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Abstracts

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BACTERIAL ENDOCARDITIS

The authors present short case histories of five cases of subacute bacterial endocarditis with a similar electrocardiographic pattern; this is characterized by prominent Q waves in leads II and aVF and particularly in lead III. One case came to autopsy and no confluent infarction was found grossly nor histologically.

The several possibilities which can account for this rather uniform pattern are pointed out. Posterior wall infarction due to coronary embolization, acute cor pulmonale, left ventricular hypertrophy in electrically vertical hearts and intraventricular conduction defects must be taken into consideration.

Pick

CONGENITAL ANOMALIES

Clinical and cardiodynamic data are reported of three cases diagnosed during life as Ebstein’s disease. The anatomic anomaly in this congenital malformation consists of a downward displacement of the tricuspid valve, with or without deformation of its posterior leaflet. This causes a subdivision of the right ventricular cavity in a distal and proximal portion, the former communicating with the right atrium. As in most of the reported cases, an atrial septal defect could be demonstrated in all three instances. The clinical picture is sufficiently characteristic to permit the diagnosis on the basis of physical, electrocardiographic and roentgenologic findings. The pertinent features consist of cyanosis with clubbing, reduplication of both heart sounds, systolic and diastolic murmurs, pronounced right bundle-branch block, a globular contour of the enlarged heart, and signs of right ventricular failure. The diagnosis can be fortified by cardiac catheterization, and typical dynamic, gasometric and spirometric findings are described. Of importance is the occurrence of sudden death. The condition must be differentiated particularly from Fallot’s tetralogy because a shunt operation may have adverse effects and is, therefore, contraindicated in Ebstein’s disease.

Pick


The anatomic and physiologic findings in congenital pulmonary stenosis are described, and their implications for surgical treatment are discussed. Infundibular stenosis and narrowing of the subpulmonary tract are caused by muscular and fibrous obstruction. By making paraffin casts of the cardiac chambers, these findings of Brock are confirmed. In valvular pulmonary stenosis, there was no narrowing of the subpulmonary tract despite the existence of muscular hypertrophy. In pulmonary stenosis without associated septal defect, no intracardiac shunts were present. In pulmonary stenosis with auricular defect, or in the tetralogy of Fallot, the shunt was predominantly from right to left as pressures in the right ventricle were elevated. Valvulotomy in patients with valvular pulmonic stenosis was followed by a fall of pressure in the right ventricle and increased pulmonary blood flow. Construction of an artificial ductus in patients with
tetralogy of Fallot resulted in a decrease in oxygen content of the blood of the right auricle. Evidence of increased left-to-right intracardiac shunt was obtained from increased oxygen content of the blood from the right ventricle, and from elevated pressures in this ventricle.

**Kitchell**


A patent ductus arteriosus is a functioning vascular connection between the aorta and the pulmonary artery. It has been shown that as much as several liters of oxygenated blood leak from the peripheral to the pulmonary circulation, forcing a larger than normal flow through the pulmonary arteries, capillaries, veins, the left auricle, and the left ventricle. Vascular rings are such abnormalities as double aortic arch, anomalous origin of the right subclavian artery, and right aortic arch. These exhibit an almost infinite variation and occasionally require no treatment. In some patients they produce symptoms and disability usually by compression of trachea, esophagus or bronchus, and in these, treatment may be vital. In the case of patent ductus arteriosus, operation should be thought of as essentially curative and should be used widely to prevent a development of complications. In the case of vascular rings, operation should be reserved for those who have a remediable anomaly producing disabling or threatening symptoms.

**Kitchell**


Defects of the cardiac septums appear clinically as a number of well-defined syndromes that can be identified on clinical grounds or with the aid of cardiac catheterization. They range from a trivial shunt not materially affecting the circulation, to a most serious and disabling cardiac lesion. Atrial septal defect affects the circulation primarily by a large left-to-right shunt leading to a striking increase of pulmonary blood flow, dilatation of the pulmonary blood vessels, and hypertrophy and strain of the right heart. A late complication of this condition may be pulmonary hypertension. Occasionally, the flow through the defect reverses the usual direction leading to anoxemia and chronic cyanosis. Ventricular septal defects are of two types: small defects in which pressure differential between the two ventricles is maintained, and larger ones in which the pressure in two ventricles is identical. Smaller defects may show no important cardiac manifestations other than the characteristic murmur. However, a large left-to-right shunt increases the pulmonary blood flow to such proportions that changes in the pulmonary circulation are similar to those with atrial septal defect. With the large ventricular defect, the dynamic situation of a double-outlet left ventricle is present, and in these cases severe pulmonary hypertension exists in the patient from the time of childhood, since the pulmonary arteriolar resistance is necessary for the maintenance of an adequate blood flow. Here pulmonary hypertension is the dominant clinical picture, and its degree determines whether the flow is primarily from left to right or from right to left. It is concluded that cases primarily best suited to surgical attempts to repair the septum are those in which a left-to-right shunt, large pulmonary flow, and little changes in intracardiac pressures are found.

**Kitchell**


Clinical, roentgenologic, electrocardiographic and catheterization data are presented of five cases considered to have Lutembacher's syndrome. In addition to an interatrial communication three had signs of mitral stenosis, one mitral stenosis and a patent ductus arteriosus, and one mitral insufficiency. The latter combination is termed by the authors "false Lutembacher." The etiology of these various combinations is probably not uniform and may be purely congenital or a combination of a congenital and an acquired (rheumatic) lesion.

The clinical picture of Lutembacher's disease is not characteristic. The most important criterion is found at roentgen examination and consists in a marked dilatation of the main pulmonary arterial trunk and of the left auricular segment which has an unusually high location on the left cardiac border. Catheterization in the presented cases revealed, apart from proving the interatrial communication, a pressure elevation in both atria and in the pulmonary capillaries. The pressure elevation in the right atrium is interpreted by the authors as being caused by pressure transmission from the left. With regard to clinical and hemodynamic findings, Lutembacher's syndrome stands between pure mitral stenosis and uncomplicated atrial septal defect. The combination of the two lesions can account for the absence of pulmonary congestion and the relatively long life expectancy of the patient. The occasional occurrence of cyanosis is explained by development of secondary pulmonary vascular changes causing pressure elevation in the right heart and a reversal of the shunt in the atria.

**Pick**


Cardiac catheterization studies disclosed no
significant difference in the pulmonary blood flow of patients with atrial septal defects, patent ductus arteriosus or ventricular septal defects, but did indicate that pulmonary arterial hypertension frequently occurred in patients with patent ductus arteriosus or ventricular septal defects and less commonly in patients with atrial septal defects. A mean pulmonary arterial pressure greater than 40 mm Hg was observed in only 1 of 24 cases of atrial septal defect, but occurred in 10 of 24 cases with patent ductus arteriosus and in 14 of 20 cases with ventricular septal defects. Moderate or severe pulmonary hypertension, when present, was due to increased pulmonary resistance, since the pulmonary blood flow was usually decreased or within normal range. A high pulmonary resistance is essential for survival in many cases of congenital septal defect and patent ductus arteriosus and may be due to a persistence of the fetal structure in the small pulmonary arteries and arterioles. Although an increased pulmonary flow may lead to the development of compensatory vascular changes to reduce excessive pulmonary flow as well as the development of degenerative vascular changes, the volume of flow alone cannot account for the development of the changes found in the pulmonary resistance, since the level of pulmonary blood flow was not significantly different among the three groups studied. It is suggested that factors of kinetic energy involved in the ejection of large volumes of blood from a high to a low pressure system, such as occurs in many cases of ventricular septal defect and patent ductus arteriosus, contribute important components to the pulmonary pressure pulse in these conditions that are absent in the pulmonary blood flow associated with the usual cases of atrial septal defects.

**HARRIS**


An operated case of aorticopulmonary fistula, partially repaired by suturing the defect, is presented and the main diagnostic criteria of this lesion are discussed on the basis of a review of the literature. Dyspnea on exertion is the most consistent symptom. The physical signs resemble those of a patent ductus, but the murmur is atypical in localization (usually at the left of the lower sternum) and, although systolic-diastolic, it is not continuous. X-ray is one of the most important aids for a correct diagnosis, showing bulging and dynamic pulsations of the ascending aorta, whereas, in a patent ductus, these signs involve mainly the aortic arch. The electrocardiogram is nonecontributory. Cardiac catheterization is important because in the majority of reported cases there was pulmonary hypertension, and the exact location of the communication can be demonstrated by entering the aorta from the pulmonary artery. In contrast to a patent ductus, arterial oxygen determinations will give equal values in all four extremities. Venous angiography is not of great help apart from occasional demonstration of a venaortic shunt, but retrograde aortography may clinch the diagnosis by visualization and precise outline of the area of the communication between the aorta and pulmonary artery.

**CONGESTIVE HEART FAILURE**


Gitalin is described as a water soluble amorphous mixture of glycosides isolated from Digitalis purpurea. In the present study with this substance, digitalization and maintenance therapy was conducted in 49 cases of congestive heart failure. The total dose for digitalization ranged from 4.0 to 9.5 mg., averaging 5.9 mg. The daily maintenance requirements were approximately 0.5 mg. of the drug. In an effort to establish the ratio between the therapeutic and toxic dose levels the drug was administered in four patients until toxicity appeared; this ratio was about 42 per cent. In nine patients, doubling of the minimal therapeutic dose produced toxicity in two instances; five of these patients showed no toxicity at doses three to six times the minimal therapeutic level. The authors conclude that Gitalin is effective for the treatment of congestive heart failure and has a wide margin of clinical safety.

**SHUMAN**


To determine the importance of precipitating factors in congestive failure of the elderly, a survey was made of 50 cases who died and 50 who recovered and were discharged. The underlying causes in the first 50 patients who died were: arteriosclerosis, 64 per cent; arteriosclerosis with hypertension, 28 per cent; rheumatic heart disease, 4 per cent; tuberculosis, 2 per cent; and kyphoscoliosis, 2 per cent. Among the 50 discharged patients, arteriosclerosis occurred in 52 per cent, arteriosclerosis and hypertension in 44 per cent, rheumatic disease in 2 per cent, and syphilis in 2 per cent. The proportion of precipitating causes in the two groups are as follows, naming deaths first, discharges second: infections 18 per cent, 48 per cent; anemia 2 per cent, 6 per cent; pulmonary embolism 4 per cent, 4 per cent; physical and emotional strain 2 per cent, 12 per cent; economic factors 0, 2 per cent; insulin shock, 0, 2 per cent; injury 0, 2 per cent; cerebral thrombosis 8 per cent, 4 per cent; renal diseases 2 per cent, 0; tuberculosis 2 per cent, 0; Paget's disease 2 per
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cent, 0; and unspecified factors 2 per cent, 4 per cent.

From the practical point of view, the best outlook for treatment was in those patients in whom the congestive heart failure was precipitated by extrinsic factors which could be treated.

RINZLER

CORONARY ARTERY DISEASE


Thirteen patients (12 male and one female) with angina pectoris of two months' to six years' duration who received a total of 14 courses of heparin therapy form the basis of this report. The severity of angina pectoris was determined during a one- to four-week observation period prior to institution of any therapy. After this preliminary period, 10 cc. of a placebo solution of 5 per cent glucose in water was administered twice weekly intravenously. At varying intervals thereafter, 100 mg. of heparin dissolved in 10 cc. of water was substituted for the placebo. The time of such substitution was unknown to the subject and to the clinician. In the latter part of the study, injections were administered only once weekly. Placebo therapy was administered for 10 to 91 days in various subjects for a total of 867 subject days, and heparin treatment was given over periods of 28 to 151 days for a total of 1329 subject days (mean of 95 days per subject). The response to therapy was evaluated by the "report card" method; the weekly nitroglycerin intake, the percentage of "better" and "worse" days in regard to chest pain, repeated two-step tests, and the clinician's judgment based on an analysis of the information available.

Eleven subjects described improvement in their symptoms during the study. In nine, the improvement started during the period of placebo therapy and in only two did improvement first appear during the period of heparin therapy. The subject's feeling of improvement was generally supported by evidences of decreased nitroglycerin intake, but often the two did not coincide. With the exception of a diminished frequency of "worse" days in the heparin treatment period there was no difference of statistical significance in the analysis of "better" and "worse" days during placebo or heparin therapy. Twenty-six "two-step" tests were performed on nine patients at intervals during the study. There were no demonstrable effects of treatment upon the electrocardiographic responses. The total clinical evaluation showed that eight subjects experienced definite improvement during the investigative period, but this improvement was found not to have been influenced by the change from placebo to heparin or vice-versa. Serum lipoprotein and cholesterol determinations per-

formed during the periods of heparin therapy showed no persistent effect for the interval of three or four days between injections nor any cumulative effect from prolonged treatment. No hemorrhagic disturbances or other untoward effects appeared during the period of heparin therapy.

The authors conclude that twice-weekly intravenous administration of 10 mg. of heparin in patients with angina pectoris resulted in no greater improvement than the injection of 5 per cent glucose in water in the same patients. In addition, heparin therapy had no persistent or cumulative effect on either the serum cholesterol or the serum S1, 12–20 or S20–100 classes of lipoprotein.

SAGALL


Treatment in myocardial infarction aims to provide optimum rest to the patient's heart for healing of the infarct, and to prevent further damage from undue strain until a firm scar has been established and collateral circulation has developed. The importance of rest, the control of pain, the use of oxygen, aminophylline, digitalis, quinidine sulfate, procaine amide hydrochloride, glyceryl trinitrate (nitroglycerin), and anticoagulant therapy are discussed. It is pointed out that moderate to severe shock with systolic blood pressure below 80 mm. Hg may become irreversible or refractory to all methods of treatment within an hour. The need for early and energetic treatment with vasopressor drugs, plasma, or whole blood is thus indicated. The author discusses in detail the use of various vasopressor agents, particularly Arterenol. Proper treatment of shock has been demonstrated clinically to reduce the mortality of acute myocardial infarction to a significant though limited extent.

KITCHELL


In 21 patients with oblitative disease of peripheral arteries proven by arteriography, serum proteins and lipids were determined by paper electrophoresis along with determinations of total and free cholesterol. Five cases with established arteriosclerosis showed an elevation of the α1 globulins, of the β lipoprotein fraction and of free cholesterol. Two cases with definite endangitis, on the other hand, showed no deviation from normal in the examined serum fractions. The authors believe that in cases in which the etiology of occlusive arterial disease cannot be established on clinical grounds—as in the 14 remaining cases of their material—study of the various serum fractions is of
value in classifying the patients either into the arteriosclerotic or endangiitic group.

**Pick**


The authors studied the association between myocardial infarction and hypertension among Negroes admitted to a large general hospital. It was found that 90 per cent of the Negroes with myocardial infarction had hypertension. Of the males, 87.5 per cent had such a factor. Thus, myocardial infarction is infrequent in the absence of hypertension among these individuals.

**Shuman**


The author reviews in detail the pathology of the following entities: (1) patent ductus arteriosus; (2) aortopulmonary septal defect; (3) aneurysm of an aortic sinus; (4) coarctation; (5) tubular hypoplasia of aortic arch, interruption of aortic arch; (6) "vascular rings"; and (7) Marfan's syndrome.

**McKusick**

**ELECTROCARDIOGRAPHY**


On the basis of experiments performed on excised frog hearts, the author discusses the causes of differences in the amplitudes of electrocardiographic leads, in the location of the point zero, and in the integrated vector, when the leads were arranged in one plane or spatially. Whereas, with spatial recordings, the electrical center coincides with the center of the part of the heart under activation (the atria or the ventricles), with leads recorded in a single plane it approaches the center of the entire heart. Furthermore, in a plane the magnitude of recorded potentials decreases in proportion to the distance of the lead while in the space it does so proportionally to the square of the distance.

The human body is an electrically nonhomogeneous medium with varying electric resistances in different tissues. Precordial leads reflect potentials transmitted mainly over the mediastinum and the diaphragm, which correspond to a plane rather than to a volume conductor. In practice the conditions in chest leads are likely to be intermediate between the two extremes. These considerations may account for certain variations of abnormal deflections, depending on the site and the extent of the lesions present.

**Pick**


The authors report electrocardiographic observations in 108 patients with a depressed sternum, ranging in age from 16 to 50 years, none of whom had clinical evidence of cardiac or pulmonary disease. In the majority of cases there was right axis deviation. In 12 per cent disturbances of rhythm (premature beats and ectopic rhythms) were recorded. In 59 per cent of the P waves and 54 per cent of the QRS complexes, there were anomalies consisting of notching and slight widening. In six cases the electrocardiographic pattern suggested the presence of incomplete right bundle-branch block. The S-T segments were normal in all, but the T wave was frequently inverted in the right sided chest leads, including V5 or V6.

In most of the cases all alterations can be accounted for by an abnormal position and/or rotation of the heart caused by the thorax deformity. The significance of these changes, which are to a certain extent characteristic but not specific for a funnel chest, lies in the fact that they may be misinterpreted unless the chest deformity is taken into consideration.

**Pick**

Segers, M., Van Dooren, F., Boyadjian, N., Uyttenhove, P., Van Houte, O., and Delatte, E.: Differentiation of True and False Patterns of WPW. Acta Cardiol. 9: 59 (Fasc. 1), 1954.

Examples are presented and discussed of doubtful pre-excitation patterns requiring long records or additional studies in order to establish the correct diagnosis. This refers to the following instances: cases in which an abnormal P wave with prolonged duration encroaches upon QRS, thus seemingly shortening the P-R interval; cases with abnormal ectopic impulse origin in the atria in the presence of intraventricular block; cases in which the anomalous QRS component (delta wave) is obvious only in certain leads, e.g., over the left precordium, or is simulated by a slurred and widened Q wave due to posterior wall infarction; and finally, escapes or late diastolic ventricular premature systoles, inscribed just after a sinus P wave may simulate ventricular preexcitation. The differential diagnostic criteria applying to such instances are indicated.

**Pick**


Displacement ballistocardiographs of each of seven subjects with an age range of 18 to 79 years were recorded in the resting state with four different ballistic systems. These systems were, respectively; (1) the low frequency, critically damped system; (2) a middle frequency, partly damped system; (3)
a high frequency, partly damped system; and (4) a direct ballistocardiograph where the body alone is the oscillating system. One subject had coarctation of the aorta; the other six were healthy. Fournier analyses of the displacement ballistocardiograms were made for the four types of instruments. The coefficients of these series were corrected for the distortion introduced by the ballistocardiograph. In comparing the coefficients of these basic series with those of the original series obtained from the analyses of patterns of the various instruments, the best agreement was obtained from the low frequency, critically damped ballistocardiograph.

RINZLER


Ballistocardiograms were taken on 100 high school boys between the ages of 14 and 18 years with a Dock type of electromagnetic ballistocardiograph. All were healthy and habitual smokers for 2 to 5 years. The records were obtained during normal respiration. A control tracing was taken and then a second tracing was obtained after the final puff of a standard cigarette. No real abnormalities in the ballistocardiogram occurred. A significant increase in respiratory variation of the I-J waves (Grade 1) occurred in only two subjects; lesser increase in this variation was noted in three others. The most frequent response to smoking was an increase in pulse rate, with minimal evidence of change in stroke volume, judging from the amplitude of the systolic waves.

RINZLER


The author studied the usefulness of various types of electrocardiographic leads in the diagnosis of healed myocardial infarction on the posterior wall. Recorded were the three standard leads, unipolar leads by Goldberger's technic, chest leads according to the method of Nebh, a dorsal chest lead and esophageal leads. Most information was obtained from esophageal leads; the six limb leads were second. Difficulties which may arise in the evaluation of a Q wave in the esophageal leads are pointed out.

PICK


Twenty-five patients were used in this study. An estimation of the spatial angle (θ) between H and the long axis of the QRS loop was made. H was determined from chest teleradiograms. The position of the QRS loop was studied by three methods: (1) by a modification of the method of Grant (VECG); (2) from plane projections of the spatial QRS loop recorded from a cube reference frame; (3) from projections of the spatial QRS loop recorded from an equilateral tetrahedron reference frame. The mean values were 50 degrees (cube); 46.6 degrees (tetrahedron); 59.2 degrees (VECG). Although the mean values of θ and its frontal and sagittal projections were not significantly different when determined by the three systems, significant association between the position of H and the QRS loop suggests difficulty in predicting the anatomic heart position from the long axis of the QRS loop. No conclusion could be reached with regard to the relative accuracy of the three methods of estimating the QRS loop position, or with regard to the relative accuracy of frontal and sagittal plane projections of the long axis of the QRS loop. No evidence was found to indicate that the VECG method of estimating QRS loop position is less accurate than the other two methods employed. This applies only to the axis of the loop and does not imply that routine nonsimultaneous precordial leads may be used to derive a spatial QRS loop.

RINZLER


In 15 patients with various types of cardiovascular disease, the time of isometric contraction of the right ventricle was determined from intracavitary pressure curves (recorded by the method of Condorelli) and simultaneous electrocardiograms. The values were obtained by determination of the time relationship between the beginning of the QRS and the onset of the systolic wave of the ventricular pressure curve, or by measuring the time interval between onset and peak of the systolic wave in the atrial pressure curve.

In subjects with normal hearts and in cardiac patients with normal pulmonary arterial pressures, the average duration of the phase of isometric contraction was found to be 0.031 second and 0.033 second, respectively. In patients with pulmonary hypertension it attains 0.04 second. However, no constant relationship exists between the duration of isometric contraction and the degree of pressure elevation in the pulmonary circulation.

PICK


In five cases of recurrent hiccups, the hiccup sounds were recorded synchronously with three
leads of the electrocardiogram. In three cases, the hiccup movements caused electrocardiographic artefacts which could be confused with U waves or with auricular and ventricular premature contractions. The hiccup sounds, as well as the artefacts, always occurred 0.17 to 0.40 seconds after the beginning of the QRS complex of the electrocardiogram, and, in some cases, two successive heart beats were followed by hiccup movements. It is postulated that, in the reported cases, the hiccup was caused by stimulation of one of the phrenic nerves by the electric currents registering as the QRS complex of the electrocardiogram. The hyperirritability of the phrenic nerves in the reported cases was probably due to a decrease in the ionized serum calcium or to alkalosis.

HARRIS


The authors describe the technic and results obtained by simulating systole in a cadaver lying on a ballistocardiograph. After a systemic diastolic pressure had been secured by an infusion of blood into the femoral artery, simultaneous injections of blood into the aorta and pulmonary artery produced a cardiac systole. Experiments were performed under different conditions of stroke volume and blood pressure in both normal and arteriosclerotic subjects.

Under the conditions of this study, it appears that the amplitude of the resulting ballistocardiogram, determined by the vertical distance between the I and J wave tips, correlates well with cardiac outputs under certain conditions. A better correlation was found between the square root of the amplitude of the ballistocardiogram (√I + J) and the maximum velocity of ejection. When the body surface area was included in the equation, the correlation was very high (0.92).

The point of particular interest is the observation that a correction for body size improves the estimate of the heart's force from measurements made on the ballistocardiogram. The authors conclude that it is entirely reasonable to employ the ballistocardiogram to estimate cardiac force in relative terms.

WAIFE


Current ballistocardiographic systems employ a heavy, rigid table on which the body evokes spring and damping forces from the soft tissues of the dorsum of the subject. These forces contribute to the finished ballistocardiogram oscillations which have no cardiovascular significance. The authors have recorded the acceleration ballistocardiogram in the head-foot axis in subjects on a very light platform floated on mercury. The resulting "aperiodic ballistocardiogram" in normals reveals a consistent pattern which is compared by the authors with Starr-type records. It is their impression that aperiodic recording will permit a closer correlation of ballistocardiographic form with physiologic factors.

McKUSICK


In this report, the engineering usage of the two degrees of freedom is used and refers to two masses connected by a spring or springs. All motions refer to the head-foot direction and the degrees of freedom are (a) motion of the body in reference to a fixed point in space, and (b) the motion of the platform in the Dock type leg-mounted ballistocardiograph with respect to a fixed point in space. For faithful recording of the motion of the body with a Dock type of pickup, the pickup frequency should be at least 14 times the frequency of the body. For recording of the cardiovascular forces, a pickup frequency of approximately six times the body frequency appears to yield clinically valid data (although clinically significant data were obtained with a frequency ratio of 4). Further study of the significant frequency components in the cardiovascular forces is needed before an optimum value of pickup frequency can be determined. An analysis of the frequency components of the forcing function (by Fourrier analysis) for a large number of abnormal and normal subjects is needed. By means of an elastic stocking and a five-ounce pickup, it is possible to maintain a pickup frequency at approximately 35 cycles. By the simple addition of weight to the platform, the natural frequency of the pickup can be lowered and controlled as desired. It can readily be seen that distortion from different body frequencies can be kept small with a platform frequency of 35 cycles, since a body frequency of 4 would have a delta of approximately 9, and a body frequency of 6 would have a delta of approximately 6. Thus, over a fairly large portion of the frequency range, the relative distortion between these two values of delta (6 and 9) is negligible. The problem of the system of two degrees of freedom may be as important in the table type of ballistocardiograph as in the Dock type. In the ballistic table type of ballistocardiograph, the complete system must be treated as a two-degrees-of-freedom system, in which the first degree of freedom is the body mass with its characteristic damping and natural frequency, and the second degree of freedom is represented by the
table and natural frequency and damping. An improper choice of table, the characteristics of which are affected by the mass of the body placed on it, may result in distortion of the signal coming from the pickup to the extent that the data so obtained are meaningless.

Rinzler

ENDOCRINE EFFECTS ON CIRCULATION


Administration of cortisone reduces the number of tissue basophils (mast cells) seen in sections of various tissues. The present study demonstrates that cortisone affects the number of basophils in the blood of human beings in a similar fashion. If these observations are substantiated, the possibility may be raised again of a relationship between the tissue or fixed mast cells and those that circulate. At least it seems that both are similarly affected by cortisone.

The results of this study allow the definite conclusion that cortisone reduces the number of basophils in the circulating blood of healthy human beings in a very similar fashion to that in which it reduces the number of eosinophils in the blood. The parallelism is sufficiently close to indicate a relationship between the basophils and the eosinophils of the blood of healthy persons. Whether this numerical relationship reflects a fundamental physiologic or functional association between the two types of cells is not established by the study.

Simon

HYPERTENSION


The use of hypotensive agents in elderly patients with arteriosclerosis and elevated blood pressures has been viewed with suspicion because of the dangers involved in reducing the blood flow to the kidneys, brain and coronary vessels. However, it has been found that Apresoline will increase renal flow and cardiac output and will decrease cerebral vascular resistance while producing a drop in hydrostatic pressure. In this study, 17 elderly hypertensive patients received Apresoline in gradually increasing doses beginning with 25 mg. four times daily. The drug was alternated with placebo therapy in a number of patients. No cerebral or cardio-renal complications were noted. Only one patient experienced distressing side effects. Studies of cerebral hemodynamics revealed a decrease in cerebral blood flow. Marked improvement in the signs of cerebral circulatory insufficiency was observed. However, the cerebral metabolic rate remained unchanged. A fall in blood pressure was noted in 16 of the patients with clinical improvement in 14 patients.

Shuman


The effects of hexamethonium were studied in 25 hypertensive and 4 normotensive subjects. The drug was administered intravenously at a rate of 1 to 2 mg. per minute for the first 15 mg. and then at a rate of 5 mg. per minute until either a significant hypotensive effect was obtained, or until 50 to 100 mg. had been administered. Observations on the hemodynamic effects revealed that in the absence of cardiac decompression, hypertensive patients have a decrease in cardiac output and right heart pressure. There was no significant change in peripheral resistance. These alterations may be the result of venous "pooling" or failure of reflex vasoconstriction.

When cardiac failure is present, the hypotensive effect is accompanied by an increase in cardiac output and a significant decrease in total peripheral resistance. These effects may be mediated by an unloading of the congested right side of the heart and inhibition of those vasoconstrictor reflexes which are activated by the low output failure.

Other observations suggest that the blood flow through the muscles is only moderately increased and the hepatic-portal blood flow decreased after hexamethonium.

Certain hemodynamic responses to hexamethonium may not be entirely desirable. For example, cardiac output may decrease, renal clearances (especially the glomerular filtration rate) may fall, at least temporarily, and vasoconstrictor reflexes essential to homeostasis may be seriously compromised. Nevertheless, the results of hemodynamic analysis need not always indicate the desirability of a drug in clinical practice where other factors may determine its usefulness.

Waife


When dietary intake of potassium is severely restricted, the blood pressure in hypertensive rats is reduced markedly. This confirms earlier work. When restrictions were less marked, the hypotensive effect was also less.

Oppenheimer

Ninety-nine patients with severe hypertension have been treated by sympathectomy of the Adson or Smithwick type with subtotal or total adrenalectomy. The Adson sympathectomy, combined with adrenal resection, is performed in two separate stages and has been well tolerated by most patients with adequate renal function. Their convalescence has been easier than that of those patients having thoracolumbar sympathectomy. It will require further observation to establish whether, or under what circumstances, this type of operation will prove superior in the long run to (1) thoracolumbar sympathectomy, (2) thoracolumbar sympathectomy plus subtotal or total adrenalectomy, or (3) total adrenalectomy alone. These operations cannot be attempted without a well-integrated medical and surgical team prepared to deal not only with all surgical complications but with any of the manifestations of severe hypertensive cardiovascular disease or with adrenal insufficiency. Each patient must have prolonged and careful follow-up with a member of the team on call at all times to treat acute adrenal insufficiency or any other emergency. The authors state that to date they have encountered no greater difficulty in managing patients after total adrenalectomy than after subtotal adrenalectomy. The most frequently encountered symptom is a mild intolerance of cold. To be eligible for operation patients had (a) an average diastolic blood pressure of 120 mm. Hg or more, (b) lack of response to intensive medical therapy, and (c) evidences of progressive vascular damage. Contraindications include any one with the following factors: (a) poor renal function, (b) less than 6 months’ convalescence from a stroke or coronary occlusion, (c) age over 55 years, or (d) inability, for any reason, to cooperate in taking adrenal cortical replacement therapy. During the period of postoperative observation, 23 per cent of the 99 patients showed excellent response, 23 per cent fair response, and 30 per cent poor response; 24 per cent died. Only one patient died from uncomplicated adrenal insufficiency. The usual cause of death was a stroke or coronary occlusion. Patients with paroxysmal dyspnea or congestive heart failure prior to operation showed the most striking improvement. Most of those subjected to subtotal adrenalectomy required adrenal cortical replacement therapy after operation. Objective changes have been observed in improvement of the heart size, retinopathy, and electrocardiographic findings.

Kitchell


The authors studied the alterations of the peripheral and pulmonary circulation in 16 patients treated with hexamethonium prior to surgery or for medical indications. Three cases had no evidence of cardiovascular disease, five cases were hypertensive, and the rest had symptoms and signs compatible with increased right ventricular load.

Hexamethonium chloride applied intravenously in doses sufficient to lower the mean systemic pressure to an average value of 80 mm. Hg causes, in addition, pressure reduction in the pulmonary vascular system and a decrease of venous filling pressure. This takes place with a reduction of total resistance in the peripheral and systemic circulation, while the calculated pulmonary arteriolar resistance remains unchanged. The work of either ventricle was found to be considerably decreased after the treatment and the arteriovenous oxygen difference increased by reduction of the venous oxygen saturation. These findings are discussed with regard to their theoretic and practical significance and to certain questions relative to the therapy of systemic and pulmonary hypertension and heart failure.

Pick


After bilateral nephrectomy, dogs were maintained on a low salt diet by intermittent peritoneal dialysis. In the absence of dehydration there was hypertension if weight and extracellular fluid volume increased. When there was dehydration and no increase in extracellular fluid, hypertension did not develop. Dehydration of hypertensive animals caused some reduction in blood pressure but not to normal. Severe dehydration produced hypotensive shock while rehydration restored blood pressure to hypertensive levels. These experiments suggest a causal relationship between increased body fluids and hypertension. It is not necessary to maintain the increased body fluids to maintain the hypertension.

Oppenheimer


The authors studied the effects of a product known as McN-181 in hypertensive subjects. This is described as a piperoxan found by laboratory
investigation to be a highly potent adrenergic blocking agent with a low order of toxicity. The patients employed were those with benign essential hypertension; the drug was administered both by oral and intravenous routes. On six occasions, a moderate reduction in systolic and diastolic pressure occurred after intravenous infusion of the agent, the hypotensive effect usually persisting 30 to 60 minutes after the infusion. In four instances, there was no significant pressure change and a pressor effect was noted twice in one patient. A slow infusion was more effective in lowering the blood pressure while rapid infusion resulted in an increase in heart rate, possibly due to a direct action of the drug on the myocardium. With oral therapy, varying degrees of reduction occurred in five of the six trials. Because the drug is capable of reducing blood pressure in certain hypertensive patients, it is worthy of consideration for long-term assessment for the treatment of hypertension.

SHUMAN


Exposure to cold (5 C.) for 20 days elevates blood pressure in normal rats while similar exposures in hypertensive rats produce no change. Temperatures of 35 C. increased pressure in controls but not in hypertensive rats. Similar food intakes at 5, 25 and 35 C. in both groups suggest that total body heat production is the same in control and hypertensives. Polydipsia and polyuria were present in renal hypertensive rats in air at 25 C. They chose more potassium solution to drink and less sodium than controls. Air at 5 C. increased fluid intake and urine production in these rats. Although hypertensives and controls took in more sodium and potassium when exposed to cold, the hypertensives took in significantly less sodium. Air at 35 C. increased the intake of total fluid, water and potassium in controls but not in hypertensives. When exposed to heat, both groups had smaller sodium and potassium intakes. Hypertensives had a greater mortality at temperature extremes than controls.

OPPENHEIMER


A group of 101 hypertensive patients were studied. All had a diastolic pressure persistently above 100 mm. Hg and evidence of retinopathy, electrocardiographic damage, or impaired renal function. Cerebral hemodynamics and metabolic studies were made by the nitrous oxide method.

The results indicate that despite a mean increase of 75 per cent in cerebral vascular resistance, the blood supply to the brain is automatically adjusted to its oxygen requirements, thus maintaining the cerebral blood flow within the normal rage. The oxygen consumption of the brain in hypertensives is not significantly different from that of normotensives, and does not vary appreciably in patients of different sexes, ages, or prognostic group.

The data obtained suggest that the cerebral oxygen consumption varies directly with the blood flow and inversely with the vascular resistance. It would seem that the oxygen consumption in hypertension is kept constant by a reciprocal relationship between the blood flow and the arteriovenous oxygen difference, keeping the jugular oxygen tension above 25 mm. Hg.

WAIFE


Based on the analysis of five of their own observations, the authors discuss criteria for the diagnosis of malignant hypertension. Most important is the finding of permanent elevation of the diastolic pressure over 120 mm. Hg, uninfluenced by bed rest and treatment, with manifestations of impaired blood supply to vital organs. The latter includes ischemic manifestations of the brain (e.g. cerebral accidents at a relatively young age, papilledema, retinitis and hemorrhagic foci), of the heart (clinical and electrocardiographic evidence of diffuse myocardial damage) and of the kidneys (proteinuria and hematuria, abnormal concentration and clearance tests). If only a few of these signs are present and not too pronounced, a certain period of observation is necessary in order to establish the progressive character of the disease. Simultaneous occurrence of several ischemic alterations in the presence of elevated diastolic pressure justifies an immediate diagnosis of malignant hypertension.

Pick


The authors report their observations on the effect of subtotal adrenalectomy (approximately 90 per cent) on arterial and jugular venous blood constituents and cerebral metabolism in patients with hypertension. Although the cerebral blood flow increased slightly after adrenalectomy, the mean values of oxygen consumption, the venous oxygen content, and venous oxygen tension remained essentially unchanged. It was found that the high cerebral vascular resistance in hypertension was lowered by adrenalectomy. The reduction in resistance, as well as the mean decrease in arterial
pressure, appeared to be greater after combined sympathectomy-adrenalectomy than after sympathectomy alone. These data suggest that the increased cerebral vascular tone in certain hypertensive patients is reversible.

**Waife**


Experiences with bilateral partial adrenalectomy for severe hypertension in 27 patients are discussed. There were six postoperative deaths. Twenty of the 21 survivors now have normal blood pressures, and some of the patients have been followed for as long as 20, 21, and 22 months. Symptomatic improvement of hypertensive symptoms was obtained in all survivors, and hypoadrenalism was present in all of them. Experience with these 27 cases permits these suggestions: (1) Indications are known and can be fairly accurately estimated; (2) the preoperative and immediate postoperative care are easily and safely established; (3) operation is not difficult for the operator accustomed to gastric or pancreatic surgery; and (4) the only phase that denies the procedure the dignity of being routinely recommended is the maintenance management. The author, however, feels that with the present hormonal substitutive drugs and a reasonable hope for better agents in the future the dangers can be successfully overcome.

**KitcheU**


Of 54 severely hypertensive patients treated with parenteral hexamethonium bromide, three developed unexpected pulmonary dyspnea with radiologic evidence of pulmonary fibrosis. Two of the three patients died, and their lungs showed a mixed intraalveolar and interstitial fibrosis associated with preservation of the normal alveolar elastic pattern. These changes are not attributed to the drug but rather to attacks of left heart failure modified by intermittent lowering of the blood pressure by hexamethionium. The treatment prolonged life and thereby made possible the development of carnification.

**Soloff**


Hypertensive disease in pregnancy may be classified into three groups: essential hypertension (patients with pre-existing vascular disease); renal disease (patients with pre-existing renal disease); and pre-eclamptic toxemia and eclampsia. Edema in itself is a common clinical finding in pregnancy and of no particular importance in relation to the development of hypertension. This retention of fluid results from sodium retention.

Renal disease in pregnancy is a very serious complication with a poor prognosis for mother and baby. Patients with chronic kidney damage may have sufficient renal reserve in the nonpregnant state to live in good health. The increased kidney load of pregnancy may precipitate the signs and symptoms of renal disease. With repeated pregnancies signs of renal damage tend to appear earlier and become more severe. Chronic renal disease is associated with less than 50 per cent prognosis for survival of the child. The treatment of chronic nephritis in pregnancy consists primarily of avoiding excessive weight gain and retention of fluid and electrolytes as well as sufficient rest. A high protein low-sodium diet is recommended. At the earliest sign of renal failure, the pregnancy should be terminated. In the last month of pregnancy renal failure and/or death in utero the baby are most likely to occur, and termination of the pregnancy should be seriously considered at this time. The patient with very mild nephritis with no signs of toxemia and without increasing renal or vascular damage or hypertension may be allowed to go to term and deliver spontaneously.

With mild pre-existent hypertenion the prognosis for the pregnancy is usually good and is better than for the patient with chronic renal disease. The author believes that essential hypertension is unaffected by pregnancy unless a superimposed pre-eclamptic toxemia develops. These patients should be watched carefully for any rise in blood pressure or the development of albuminuria. These findings warn of impending pre-eclampsia. This usually occurs in the third trimester. If pre-eclampsia develops, the pregnancy should be terminated. Treatment of essential hypertension in pregnancy is aimed at the prevention of pre-eclamptic toxemia mainly by preventing water and electrolyte retention. The patient should be on an extremely low sodium intake. With the development of any edema or excessive weight gain, the patient should be hospitalized and attempts made to induce a diuresis. The type of delivery depends on the individual case. If the patient passes through the pregnancy uneventfully, there is usually no harm done and further pregnancies are relatively safe, despite the presence of hypertension.

Pre-eclamptic toxemia is a hypertensive state which appears usually in the last trimester and disappears after the pregnancy has terminated. The condition is indicated by the appearance of an increase in blood pressure (especially diastolic) over pre-existing levels and albuminuria. In most cases these findings are preceded by a marked increase in weight from fluid retention. Visual and cerebral symptoms develop as the disease progresses. The treatment of pre-eclamptic toxemia has to be
individualized. With mild cases the aims of therapy consist of rest, low sodium diet, and diuresis to reduce fluid retention. A pre-eclamptic toxemia with a blood pressure of over 160 systolic and particularly over 100 diastolic must be considered a serious case. Excessive albuminuria, the presence of cerebral or visual symptoms, or a marked rapid weight gain also indicate a severe case. In such cases the early or immediate termination of pregnancy has to be considered. Hypotensive drugs and magnesium sulfate may be of some value in therapy.

Eclampsia is the terminal stage of pre-eclamptic toxemia and is manifested by convulsions, coma or both. Pregnancy in patients with severe pre-eclampsia should be terminated before eclampsia develops. With eclampsia, anuria and oliguria are common along with other signs of renal failure. The immediate treatment of eclampsia is the control of the convulsion and the coma. Once the patient has recovered from the convulsions delivery should be performed by rupturing the membranes or by cesarean section.

SAGALL


Arterial blood pressure and pulse rate were studied during chronic splanchnic nerve stimulation. After 20 hours of continuous stimulation, the pulse rate was normal during the hypertension. A tachycardia appeared as the blood pressure declined. The pressor receptor and/or the central pathways may adapt to the hypertension without bradycardia or vasodilation. Permanent hypertension could not be produced even though the blood pressure was elevated 30 mm. Hg 20 hours a day for 28 consecutive days. At the end of stimulation, pressure returned to control values within a few minutes. During this prolonged stimulation of the nerve, it did not lose its ability to respond.

OPPENHEIMER


In a variety of disorders of the heart and lungs, an increase occurs in the normal low hydrostatic pressure within the pulmonary vascular bed. Incomplete systolic emptying of the left ventricle, which is not balanced by a similar immediate change in the right ventricular emptying, will result in a greater temporary right ventricular output, thus producing pulmonary congestion. The shift of blood from the systemic circulation to the pulmonary circulation increases the pulmonary blood pressure. Increased pulmonary pressure in mitral stenosis is not a compensatory response to maintain an adequate cardiac output in the face of valvular obstruction, but is a reflection of the state of equilibrium between the various factors regulating cardiac output and the impedance of blood flow due to the valvular obstruction. Severe pulmonary hypertension may result from changes in the pulmonary vascular bed occurring in disease, e.g., the direct obstruction of the smaller pulmonary vessels in metastatic carcinoma, multiple pulmonary emboli, severe mitral stenosis, and the decrease in the number of smaller vessels seen in chronic pulmonary disease. Inhalation of low oxygen mixtures may reduce the pulmonary vascular bed by vasoconstriction. Any factor tending to increase pulmonary blood flow in the presence of these obstructive lesions tends to raise the pulmonary vascular pressures even more.

In chronic pulmonary disease, pulmonary hypertension usually results from multiple causes. Which of the multiple factors will prevail depends upon the nature of the disease present. The duration and severity of the changes determines whether or not clinical cor pulmonale will result. Reduction in cardiac output and increased pulmonary vascular pressures are the two major physiologic defects characterizing mitral stenosis. These are caused by the valvular deformity, alteration of the pulmonary vascular bed and myocardial disease associated with mitral stenosis. The latter factors also cause congestive heart failure and cardiac arrhythmias. There is no definite relationship between pulmonary blood pressure and cardiac enlargement or cardiac failure. The symptom of dyspnea in these patients cannot readily be accounted for. Recent studies indicate that dyspnea in these patients does not arise primarily from an interference in pulmonary function secondary to pulmonary congestion. The author discusses other possible causes of dyspnea, but the final answer is as yet unknown.

SAGALL

PATHOLOGIC PHYSIOLOGY


Interference with the return flow of blood through the superior vena cava to the right heart produces (a) increased venous pressure in the upper extremities and thorax, (b) delayed circulation time in the upper part of the body and (c) signs of collateral venous flow toward the inferior caval tributaries. These manifestations can readily be observed and examined by appropriate methods. By the use of phlebography, the precise location of the obstruction and information concerning its nature can be obtained. During the determination of the venous pressure in the upper extremities, an abnormal rise in pressure will be observed if the patient exercises by clenching his hand repeatedly for one minute. By these means, the author has found 22 cases of superior caval syndrome in recent years. The principal cause for this disorder has been the
invasion of the vena cava by malignant tumors. An 11 per cent incidence of involvement of this structure in primary carcinoma of the lung was found. Aneurysm of the ascending aorta represents a less commonly occurring cause owing to its decreasing incidence.

SHUMAN


A suspension of Lycopodium spores injected into the pulmonary artery produced acute pulmonary hypertension. Coronary outflow was unchanged although the pressure in the pulmonary artery was three times that of the control values. Cardiac output and total pulmonary resistance were increased. Although the left ventricular work was increased, there was also an increase in efficiency since left ventricular oxygen use was unchanged.

OPPENHEIMER


Examples are presented of oscillographic intracardiac pressure curves recorded in normals as well as in various pathologic conditions by a method developed by Condorelli. The principle of the method consists of air transmission of pressure variations with the help of a modified Franck capsule. The authors claim the following advantages as compared with conventional manometric methods.

The amplitude of all deflections is larger, particularly in atrial tracings. Artefacts inherent in manometric methods are largely eliminated, and the tracings retain their original contour regardless of the duration of registration. The elimination of the important factor of friction of a liquid column in a narrow tube permits more precise recording of pressure variations. Oscillograms can be easily synchronized with recordings of other manifestations of cardiac activity such as the electrocardiogram, the phonocardiogram and peripheral pulses and thus, a more exact calculation of various phases of the cardiac cycle in the normal and in pathologic states becomes possible.

Pick


When a balloon is inflated in the inferior vena cava above the entrance of the hepatic veins, arterial hypotension is produced. During the hypotension the heart is smaller in size. There is also venous and arterial unsaturation, hemoconcentra-

tion, high plasma potassium, decreased urine flow, decreased excretion of electrolytes, low glomerular filtration rate and renal plasma flow. When the blood pressure rises after deflation of the balloon, the blood changes quickly disappear and water and electrolyte excretion become normal. Glomerular filtration rate and renal plasma flow are restored slowly. Prolonged hypotension (two hours) causes irreversible shock. Postmortem examination shows ascites and focal liver necrosis. The heart and kidneys are normal.

OPPENHEIMER


Dogs which had been fasted for a long time were fed a high carbohydrate diet. This is considered to be a severe dietary stress and results in a marked systolic hypertension. If salt is added later, there is no significant change in blood pressure. When salt was given with the diet, two of three dogs had a systolic hypertension and one had a diastolic rise. The systolic elevation in the latter case (simultaneous salt and high carbohydrate diet) was the same as obtained when salt was added to the diet of fed dogs. Only the sustained systolic elevation during salt feeding and the absence of a sudden fall when salt was stopped are attributed by the authors to the preliminary fasting and high carbohydrate diet. Isocaloric horse meat diets lowered the hypertensive levels established previously due to carbohydrate feeding. Salt did not affect this result.

OPPENHEIMER


Peripheral resistance was decreased by stimulation of the carotid sinus nerve, acetylcholine, or opening an arteriovenous fistula. Peripheral resistance was increased by stimulation of the central end of the vagus or sciatic nerve, commercial epinephrine, pure l-norepinephrine, pure l-epinephrine or asphyxia. With but a single exception, venous return and peripheral resistance changed in the same direction. It was suggested that changes in the venous return are produced by active changes in the tone of the postarteriolar blood vessels. The veins are the most likely site of this activity.

OPPENHEIMER

Extensive expansion of collateral circulation may develop in pulmonary disease. This may involve the arterial or venous circulation or both. Large precapillary communications may develop between branches of the aorta and pulmonary arteries, acting as points of increased resistance to the outflow from the right ventricle. In pulmonary disease these anastomotic vessels may shunt desaturated blood away from the diseased parenchyma, and actually result in a reversal of blood flow in the pulmonary artery. A burden may be placed entirely on the left side of the heart by this arterial collateral flow passing through the pulmonary capillaries. As the venous collateral circulation expands, an increased shunt between the systemic and pulmonary venous system occurs. The flow of blood in the pulmonary veins depends upon the relative pressures in the pulmonary and systemic veins and, therefore, may be in either direction. In cor pulmonale with congestive heart failure, the venous blood is probably reversed (from right to left), thereby adding unoxygenated blood to the systemic arterial circulation.

Sagall


The authors review the literature concerning total uncomplicated anomalous pulmonary venous drainage and report 14 additional cases. The main clinical findings in infants and children are lack of clinical cyanosis and failure to thrive. Murmurs may be absent or faint initially. Later, a parasternal systolic murmur between the second and fourth left intercostal spaces becomes increasingly evident. Diastolic murmurs are occasionally heard. A venous hum was audible in the pulmonary area in about one-fourth of the cases and is specific to one particular type.

The radiologic picture varies with the anatomic type. When the pulmonary veins drain into a left superior vena cava, a characteristic mediastinal venous shadow is present except in the first few months of life. Increasing cardiac enlargement after birth is the rule. Lung vascularly is markedly increased. The electrocardiogram shows marked right ventricular hypertrophy with a qR pattern and inverted T waves in the right precordial leads. Cardiac catheterization is of value but has a number of limitations.

The chief diagnostic difficulty lies in separating this anomaly from aortic hypoplasia in infancy and auricular septal defect in older children. Surgical correction of the condition would seem theoretically possible because of the close proximity of the left auricular appendage to the anomalous venous trunk. However, the small waist of the left auricular appendage, the difficulty in making a large enough anastomosis, the small left auricle and ventricle all mitigate against successful surgery.

Harris


The authors report the case of a 35 year old male who had had chronic auricular fibrillation for at least 10 years without evidence of organic heart disease and then developed a series of syncopal reactions. Electrocardiograms revealed that the basic rhythm was auricular fibrillation with periods of ventricular asystole up to two seconds duration. Normal sinus rhythm was re-established after a total dose of 3.2 Gm. of quinidine had been given over a two-day period. Maintenance therapy of 0.2 Gm. of quinidine three times daily was effective in continuing normal sinus rhythm up to the time of the last examination (18 months later). During this period the patient had no further episodes of syncope. This patient, during the time that he suffered syncopal reactions, showed mild hypotension during recumbency and extreme hypotension in the upright position. Because the ventricular standstill lasted only up to two seconds and the syncopal reactions did not coincide with the periods of cardiac standstill, and because syncope occurred only in the upright position, the authors believe that the syncope in this case was due to postural hypotension and not to ventricular asystole. The fact that syncope did not occur after conversion to normal sinus rhythm suggests that the syncope and postural hypotension were in some way related to the auricular fibrillation. The mechanism involved in this association is unknown, but it is suggested that the heart in auricular fibrillation may sensitize the neural arc responsible for the vasodepressor type of syncope. This mechanism may not apply to other unstudied episodes of syncope in this patient or in other patients.

Sagall


A study was made of 240 patients with chronic diffuse obstructive emphysema. Values for arterial oxygen saturation were recorded by oximetry with the patients at rest, during exercise, and breathing 90 to 95 per cent oxygen. Half of this group maintained normal values for arterial oxygen saturation, even after exercise, to the limit of their tolerance. Twenty-three per cent had hypoxemia at rest. In an additional 27 per cent whose arterial blood was
normally saturated at rest, hypoxemia developed during a standard exercise test.

Although the incidence of hypoxemia was greater in patients with more marked clinical disability, the presence or absence of hypoxemia did not govern the degree of disability in individual cases. There were many patients with hypoxemia who had a fairly good tolerance to exercise and also numerous patients with normal arterial oxygen saturation who had severe exertional dyspnea. This was true on the basis of the clinical history as well as exercise tests in the laboratory. Cor pulmonale with congestive failure, when present, occurred almost exclusively among patients who had either transient or persistent hypoxemia. The incidence was greatest among those patients with persistent hypoxemia. There was only one case of congestive failure and cor pulmonale among 118 patients in whom normal values for arterial oxygen saturation were recorded at rest and exercise. There were 18 instances of congestive right heart failure among 122 patients in whom persistent or transient hypoxemia was demonstrated.

SIMON


A case of congenital auricular flutter was described and a review made of the nine previously described cases of congenital paroxysmal tachycardia. The prognosis is uniformly good with all cases showing a reversion to normal rhythm. Only one case was associated with a known heart defect. Recommended drug treatment is digoxin in a dosage of 0.06 mg. per 1.0 Kg. of body weight. In cases where the obstetrician is able to diagnose a fetal paroxysmal tachycardia, there would seem to be no good reason for altering the usual management of labor and delivery. Congenital paroxysmal tachycardia differs from that commencing in the early months of infancy by its equal occurrence in males and females and by the preponderance of flutter arrhythmias.

MAXWELL


In these experiments, ether is demonstrated to have a negative inotropic action on the myocardium. This is sufficient to reduce cardiac output or produce cardiac arrest at blood ether levels required in surgical anesthesia. These cardiac effects of ether take place in the absence of circulating epinephrine and norepinephrine. The reflex release of epinephrine and norepinephrine from the adrenal medulla and sympathetic nerve ends is a major factor of safety in ether anesthesia when myocardial effects are considered. The positive inotropic effects of epinephrine and norepinephrine offset the negative inotropic effect of ether.

Oppenheimer


An isovolemic anemia was produced in anesthetized dogs. At a critical level of anemia, a further decrease in hematocrit produced a proportional increase in minute volume. Right atrial pressure was unchanged or decreased. After the hematocrit returned to normal, cardiac output decreased without change in atrial pressures. The authors conclude that the arterial-oxygen content is the primary factor in the regulation of the cardiac output.

Oppenheimer


These experiments demonstrate that plasma expansion is optimal when bled animals receive fractions which are not excreted by the kidney. These same solutions are not so efficient in dogs which have not been bled. Although "Expandex" increases volume in both bled and unbled animals, the expansion is not well maintained; nonrenal-excretable fractions are better. The kidney eliminates the renal-excretable fraction and plasma volume is little increased. Dextran does not change plasma proteins in bled dogs but lowers them in unbled animals. The thoracic duct lymph contained all fractions of Dextran. Renal-excretable and non-excretable fraction increase the lymph flow in unbled dogs. The authors deduce that nonrenal-excretable dextran fraction is better in bled dogs because the larger molecules are retained in the plasma. Small molecules of renal-excretable fraction are lost rapidly into tissue fluids and via the kidney.

Oppenheimer


A study of the anatomy of the pulmonary veins was made on five patients from specimens obtained within three hours after death. Strips, 3 to 5 mm. wide and 35 to 40 mm. long, were cut, beginning from the severed end of the pulmonary veins within the lung and continuing well into the left atrial wall. The strips represented longitudinal segments of vein and segments of left atrium, including the
junctial area. The functional anatomy of this area was studied because of the probable importance of the pulmonary veins in the regulation of pulmonary blood flow and the possibility of spasm of the pulmonary veins as a cause of pulmonary edema.

The smooth muscle of the vein and the atrial myocardium were found to overlap, although it was not always possible to estimate the degree of overlapping. The overlap occurred in two ways: (1) a simple overlap of the atrial myocardium over and external to the smooth muscle of the vein; (2) the atrial myocardium wedged into the smooth muscle layer of the venous wall, being surrounded on both sides with smooth muscle. Grossly, the atrial myocardium seemed to extend onto the pulmonary veins for about 10 mm. In most subjects, the pulmonary veins tended to run perpendicularly into the surface of the atrium. Many nerve fibers were found distributed throughout the walls of the pulmonary vein.

The authors discuss the probable significance of this region in cardiac and pulmonary hemodynamics, and the possible role of the “throttle valve” action of pulmonary veins in acute pulmonary edema, syncope, and sudden death, as well as its therapeutic implications.

**RINZLER**


The effect of intravenous injection of 0.35 mg. of K-strophanthin (Kombetin Boehringer) upon water and electrolyte urinary excretion, and sodium, potassium and calcium plasma levels was studied in 23 normal females. While renal water excretion remained unaffected, excretion of the three electrolytes increased significantly. The authors attribute this to a decrease of tubular reabsorption caused by a direct effect of the glycoside upon the tubular epithelium. Plasma electrolyte concentration also changed to a marked degree following the strophanthin injection. Sodium concentration decreased, potassium increased, while calcium remained unaffected. These alterations suggest a primary shift of potassium out of the cell, while the loss of sodium might be caused by simultaneous transfer of this ion into the cell and excretion through the kidney.

The significance of these findings is discussed with reference to the reduction of plasma volume following injection of strophanthin, and the hypostasemia frequently encountered in the presence of heart failure.

**PIECK**


A study of 41 patients with chronic diffuse obstructive emphysema was made to evaluate the relative therapeutic merits over a two- to 3-week period of inspiratory positive-pressure breathing of oxygen, inhalation of an oxygen-generated aerosol of isopropyl Arterenal (Isuprel) and their combination. The results, judged chiefly by symptomatic improvement and by results of various pulmonary function tests, indicate that aerosolized Isuprel was superior to oxygen-intermittent positive pressure breathing alone and equal to the combined treatment, including Isuprel aerosol and intermittent positive pressure breathing. Moderate symptomatic improvement was obtained by the majority of patients when an oxygen-generated Isuprel aerosol was administered either with or without intermittent positive pressure breathing. The persistence of dyspnea, although variably reduced, and the unchanged results of pulmonary function tests indicate that the basic bronchopulmonary changes were not altered by any of the treatments given.

**SIMON**

**PATHOLOGY**


A case is presented in which recurrent hemoptysis dominated the terminal phase of a clinical picture and in which death resulted from extensive pulmonary hemorrhage. The lungs were shown to be the site of a necrotizing alveolitis, and there were associated acute nephritis and periarteritis nodosa, although no arterial lesions were identified in the lungs. The pulmonary alveolar lesions areinterpreted as resulting from a hypersensitivity state. The case emphasizes the point that occasionally recurrent and severe hemoptysis may dominate the clinical picture in a patient with a hypersensitivity state.

**SIMON**


A case is described of primary cardiac tumor in a 3 month old infant, with improvement following surgical drainage of the pericardial sac but followed by death due to spread of the tumor. The most common types of primary cardiac tumors found in early life and the diagnosis and management of infants with such lesions are reviewed.

Infants with primary cardiac tumors often are considered entirely normal at birth with no evi-
dence of cardiomegaly, tracheal or esophageal obstruction, or cyanosis. Subsequently, as the tumor proliferates in an intra- or extracardiac direction, signs of irritability, failure to gain weight, coughing, respiratory retraction, cyanosis, cardiomegaly, and, ultimately, cardiac failure intervene. In the face of such a history, the possibility of a primary cardiac tumor should always be considered, despite its statistical rarity. Surgical intervention is usually of no avail, but perhaps earlier and more frequent recognition of this condition will permit cures to be achieved in those patients having benign tumors or cardiac neoplasms of low-grade malignancy.

MAXWELL

PHARMACOLOGY


Twenty-four adult males, with a blood level of 50 mg. per 100 cc. or more of the S1 12–20 class of lipoprotein, were given six 0.5 Gm. capsules of dl-methionine daily, by mouth, for 42 days. Their daily routine of activities and diet was not changed. The serum cholesterol and lipoprotein levels were not altered with this course of treatment.

SAGALL


Thiamine-deficient dogs (both acute and chronic) demonstrate an abnormal pattern of myocardial metabolism. The coronary arteriovenous difference and total utilization of pyruvate were maintained within normal limits despite markedly elevated arterial pyruvate. The threshold of utilization of pyruvate was significantly increased and the coefficient of extraction was decreased. Lactate extraction was inhibited more than pyruvate; glucose extraction by the myocardium was also below normal. An abnormality in oxygen utilization was demonstrated by the limitation placed on the myocardial oxygen extraction coefficient by higher rates of coronary flow in acute thiamine deficiency.

RINZLER

SURGERY


The authors described their experiences with surgical treatment of 23 patients suffering from aneurysms of the abdominal aorta. Thrombendarterectomy was performed in four cases and resection and replacement by aortic graft were utilized in one case. In the remaining 18 patients, reinforcement with polyvinyl sponge was carried out. Of the latter group, two died. One of the four patients in whom thrombendarterectomy was performed also died, while in another, arterial insufficiency developed in one lower extremity, necessitating a mid-thigh amputation.

Follow-up studies revealed that 5 of the 15 patients surviving reinforcement of the abdominal aneurysm with polyvinyl sponge subsequently died as a result of the disease, while another patient, although still alive, suffered from constant, severe and progressing pain. Of the three patients who survived thrombendarterectomy, two were alive and asymptomatic, while one died suddenly seven months after operation.

It was the opinion of the authors that the procedures utilized did not significantly increase the survival rate as compared with a series of untreated patients. They concluded that possibly the best approach to the problem was through the use of preserved homologous aortic grafts.

ABRAMSON


Surgical considerations and various methods for closing atrial septal defects are discussed by the authors with suitable comments and criticisms. Their own methods for handling the various types of interauricular septal defects are presented. For posterior defects, which are neither very high nor very low in the septum, the authors found it amazingly easy to obtain closure by drawing the septal edge back to the posterior wall of the auricle with mattress sutures. This procedure was carried out by passing a finger into an auricle through the appendage, effectively and thoroughly closing the septal orifice, withdrawing the finger and suturing the auricular appendage, all in less than 10 minutes.

For those lesions which may be very high, very low or very far forward, and for all of the openings which are great in size, a rubber “well” can be attached to the opened auricle, forming a pool of blood through which the fingers can be passed into the auricular chamber, allowing by tactile direction with the fingers a repair of the septal opening by direct suture or by the onlay of a polyethylene sheet which is made to cover the opening. This foreign material, from observations on dogs, has been found to be tolerated very well and is known to become covered over with fibrous tissue and endocardium.

The authors point out that many patients with atrial septal defects have anomalous drainage of the pulmonary veins, particularly of those veins from the right lung. Fortunately, most anomalies of pulmonary vein drainage are such that the vessels enter the right auricle. In this situation, repair is
done in such a way that all pulmonary vein blood is directed into the left auricle, as well as abolishing the communication between the two auricles.

The authors report on the use of the two main techinies in 12 patients. There have been seven survivors. In four of these the septum was repaired by direct suture; in three others the opening was closed by the onlay of a polyethylene sheet which was sewed into place and anchored to the septum. It is pointed out that small interauricular shunts can be tolerated by the human heart through a long life and, hence, do not require any surgical relief. Large interauricular shunts in which the pulmonary blood flow is twice (or more) that of the peripheral blood flow should be subjected to surgical closure of the septal opening.

Dennison


Aneurysms of the internal carotid artery, both in the cavernous and cerebral portions, have been treated in this clinic for the past 16 years by proximal arterial ligation in the neck. Thirty-five patients are presented in this series. To date, eight patients have died of various causes and 27 are living. The usual site of ligation in patients over 40 years of age was the common carotid. In some instances the internal carotid was subsequently ligated. In younger patients, the internal was ligated initially unless there was evidence of existing or impending vascular deficit as determined clinically and by intra-arterial pressure determination at the time of ligation.

The therapeutic objective is simple: to reduce strain on the aneurysm while maintaining adequate circulation to all parts of the brain. Strain upon the aneurysm is equal to the sum of the stresses operating. These include: total hydrostatic pressure in the parent artery; the pulsatile nature of the flow; turbulence; and jet action.

The authors do not advocate ligation in the neck for aneurysms of arteries other than the carotid, especially of the communicating series. While the principle of proximal ligation for intracranial aneurysms is validated largely on an empiric basis, this study would tend to indicate that the procedure has a sound theoretic basis. The authors feel that most of the patients in this series have been benefited by the procedure, but the percentage gain in terms of morbidity and mortality can be assessed only in relation to comparable series of untreated cases.

Dennison


The arrhythmias which can occur during cardiac surgery include paroxysmal supraventricular tachycardia, auricular fibrillation, auricular flutter, isolated ventricular premature contractions, ventricular tachycardia and ventricular fibrillation. Of these, ventricular tachycardia and ventricular fibrillation constitute the most serious types of arrhythmia. The latter demands immediate heroic treatment by a trained team making use of the defibrillator, followed by mechanical massage and intracardiac injections of calcium chloride and/or epinephrine. Ventricular tachycardia can be treated by intravenous injection of either pronestyl or quinidine. The supraventricular tachycardias can be controlled by prostigmine or Tensilon. Paroxysmal auricular fibrillation or flutter can be treated with either digitalis, quinidine, or pronestyl. As yet, there are no dependable means for preventing the arrhythmias which occur during cardiac surgery, so that the anesthesiologist and the surgeon should be alerted to their possible development and be prepared to treat this complication immediately.

Wendkos


A patient with carcinoma of the lower lobe of the right lung and mitral stenosis was improved by a combined lobectomy and mitral valvotomy, using a right-sided thoracic approach. The valvotomy was accomplished by finger-pressure through the right inferior pulmonary vein following the lobectomy.

Maxwell


Of 40 patients subjected to surgery for mitral stenosis, Aschoff bodies were found in the surgical specimens of 55 per cent. Less than half of this group had a past history of rheumatic fever and none had had evidence of recent rheumatic activity. The atrial appendages of 40 patients who died with severe fulminating rheumatic fever were examined for comparison. The endocardium of the atrial appendages in all of these cases showed striking pathologic changes. Seventy-two per cent showed one or more Aschoff bodies, and 95 per cent showed infiltration with lymphocytes and monocytes. Myocardial changes were less prominent with only two patients showing Aschoff bodies. There was a close correlation between the pathologic findings in the atrial appendages and those found in routine sections from other portions of the heart. These findings indicate that latent rheumatic activity, although not apparent clinically, was present in the surgical group.
The postoperative courses of 25 per cent of patients with prolonged convalescence, low grade fever, tachycardia, friction rubs, pneumonitis, arrhythmias, atypical chest pain, or arthritis would seem to substantiate this belief. Aschoff bodies were not found in nine patients over 50 years of age who had valvular lesions consistent with inactive healed rheumatic endocarditis and in a group of 50 persons who died from other causes and had no gross anatomic evidence of rheumatic heart disease.

**SAGALL**

**THROMBOEMBOLIC PHENOMENA**


Using rabbits, the author studied various means of preventing experimentally produced emboli from occluding cerebral arteries. It was found that where no measures were used, 27 per cent of the animals demonstrated emboli in these vessels. Ligation of the left carotid artery did not increase the risk of cerebral embolization on the other side, while maintenance of the head in a raised position or manual compression of both carotid arteries diminished the incidence of this state. A combination of these two measures further reduced the possibility of cerebral embolization. The possible clinical implications of such findings were presented.

**ABRAMSON**

**VASCULAR DISEASE**


The authors reviewed the literature on lipoidosis and studied in their own material the incidence of atherosclerosis in various types of primary and secondary disturbances of lipid metabolism.

Essential familial hypercholesteremic xanthomatosis is, in a high percentage of cases, associated with general and coronary arteriosclerosis. The majority of juvenile arteriosclerotic patients belong to this group. In contrast, patients with essential familial hyperlipemic xanthomatosis remain practically free from arteriosclerosis even with persistence of the metabolic disorder for many years. Secondary hypercholesteremic xanthomatous diseases may be caused by a variety of conditions. If associated with primary biliary cirrhosis of the liver the incidence of xanthomatosis is very low. Xanthomatous skin lesions occurring in diabetes mellitus, in pancreatic disease and in cholecytostatheries appear to be unrelated to arteriosclerotic vascular disease.

**Pick**


Thirty-five cases of periarteritis nodosa and 10 cases of hypersensitivity angitis are reviewed and tabulated. Certain striking differences in course and symptomatology have been revealed. In the 14 cases designated primary periarteritis nodosa, there were widespread lesions in various stages at necropsy after a long clinical course characterized by gastrointestinal symptoms, peripheral neuropathy, hypertension, and occasionally, eosinophilia. Twenty-one cases of secondary periarteritis nodosa were essentially cases of renal disease with hypertension, in which a few lesions of periarteritis nodosa had been initiated a short time before death. In these the clinical findings of periarteritis nodosa were masked by those of severe renal disease and hypertension.

In sharp contrast, in the 10 cases of hypersensitivity angitis, the clinical manifestations were of a fulminating disease characterized by fever, skin rash, nephritis, myocardiitis, and frequently a history of recent sulfonamide ingestion. It is concluded that periarteritis nodosa and hypersensitivity angitis can be differentiated clinically, and represent two distinct disease conditions.

**BERNSTEIN**


The cases which have been considered show the variability of the clinical course of diffuse arteritis. Rapidly progressing necrotizing arterial disease, leading to fatal termination, may occur if the arteritis is of acute onset, representing a generalized insult to the vascular system. If the process is a recurring one with remissions and exacerbations, the pathologic change may vary from acute necrosis to healing with recanalization.

The course of a disease characterized by diffuse arteritis and extending over a period of more than 20 years is presented. Remissions and exacerbations were present, and there is proof that arterial disease of varying degrees and types was present during this period. Biopsy studies emphasize the focal nature of the arteritis under discussion since numerous sections are often needed to demonstrate the essential lesions. Because of its great variability, the clinical course might well have been classified as dermatomyositis upon one occasion, as disseminated lupus erythematosus on another occasion, and as periarteritis nodosa on still another occasion. In fact the great variety of manifestations of disease throughout a period of over 20 years precludes its designation as any single type of arteritis now classified.

**BERNSTEIN**

Heyman, A., Patterson, J. L., Jr., Duke, T. W., and Battey, L. L.: The Cerebral Circulation and Metabolism in Arteriosclerotic and Hypertensive

This report is concerned with observations of cerebral blood flow and metabolism in 48 control subjects of varying ages, and 39 patients with cerebrovascular accidents or with encephalomalacia associated with arteriosclerosis and hypertension. The effects of inhalation of 50 and 100 per cent concentrations of oxygen were also studied. The cerebral blood flow was somewhat lower in older control subjects than that in young, healthy subjects, and it was even more greatly reduced in patients with cerebrovascular accidents. There was also a marked reduction of the cerebral oxygen consumption in patients with chronic cerebrovascular disease. In patients with an acute cerebrovascular accident, the mean cerebral oxygen consumption was only slightly lower than that of the older control group. Inhalation of 85 to 100 per cent oxygen produced an increase in cerebral vascular resistance and a decrease in cerebral blood flow in all patients. Inhalation of 50 per cent oxygen concentrations produced similar but less striking changes. The uptake of oxygen by the brain was unaffected by either concentration. It is suggested that, in view of the vasoconstrictive effects of 100 per cent oxygen shown by these studies, it would seem wise to avoid administration of 100 per cent oxygen by mask in patients with cerebral vascular disease and to use a nasal catheter or tent which supply concentrations of approximately 35 to 50 per cent oxygen.

Rosenbaum


A study was made of certain polysaccharide components in the sera of 66 diabetic patients with and without clinically detectable degenerative vascular disease. The concentration of total nonglucosamine polysaccharides bound to serum protein, serum glucosamine and the protein (tyrosine) and polysaccharide of serum mucusprotein were found to be within normal limits in those patients without degenerative vascular disease. However, those with such changes manifested an increase in the total polysaccharides bound to serum proteins and glucosamine of the serum. No constant relationship was noted between the level of blood sugar and the concentration of the various serum polysaccharide substances measured.

It was concluded that the increased concentration of the polysaccharides reflected the widespread degenerative alterations in blood vessels and other structures.

Abramson


The basis for the author's conviction that diabetic angiopathy is a specific entity distinct from arteriosclerosis and from atherosclerosis is as follows. The male-female ratio is one. The ophthalmoscopic findings are specific. The histologic findings in the kidney are specific. There is an alleged difference in the lipid fractions extractable from the coronary arteries of diabetics. In diabetics, serum concentrations of phospholipid and cholesterol rise in a parallel fashion so that the ratio remains normal. The author insists that the conception of the vascular disease in diabetes as a distinct entity will hasten elucidation of its pathogenesis.

McKusick


Atherosclerosis in North Americans begins in early infancy and the rate of lipid deposition shows three peaks, the highest in the first year of life, with lower peaks in early adolescence and early middle age. The process depends on inability of most human beings to deal with the modern high fat, high cholesterol diet. In animals very rapid atherosclerosis can be produced, even in immature individuals, by high cholesterol intake; high fat diets or fattening on carbohydrate has not been shown to lead to atherosclerosis in men or animals on low cholesterol diets with good protein content. Men with coronary disease early in life are no more obese than controls still free of symptoms.

Cholesterol reabsorption can be blocked by other sterols, which in themselves are not absorbed. This suggests the possibility of control by dietary supplement rather than restriction. At present, a low fat, low cholesterol diet is reasonable for those with precocious onset of arteriosclerosis, but the protein content should be liberal. Should it be proved that man, unlike other animals, is unaffected by excess cholesterol feeding, and his vascular disease is a result of the excess fat, the outlook for control is bleak. It would involve a change in diet, from early childhood on, which the population would never accept.

Bernstein


The authors present two illustrative proven cases and one probable case of embolic mycotic aneurysm complicating bacterial endocarditis and review 59 additional cases reported since the last complete report in 1923. The development of an embolic mycotic aneurysm is an unusual but serious complication of bacterial endocarditis. Four characteristic clinical syndromes are described which allow
for recognition or a high index of suspicion. These syndromes reflect the intracranial, abdominal, thoracic or peripheral extremity location of the mycotic aneurysm.

HARRIS


A study of the colloid stability of the serum was made in 133 patients with arteriosclerosis, 60 normal individuals, and 13 patients with various diseases but free of stigmata of arteriosclerosis. Colloid stability of serum depends upon the charge of the protein molecules. By adding cations under standard set conditions, the negative charge is decreased and coalescence of protein occurs with resultant turbidity. The rate of development of turbidity can be measured. Colloid stability of serum is decreased specifically by addition of gamma globulins, cholesterol, and decrease in pH. Acute disease processes can alter the factors controlling colloid stability of serum. Thus in patients with arteriosclerosis, and in patients with other acute disease processes, the serum stability was lowered in 90 per cent by addition of metallic cations to the serum. It is theorized then that the deposition of cholesterol and of calcium upon vessel walls is aided by the decrease in the colloid stability of the "blood transudate" as it passes through the arterial intima.

HARVEY

OTHER SUBJECTS


With few exceptions, every chemical reaction occurring in the cells of the organism is catalyzed by enzymes. The study and recognition of deranged metabolism or disease is therefore largely based on enzymology. Enzymes are organic catalysts which differ from other catalysts in that each enzyme catalyzes only one kind of reaction. Because enzymes are protein and derived from animal tissues, the problem of antigenicity has to be overcome if prolonged administration is to be undertaken. Attempts at using enzymes therapeutically have become possible only since purified and crystalline enzymes have become available. The majority of enzymes are intracellular and their site of action is in the cytoplasm of the cell. To be effective, penetration of the enzyme into the cell after therapeutic administration becomes necessary. If enzymes could traverse the cell membrane, it is improbable, at present, that they would reach the precise intracellular location where they could exert their activity. Many enzymes require cofactors or coenzymes for their activity, and to be therapeutically active such an enzyme given parenterally would require an adequate concentration of cofactors at the intended site of action. Recent uses of enzymes have been confined to those which do not require cofactors and they have been employed for actions which do not require penetration of the enzyme into the cell. These enzymes have belonged to the peptidases.

Streptocoei elaborate two enzymes. One of these, streptokinase, activates plasmin into the active proteolytic enzyme of plasma (plasmin). The other enzyme is streptodornase, whose substrate is deoxyribonuclease. These two enzymes have been used for the liquefaction of purulent and hemorrhagic exudates in closed cavities, amebic abscess, unresolved pneumonia and similar situations, making adequate drainage possible. These enzymes are definitely antigenic and antibodies usually develop after a period of about two weeks, persisting up to three months after cessation of therapy. The application of these enzymes to wounds, burns and ulcers to achieve a type of medical débridement has also been developed. The objective is limited to cleansing. Unfavorable reactions have been reported in lesions due to irradiation. To obtain an adequate result, there must be proper contact between the enzyme and the surface to be cleaned.

Theoretically, streptokinase, an activator of plasminogen, should be of value in stimulating increased production of plasmin which would remove fibrin when abnormal clotting is present. However, it has been found that to accomplish this intravenous injection of adequate amounts of streptokinase is pyrogenic. Although intravenous injection of trypsin reduces the level of fibrinogen and prothrombin in the circulating blood, small doses of this proteolytic enzyme hasten blood coagulation in vivo as well as in vitro. Blood plasma is also a powerful trypsin inhibitor, and the small amounts of trypsin that are nontoxic, which have been given intravenously for the treatment of thromboembolic diseases, are probably ineffective because they are completely neutralized by the serum inhibitor. The author recommends an attitude of extreme caution in the intravenous use of trypsin in humans. Chymotrypsin has no clotting activity on blood and is generally less toxic than trypsin. However, experiments with this enzyme upon preformed clots in animals have not been impressive. The enzyme plasmin, prepared from human plasma, is another material which may hold promise in thromboembolic disease.

Measurement of acid phosphatase of the serum and of serum cholinesterase are examples of the diagnostic application of measurements of enzymes or enzyme inhibitors. A prostatic fibrinolysin has been found in a small proportion of patients with
metastatic carcinoma of the prostate. There is evidence that proteolytic activity may appear in the blood in certain disorders such as shock due to trauma, hemorrhages or burns, liver disease, cancer of the prostate, and possibly extensive surgical procedures associated with transient anoxemia. This fibrinolysis is believed to cause fibrinogenopenia. When fibrinolysis is intense, it produces a hemorrhagic condition with deficiency of prothrombin, accelerator globulin and fibrinogen, and weak, fragile clots.

Rosenbaum


A method for estimating quantitatively the severity of illness of patients with acute myocardial infarction on admission to the hospital was accomplished by devising a scoring system termed "Pathologic Index Rating." The determinants in computing the Pathologic Index include the following: (1) shock, (2) heart failure, (3) arrhythmia, (4) gallop rhythm, (5) preceding history of heart or vascular disease, (6) associated serious diseases. A numerical value is assigned to each of these determinants and the Pathologic Index computed on their sum in any individual case. Such a Pathologic Index Rating was found to be closely related to the mortality rate, ranging from 8 per cent in the group with the lowest rating to 95 per cent in the group with the highest rating. In attempting to evaluate the results of any therapeutic procedure this method could be useful in the design of a controlled experiment, the patients being paired on the basis of their pathologic index, and then alternately assigned to the treated and untreated groups. This approach would seem to be superior to past practices in establishing the merits of any therapeutic program in lowering mortality and morbidity in myocardial infarction.

Wendkos


The clinical and laboratory features of 28 cases of acute benign pericarditis encountered over a three and one-half year period at Fitzsimons Army Hospital are summarized. The findings are in accord with those noted in previous publications dealing with this disorder. The differentiation of this condition from acute myocardial infarction is stressed. Emphasis is placed upon a proper evaluation of the electrocardiographic findings, particularly in serial records. Treatment is symptomatic and should not include the use of anticoagulants. Antibiotics have no proven benefits.

Wendkos


Mitral stenosis was produced gradually in dogs by ligation of the mitral orifices. The resulting murmur was typical. Pulmonary blood pressure is increased. These animals are susceptible to hyperventilation. There is sodium retention and ascites. Para-aminobipurate and creatinine clearances were hardly disturbed. Venous pressure showed little elevation. It is suggested from incomplete endocrine studies that the posterior pituitary and adrenal glands are implicated.

Oppenheimer


Intracardiac phonocardiography, was performed by means of a condenser microphone using the body as one pole. The experiments were carried out on dogs and oscillograms were taken with limb lead or intracardiac unipolar lead electrocardiograms. By this means, a recording was obtained of a distinct vibration which occurred synchronously with the heart sounds that are usually recorded from the chest wall as the auriicular, first, second, and third sounds. Moreover, the heart sounds thereby obtained were found to possess the same characteristics as those taken from the chest wall.

The phonocardiogram recorded from the chest wall during this stage did not give distinct tracings of auriicular and third sounds. It was at first feared that some artefact might appear on the intracardiac phonocardiogram as a result of the introduction of the catheter into the heart cavity, but no such event occurred when the degree of amplification was suitable.

Bernstein


Experiments were performed to compare the effects of cholesterol feeding in control rabbits, alloxan-diabetic rabbits, and rabbits injected with alloxan while the pancreas was temporarily occluded from the circulation. The alloxan-diabetic rabbits consumed significantly higher quantities of cholesterol and food and had serum cholesterol and lipoprotein (S1, 5-9 and S2, 16-30) concentrations significantly increased over the control levels. They failed to show a commensurate increase in the degree of atherosclerosis.

Rabbits in which the diabetogenic action of al-
lozan was prevented by temporary occlusion of the pancreas from the circulation during its administration.

Bernstein


Most reports on the so-called functional improvement following mitral commisurotomy have to be taken on faith. The technical accomplishments of this group of blind and crude procedures is interpreted by one individual—the surgeon. To be meaningful, reports attributing improvement to mitral commisurotomy should show that (1) medical and naturally occurring factors were not active and (2) no deleterious effects were produced. Sufficient factual data should be given so the reader can form his own conclusions and the surgeon's conception of his accomplishment should be included. Correlation of these statements with the so-called functional improvement may help to differentiate the psycho-therapeutic, naturally occurring, and medically induced remissions from the surgical accomplishments. This differentiation is extremely important because the operation has an immediate higher mortality (about 6 per cent) than the naturally occurring mortality (about 1 per cent) and its morbidity is very high. The fact that the heart can adjust functionally to the added load imposed on it by surgery should not be permitted to mask the actual effects of the operation.

Kitchell


During 22 complete menstrual cycles, daily radial pulse rates and body temperatures were observed on 10 healthy, young, unmarried women between 7:00 a.m. and 8:00 a.m., before they rose from bed. The average pulse rate was faster during the luteal phase than during the follicular phase of the cycle. This pulse rate acceleration was not commensurate with the elevation of body temperature observed. The author postulates that increased corticoid activity during the luteal phase of the cycle is responsible for the failure of the heart rate to accelerate commensurately with the elevation in body temperature.

Sagall


The cases described comprise only a small series of 5 cases, but from a study of these and the cases reported in the literature the following conclusions seem justified according to the author. In the absence of abnormal signs or symptoms, polycystic disease of the kidneys is no contraindication to the continuation of the pregnancy. Urinary infection is frequent, but can usually be satisfactorily controlled by chemotherapy or antibiotics, and pregnancy should be allowed to continue. In the presence of hypertension, the continuation of pregnancy is a hazardous procedure and interruption is advised.

Bernstein


The effects of a low environmental temperature on cerebral tissue were studied in a series of 10 immature monkeys. The animals were placed in an ice-water bath kept at 10 C. All 10 monkeys survived the lowering of the body temperature to 20 C. or less. The heart and respiratory rate was reduced, with deep unconsciousness occurring as cooling progressed. Electroencephalographic studies disclosed a depression of cortical activity during cooling, with little or no activity at 20 C. Subsequent examinations revealed that there was no effect on the aptitude with which the animals performed tests learned prior to the experiment.

It was concluded that in the monkey a reduction of body temperature to 20 C. appeared to have no permanent ill effects on cerebral function.

Abramson


It is well to point out that many drugs improve the peripheral arterial circulation in small or great degree and for short or long periods. Continuous long-term therapy with drugs does not appear to be feasible. Surgical sympathectomy remains the method of choice for increasing the circulation to the skin of the extremities. The author prefers surgical sympathectomy to medical treatment except in cases in which the general condition of a patient imposes an undesirable surgical risk and in instances in which the arterial circulation is not sufficiently jeopardized to warrant sympathectomy. Chemical sympathectomy is a useful and justifiable procedure when the risk of a surgical sympathectomy seems to be too great, and when vasodilatation is desired for several weeks or months. Drugs are preferable to sympathectomy in acute arterial oc-
elusion. Early diagnosis is important in occlusive arterial disease. The diagnosis ordinarily is not difficult to make. In a few carefully selected cases, arteriography and aortography may be necessary to find the rare, isolated instance of segmental disease of the aorta or major artery. If such an instance is found, appropriate surgery can be performed. If the disease is one of a diffuse nature, then institution of adequate active and prophylactic treatment may do much to prevent pain, disability, gangrene and economic loss.

Simon


The work of pulmonary ventilation in patients with emphysema was measured by the authors’ previously described method. Compared with normal subjects the work done against nonelastic resistance is greatly increased, and the work done against elastic resistance is relatively diminished. Furthermore, active work is performed during the expiratory phase. Emphysematous patients show an inordinate increase in respiratory work on exercise. For example, a patient with emphysema may have to perform as much work while breathing 15 liters a minute as a normal subject breathing 40 liters a minute. This abnormal increase in respiratory work must be an important factor in accounting for dyspnea and in limiting the maximal breathing capacity. The increase in nonelastic resistance is not wholly due to bronchial obstruction, since there is a comparatively small reduction in resistance upon breathing hydrogen. It is due in part to changes in the viscous properties of the lung itself which are probably irreversible.

Enselberg


It is pointed out that many pathologic states, including those which are metabolic, endocrine, infective or malignant, frequently manifest themselves first in the skin. The lymphoblastomas are cited as an example, and it is mentioned that the first sign of lymphoblastoma may be severe, intractable pruritus with no visible dermatitis. Mycosis fungoides is eczematous in its early stages, and, if recognized early and treated with superficial x-ray therapy, the life of the patient may be prolonged for many years. Changes appear in the skin in about 40 per cent of cases of leukemia, although chronic myelogenous leukemia is rarely so manifested. However, chloroma is an unusual type of chronic myelogenous leukemia in which skin tumors of greenish hue make their appearance. The so-called lipoidoses may be diagnosed by cutaneous inspection, the primary lesion being a xanthoma, a nodule composed of foam cells. Xanthomas may appear in myxedema, biliary cirrhosis, obstruction of the common bile duct, hemochromatosis, and hereditary xanthomatosis. Xanthoma tuberosum multiplex is often associated with definite involvement of the cardiac valves, coronary and other blood vessels and circulatory impairment which may lead to sudden death. The authors consider xanthelasma of the eyelids an early sign of impending trouble, particularly anginal accidents. Poorly controlled diabetes results in hyperlipemia and xanthoma diabeticorum; it is said that cardiovascular disturbances may follow. Necrobiosis lipoidica diabeticorum is usually accompanied by a familial tendency to peripheral vascular disturbances. The reticuloendothelial diseases which have been reclassified in the eosinophilic granuloma group present various skin manifestations including petechiae, xanthomat, and changes in skin color. The collagen diseases including lupus erythematous, scleroderma, dermatoiyositis and periarteritis nodosa are reviewed. Periarteritis nodosa is said to be seen seldom by dermatologists. The association of dermatitis herpetiformis or very similar skin lesions with a number of systemic disorders is mentioned; these include carcinoma of the liver, cirrhosis, liver disease due to cincophen, retroperitoneal lymphosarcoma, carcinoma of the uterus and pregnancy.

Rosenbaum


This designation is employed by the author for the association of acute ischemia or even gangrene with thrombphlebitis of an extremity. Pseudoembolic phlebitis, blue phlebitis and gangrenous thrombphlebitis are other terms which have been applied. This particular clinical picture is likely to follow abrupt obstruction of the major venous drainage of a limb. It may follow venous ligation. Heparin, heating of the unaffected extremity and heavy sedation are recommended. Paravertebral sympathetic block may be risky in the presence of heparinization.

McKusick


Two cases of serum sickness following administration of tetanus antitoxin are described. One case is reported in considerable detail. Evidence for pericarditis included transient inversion of the T waves in leads aV1, aVr, V5, V6, and V4, as well as pericardial friction rub and considerable pain in the chest. A favorable response to cortisone was observed and all abnormalities cleared promptly. It is felt possible that pericarditis or myocarditis or both are more common in this disorder than is recognized clinically.

Rosenbaum