger of creating foreign reactions, erosion of vessel wall, dislodgement, and thrombosis. A major objection to the new method is the location of the valve distal to the coronary arteries. It is obvious that a longer period of observation is required to determine its effectiveness.

AVIADO


The authors present 2 innovations in extracorporeal circulation. The first consists of exchange transfusion, in which a portion of the patient's blood is removed and the patient maintained on donor's blood. At the end of the operation the used blood is washed out and the original blood returned to the patient. The rationale for this method is the observation that various hematologic and enzyme defects are common as a result of injury to the blood during extracorporeal circulation.
The second innovation is in suturing an aortic graft on to the side of the aorta, producing a large orifice through which arterialized blood can be returned to the system. This large orifice permits the maintenance of a normal or relatively normal blood pressure with preservation of the pulse pressure.

Observations in human subjects have shown that these technique result in maintenance of normal blood flows, arterial oxygen saturations, plasma carbon dioxide levels, pH of blood, blood platelets, and usually normal electroencephalograms. The authors have used these procedures in 6 patients (5 interventricular defects and 1 tetralogy of Fallot). The operative mortality was 50 per cent.

**ENSERBERG**


This report evaluates the immediate and long-term results in 433 transmetatarsal amputations in diabetic patients. Candidates for the operation were divided into 2 groups: group 1 consisted of patients with neuropathy and severe infection but with a good arterial circulation and group 2 consisted of patients with necrosis and arterial insufficiency. Follow-up studies on 57 group 1 patients showed that 22 died of causes unrelated to their feet. One was a postoperative death. Five late failures required higher amputation from 1 to 8 years after the initial operation. Forty-four of 47 patients (93.5 per cent) living for 3 years following amputation were doing well. Among those alive 5 years or more after amputation 31 of 34 (91.2 per cent) were doing well. Follow-up studies were obtained in 348 of 366 group 2 patients (95 per cent). At the time of the report 88 were alive and using the involved foot. There were 4 postoperative deaths and 134 died after leaving the hospital. One hundred and twenty of the operations failed eventually and 2 remained unhealed. At the end of 1 year, 218 of 317 patients (69 per cent) were living and doing well. At the end of 3 years, 156 of 255 (61 per cent) were doing well. After 5 years or more 87 of 174 (50 per cent) patients living were healed. Thirty seven patients had bilateral amputations on different admissions. It is concluded that in properly selected diabetic patients, transmetatarsal amputation has proved to be sufficiently successful to warrant its continued use.

**BROTHERS**

**UNCOMMON FORMS OF HEART DISEASE**

Fascuzzi, C. A., Parkin, T. W., Bruwer, A. J. and Edwards, J. E.: Cardiac Clinics, CXLVII.

**ABSTRACTS**


The authors describe a case in which a 25-year-old woman died of primary rhabdomyosarcoma of the heart. The prominent features of the illness were arthralgia, clubbing of the fingers, and periosteal proliferation of long bones. Angiocardiography and periarticular biopsy permitted the diagnosis of primary sarcoma of the heart to be made ante mortem. The serum mucoprotein was increased to twice the normal value. Wide-field irradiation therapy with cobalt** was ineffective.

**SIMON**


A 22-year-old brother, a 13-year-old sister, and a 54-year-old uncle showed marked cardiac enlargement without signs of hypertension or valvular disease. The electrocardiogram showed incomplete left bundle-branch block with short P-R interval and resembled the Wolf-Parkinson-White pattern. Another brother died suddenly at the age of 20. Another patient not belonging to the family but showing the same signs is described. One of the patients died in congestive failure, and at autopsy normal coronary arteries and valves were found. All chambers of the heart, but especially the left ventricle, were hypertrophied, and the myocardium showed disseminated sclerosis with vacuolization of the fibers.

**LEPESCHIN**


Ten cases of cardiac disease of unrecognized cause occurring in 5 pairs of siblings are reported in this paper. All succumbed to their illness and necropsies were obtained in 7 patients. Although the pathologic features varied from one patient to another, the clinical course was similar. Common features were progressive congestive heart failure frequently similar to that associated with constrictive pericarditis, cardiac arrhythmias, peripheral emboli, and enlargement of the heart often without significant murmurs. In 3 of the patients, the exclusion of constrictive pericarditis was made possible only after surgical exploration of the pericardium. From the pathologic view, endocardial fibroelastosis, myocardial hypertrophy, and myocardial fibrosis were the constant findings. The presence of cardiac disease
ABSTRACTS

of unknown cause in these pairs of siblings suggests that the primary defect was possibly congenital. The frequent finding of endocardial fibroelastosis tends to support this view, inasmuch as this type of pathologic change in the heart is frequently considered to be the result of a developmental defect.

WENDEKOS

VALVULAR HEART DISEASE


A review of about 300 cases of severe aortic insufficiency has revealed a number of unusual clinical aspects that have not previously received the recognition that they deserve. Sudden death was most common in patients with previous ventricular extrasystoles, usually with more advanced cardiac disease, and was attributed to the development of ventricular fibrillation. Excessive perspiration was observed in a majority of patients with severe congestive failure. The intolerance to heat was sufficiently severe to suggest in many cases the presence of hyperthyroidism but studies failed to demonstrate any evidence of thyroid overactivity. Carotid arterial pain was frequently bilateral and was located over the carotid arteries. This commonly lasted 5 to 7 days and required narcotics for relief. Although presumably the pain was due to stretching of the carotid sheath, in some patients the vigorously pulsating carotid artery in the vicinity of inflamed tender lymph nodes, secondary to an upper respiratory infection, may have played an etiologic role. Abdominal pain was nonspecific and could simulate the pain of peptic ulcer, biliary tract disease, pancreatitis, or even renal colic. The abdominal discomfort appeared to differ from that associated with hepatic engorgement in congestive failure. The pain was probably secondary to the constant stretching of the wall of the abdominal aorta. Pounding sensations were generally described as a throbbing in the head and neck but at times the patient was literally aware of the entire body being jolted back and forth. This was particularly noticeable during periods of rest in bed and the patients generally wore loose-fitting collars to minimize the pounding sensation from the carotid arteries. Angina pectoris occurred in about 50 per cent of the patients and was not unusual in its manifestations except that it was predominantly present at night and was generally prolonged. It was common in association with severe aortic insufficiency regardless of whether the origin was rheumatic or syphilitic. Other unusual associations with aortic insufficiency were splashing sounds over the stomach, rheumatoid spondylitis, coarctation of the aorta, and the Marfan syndrome, the last being characterized by defects in the media of the ascending aorta, gracile habitus, high-arched palate, subluxation of the lens of the eyes, and unusual freedom of movement of the joints.

WENDEKOS


Five patients with severe mitral stenosis are presented. All of these patients were suspected initially of having significant mitral insufficiency because of a loud apical systolic murmur, but on careful evaluation the systolic murmur proved to be that of associated tricuspid valve incompetence. At surgery, severe mitral stenosis without insufficiency was discovered and operation was followed by uniformly good results. The authors point out that these patients are representative of an important group with mitral stenosis that is frequently denied the benefit of surgery because associated tricuspid incompetence masquerades as mitral insufficiency. Certain characteristics of the transmitted murmur of tricuspid incompetence may help in establishing the proper diagnosis. The murmur of tricuspid incompetence varies considerably in nature, frequently seems close to the ear, is heard best over the xiphoid area and along the lower left sternal border, characteristically is inconstant in appearance, varies in intensity, and becomes louder following exercise and deep inspiration (Carvallo's sign). In this group of patients other features commonly present are atrial fibrillation, advanced right heart failure, loud functional pulmonic murmurs, and other physical evidence of tricuspid incompetence.

SAGALL


The effect of a single intravenous dose of Seillaren B on the blood pressure in the lesser circulation and the clearance values of inulin and para-aminophenurate as well as sodium excretion were studied in 6 patients with rheumatic heart disease. The heart rate was found to decrease rapidly, in some cases during the first minute
after administration. The pulmonary blood pressure fell rapidly, while cardiac output remained unchanged. The stroke index rose considerably. No effect was noted on clearance values or sodium excretion. Compared with lanatoside C, Seillaren B acted with shorter latency on pulmonary pressures in patients with mitral stenosis, but did not show any of the prompt, direct renal effects of the digitalis drug. Seillaren B was found to be a rapidly acting potent cardiac drug with its renal action being secondary to the effect on the heart.

SAGALL


The administration of hexamethonium chloride via cardiac catheter to 15 patients with pulmonary hypertension at rest and supine resulted in a lowering of the brachial artery, pulmonary artery, and left atrial pressures; the cardiac output remained constant. The pulmonary arteriolar resistance decreased to a greater extent than either the total pulmonary or total peripheral resistances, suggesting the inhibition of pulmonary arteriolar vasoconstriction by hexamethonium. A second factor that may have been effective in lowering the pulmonary arterial pressure was a shifting of blood from the pulmonary to the systemic circuit as a result of the decrease in the total peripheral resistance. The marked increase in pulmonary artery pressure during exercise after hexamethonium administration may be related to the decreased volume and relative inelasticity of the pulmonary vascular bed but also to a closure of vascular pathways in the lungs, resulting in a greater resistance. A decrease in cardiac output during exercise was noted after hexamethonium administration as compared to the level before the giving of this drug.

MAXWELL


In 27 patients with mitral stenosis the left atrial, left ventricular, and sometimes also aortic pressures were registered with the same sensitivity and base line, together with the electrocardiogram, during mitral commissurotomy. This registration permitted direct calculation of the diastolic pressure gradient across the mitral valve as well as the mean surface of this gradient. In 17 patients this surface reached the normal value of 10 mm Hg after commissurotomy, while in 8 patients it decreased but did not reach this value, and in 2 patients it increased as a result of mitral regurgitation; in these latter a tall V wave and a holosystolic murmur appeared in the left atrial curve. Decrease of the gradient was accomplished in some of the patients by decrease of atrial pressure, while in the remainder a rise of diastolic ventricular pressure was also observed. This rise was evidently caused by traumatic injury of the left ventricle or by failure of this ventricle to adapt to the increased flow, since in 1 patient it could be abolished by injection of ouabaine.

LEPESCHKIN


Cardiopulmonary studies, including cardiac catheterization, in a series of patients with mitral stenosis demonstrated that patients with milder degrees of mitral stenosis show a normal ventilatory response to exercise by increasing the oxygen removal ratio with exercise to a degree only slightly less than do normal individuals. Those with severe mitral stenosis respond abnormally in that the oxygen removal ratio remains unaltered or falls with exercise. This abnormal response in the ventilation-oxygen consumption relationship could be correlated with the degree of dynamic alterations due to mitral stenosis as expressed by elevated pulmonary arterial and "wedge" pressures. The abnormal ventilatory response could not be correlated with the changes in cardiac output induced by exercise. The suggestion that changes in the oxygen removal ratio reflect an adequate or an inadequate increase in cardiac output during exercise is thus not confirmed. The altered ventilatory pattern is not directly related to hemodynamics in cardiac patients but rather is the effect of an alteration of the breathing mechanism that also causes dyspnea and that is thought to be due to changes in pulmonary compliance. The authors conclude that the change in total pulmonary ventilation in relation to oxygen consumption induced by exercise does not provide a specific test for various types of cardiac disorders. An abnormality in this ratio merely reflects an altered pattern of breathing that occurs frequently in patients with exertional dyspnea.

HARRIS


A series of 85 patients with congenital aortic
ABSTRACTS


Previously reported studies of alterations in hemodynamics following surgical relief of mitral stenosis have been relatively few, and have been made at relatively short intervals after the operation. The authors therefore report observations on 28 patients made 17 to 51 months postoperatively, the mean period being 25 months. Nine of these patients were also studied at intervals of 6 to 12 months. Twenty-four of the patients showed great clinical improvement, despite mitral valve calcification, atrial fibrillation, rapid sedimentation rate, or heart failure. Improvement in the radiologic appearance of the heart and lung fields was less than expected. Only 4 patients showed reduction in pulmonary vascular shadows or disappearance of interlobular lines. Electrocardiographic changes were also infrequent. The outstanding finding was marked reduction in ventilation both at rest and after exercise, often to normal values. Another striking finding was reduction of right ventricular work at rest and, to a lesser extent, after exercise. Pulmonary arterial pressures and wedge pressures at rest were reduced in all but 2 patients, though they remained abnormally high. Pulmonary arterial pressures fell more than the wedge pressures. The latter became extremely elevated on exercise. Despite the marked clinical improvement, resting cardiac output was generally lower than before operation.

KURLAND


A 38-year-old woman, who at the age of 4 had rheumatic polyarthritis and endocarditis, showed roentgenologically dilatation and vigorous pulsation of the pulmonary artery. The phonocardio- gram showed an intense, diamond-shaped protodiastolic murmur, beginning after the second component of the split second heart sound, and localized in the left third interspace, while right bundle-branch block without signs of right ventricular hypertrophy was present in the electrocardiogram. The pulmonary arterial pressure curve showed a diastolic drop to zero; other pressure and oxygen values were normal. No signs of cardiac failure were present. This is the first published case of pulmonary regurgitation with rheumatic etiology.

LEPESCHKIN


In the last year of life a 63-year-old patient developed blindness from acute iridocyclitis, a loud blowing mitral systolic murmur and congestive heart failure. At autopsy the anterior mitral cusp “was distorted by a pouch large enough to accommodate the tip of the little finger to a depth of over 1 cm. The pouch was directed


Three cases of tricuspid stenosis, 2 already subjected to mitral valvulotomy, are presented and the clinical hemodynamic and surgical aspects are discussed. The symptoms are those associated with impaired cardiac filling. When the tricuspid stenosis is severe, it may mask the associated mitral disease. When it is moderate, the mitral disease dominates the picture and the tricuspid lesion may be unsuspected. Venous pressure is elevated and giant a waves may be found. Presystolic hepatic pulsation and cardiac eirehrosis may be noted. A rumbling diastolic murmur is heard at the left border of the sternum and a tricuspid opening snap may be present. The most striking feature is the presence of gross physical signs suggesting right ventricular failure in patients who are practically free of symptoms. Confirmatory evidence may be obtained from fluoroscopy, electrocardiography, and cardiac catheterization. An atrioventricular pressure gradient can be demonstrated. At operation, mitral obstruction should be dealt with before tricuspid valvulotomy to protect against pulmonary congestion. In 1 patient, an unusual degree of hypotension followed combined mitral and tricuspid operation.

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steno sis who were under the age of 16 years when first seen were studied in regard to state of health and cardiac symptoms. Follow-up data were available in 73. Of these patients 41 were completely asymptomatic, 26 had 1 or more cardiac symptoms and 6 under the age of 16 had died (5 suddenly). The case histories of those who had died are presented in detail. The high mortality rate found in this series leads the authors to conclude that congenital aortic stenosis is not as benign a condition as previously believed and selected cases should be considered for aortic valvulotomy. Based upon this study the principal indications for surgery would be the occurrence of syncope and easy fatigability, cardiac enlargement, and marked left heart strain.

SAGALL
backwards so that during ventricular systole it would impinge on the posterior cusp as a round ball, leaving a triangular orifice on either side." The pathogenesis was obscure.

McKUSICK


In 53 patients with mitral stenosis of various degrees the cardiac output was determined by the Fick method before and after inhalation of pure oxygen. In cases with a cardiac index higher than 2.61, no change occurred. However, a statistically significant rise of cardiac output was observed in patients with cardiac indices below 2.61, and this was independent of the pulmonary arterial pressure and the level of the original arterial oxygen saturation. The result suggests that oxygen inhalation may improve cardiac efficiency in patients with reduced cardiac output, which is in keeping with Harrison’s hypothesis concerning the role of myocardial oxygen tension in the regulation of cardiac output.

Pick


The authors present pulse curves recorded by their method (rheography) from the hepatic region in normal individuals and in patients with tricuspid regurgitation. In the latter, the hepatorheogram revealed pronounced diastolic variations ascribed to congestion associated with pulsation. An alternative interpretation, viz., direct regurgitation waves was rejected on the basis of comparison of synchronous pulse curves obtained from the right and left side of the liver that gave mirror-image patterns. This divergence of the pulsations can be explained by the well-known see-saw movement of the thorax and hence is attributable to mechanical impulses originating in the heart itself. In support of their views, the authors consider the regression of diastolic pulse phenomena subsequent to ligation of the inferior vena cava in some patients.

Pick


Advances in diagnosis, in preoperative and post- operative care and in technique have reduced the operative mortality of mitral valvuloplasty for mitral stenosis to less than 1 per cent in patients who have not progressed to irreversible congestive heart failure. Accordingly, operation can be advised routinely for patients with symp- tomatic mitral stenosis, for in these patients the risk of operation is far less than the danger of the disease. Because of the marked increase in operative mortality when refractory congestive failure has developed, patients should not be allowed to reach such a phase of their disease when relief by surgery is available earlier at such a low risk. An age over 50, atrial fibrillation, moderate mitral insufficiency, associated valvular disease and suspected rheumatic activity are no longer considered as absolute deterrents to operation.

Sagall


Clinical, hemodynamic, and electrocardiographic observations are reported in 2 female patients (21 and 26 years old) with rheumatic mitral disease suffering from precordial pain on effort or emotion. Electrocardiograms after exercise showed changes characteristic of acute coronary insufficiency while simultaneous pressure recordings revealed an increase in right ventricular hypertension. The pathogenesis of angina in mitral valvular disease can be explained on the basis of a sudden disproportion between coronary blood flow and work of the left ventricle resulting in relative myocardial ischemia. The attacks are precipitated by a sudden aggravation of pressure elevation in the lesser circulation leading to an increase in the work of the heart, which in turn demands increase of coronary flow. If this adaptation fails, an attack of angina results.

Pick


A case of disseminated nodular pulmonary ossification in association with mitral stenosis is described. The patient was a 30-year-old man who presented typical findings of rheumatic heart disease with mitral stenosis and insufficiency and who pursued a downhill course to death in 3 years. On x-ray, his lungs showed multiple, small, dense opacities, measuring up to 8 mm in diameter, throughout both lung fields. At autopsy these were proved to be bony nodules occupying the air spaces of the lungs without associated degenerative, inflammatory or proliferative vascular changes. Pulmonary ossifications are rare, and occur in association with rheumatic heart disease and mitral stenosis. They occur mostly in young adults, with a predominance of males. The pathogenesis is unclear.

Maxwell
ABSTRACTS

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