ABSTRACTS

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BLOOD COAGULATION AND THROMBOEMBOLISM


The author discusses the pathophysiologic derangements induced by massive pulmonary embolism as a background for therapeutic procedures. Among the noxious factors, the most important are acute pulmonary and right ventricular hypertension, interference with capillary-alveolar gas exchange, reduction of pulmonary venous and left ventricular filling, peripheral vascular collapse and visceral hypoxia. Among secondary factors, the local liberation of serotonin is considered as possibly leading to further vasomotor reactions. Therapeutically, the use of vasopressor amines, particularly norepinephrine and Aramin is recommended. Anticoagulants are advised for prophylaxis. Surgical procedures such as embolectomy and vein ligation have only limited value but are occasionally life saving.

PICK


A 39-year-old woman showed intense cyanosis, fever and rapidly progressive right ventricular failure; the electrocardiogram showed atrial fibrillation and tall R waves without S waves in V5–6. No diastolic murmur could be heard. Autopsy disclosed a very tight mitral stenosis and an organized thrombus of the entire left atrial appendage and part of the atrium, 9 by 6 cm. in dimensions. The thrombus was transfixed by 2 canals continuing the course of the left pulmonary veins, and 2 indentations continuing the course of the right pulmonary veins; it did not adhere to the atrial wall.

LEPESCHKIN


The changes in the Russell-viper-venom accelerated clotting time (Stypven time) of platelet-poor plasma and the plasma fatty acid, cholesterol, and phospholipid were measured after meals containing various lipids. Four fats shortened the postprandial Stypven time. The degree of unsaturation was not significant in affecting clotting but the length of the fatty acid chain seemed important. Ingested phospholipid was more effective than triglyceride but its effectiveness bore no relation to its activity in an in vitro test system of plasma and venom.

KURLAND


An in vitro test utilizing coagulation and recalcification times was employed to study the resistance to varying amounts of tissue thromboplastin of human blood rendered hypocoagulable, to so-called “therapeutic” levels, by heparin and bishydroxycoumarin. Blood heparinized in vivo to a coagulation time of 30 minutes is more resistant to tissue thromboplastin in a test tube than is blood
Dicumarolized to a prothrombin activity of 10 per cent to 19.9 per cent. Blood heparinized in vitro to a coagulation time of 30 minutes and its resistance to thromboplastin studied by coagulation time was the same as blood Dicumarolized to a prothrombin activity of 10 per cent to 19.9 per cent and studied by plasma recalcification time. If both bloods were studied by the plasma recalcification time, the resistance to thromboplastin was greater in the heparinized blood than in the Dicumarolized blood. In the opinion of the authors, the data suggest that blood with a 30-minute coagulation under heparin is somewhat more effective in resisting thrombosis than is blood Dicumarolized to a level between 10 per cent and 19.9 per cent prothrombin activity. By both coagulation times and plasma recalcification times, heparinized blood with a coagulation time of 30 minutes was found to be markedly superior in anticoagulant effect to Dicumarolized blood with prothrombin activity of 20 per cent to 30 per cent. The amounts of thromboplastin used were arbitrarily chosen and just how closely they approximate the ordinary stimulus to thrombosis in vivo is unknown. Further, both heparinized and Dicumarolized blood remain less coagulable than normal blood even at the highest amount of thromboplastin used. Therefore, despite the evidence suggesting that heparin is a better anticoagulant than bishydroxycoumarin, the authors do not advocate that heparin replace Dicumarol where long-term anticoagulants are needed. They would employ heparin in situations where the choice between heparin and bishydroxycoumarin from the point of view of convenience and duration of anticoagulant administration is equal.

BROTHERS

CONGENITAL ANOMALIES


The authors describe the heart of the first case of Ebstein's disease diagnosed during life. The pathognomonic angiocardiographic feature of Ebstein's disease is the presence of a nonopacified narrow band separating the right atrium and auricularized right ventricle from a diminutive, functioning right ventricle. This narrow band is due to a muscular ridge at the caudal line of fusion of the 3 leaflets of the anomalous tricuspid valve. The enlarged right atrium probably contributes little to the forward movement of blood. Hypoplasia of the right ventricular wall proximal to the anomalous posterior leaflet is an integral part of Ebstein's disease. The major factor producing forward propulsion of blood may be the septal wall, as suggested by the considerable hypertrophy of the septal wall of the heart found by the authors at autopsy.

HARRIS


The authors analyze the features of patent ductus in 22 infants under the age of 2 years, seen in a 3-year period along with 52 other cases among older children. Nearly all the infants had a history of poor weight gain since birth, and many also had dyspnea or frequent respiratory infections. A continuous murmur was present in 9 of the 22 patients, whereas 12 had only a systolic murmur along the left sternal border. The latter group presented a problem in differential diagnosis, chiefly with respect to interventricular septal defect. In these infants retrograde aortography is preferred to cardiac catheterization because of the greater ease of performing the procedure in such small subjects. The authors believe that the diagnosis of patent ductus should be considered in infants with a systolic murmur and a history of poor weight gain. If there is evidence of cardiac enlargement and increased pulmonary vascularity retrograde aortography is indicated.

ENSELBERG


A case of surgically treated tetralogy of Fallot with pregnancy, delivery, and uneventful postpartum course is presented. A review of the literature reveals that 3 similar cases have previously been reported. It is suggested that patients with surgically treated tetralogy of Fallot and possibly other cyanotic heart diseases may have normal pregnancy and successful delivery. The essential problems of management are briefly discussed.

BERNSTEIN


A male child died at 13 weeks and at autopsy showed a bicuspid heart. Each lung possessed 3 lobes. There was no spleen. The pancreas was a small round mass of tissue and the stomach a mere widening of the gut buried in the liver. In life counting white cells the total number of nucleated cells was 19,000 of which 40 per cent were normoblasts. The combination of unusual blood picture with cyanotic heart disease might have
suggested the correct diagnosis. According to the review of the literature in the annotation, symmetrical lobation of the liver and lungs has been frequent. The commonest single cardiac defect seems to be ostium atrioventriculare communis. Putschar and Manion are quoted as pointing out that the spleen is the only strictly unilateral organ in the body. The disturbance in embryonic development seems to be one of development of "laterality." Gasser and Willi are reported as finding Heinz bodies in 10 per cent or more of red cells in splenic agenesis—a potentially useful diagnostic clue. There is insufficient evidence to come to any conclusion about susceptibility to infection in these patients.

McKusick


A 38-year-old man showed intense cyanosis but no murmurs and only slight lowering of the T wave in lead I and wide P waves in the electrocardiogram. Cardiac catheterization showed very low oxygen saturation and a small effective heart output. The catheter penetrated through the right pulmonary artery into the right atrium, and a communication between these could also be demonstrated by means of angiocardiography. Operative ligation of the communication proved impossible, and the patient died a few hours after the operation. At autopsy the communication was found to be three fingers wide.

Lefeschkin


This report is based on experience with 36 patients operated upon for repair of ventricular septal defects. Extracorporeal circulation, using a mechanical pump-oxygenator with a Gibbon-type stationary vertical screen oxygenator, permitted the right ventricle to be opened widely. Since this report was prepared the authors have adopted the routine use of potassium-induced cardioplegic solution in performing these repairs. The types of defects encountered in these 36 patients can be divided into 2 main groups; those related to the outflow tracts and those related to the inflow tracts. The most common site was the right ventricular outflow tract inferior to the crista supraventricularis. These defects may involve the septal tissue just below the aortic annulus. Defects superior to the crista supraventricularis are closely related to the pulmonary valve. In the inflow tract defects are located entirely in the muscular wall in 2 locations; beneath the septal leaflet of the tricuspid valve or in the muscular septum near the apex. Trauma by forceps or needle point, to the remnant of membranous septum at the postero-inferior edge of the defect may result in ventricular standstill or ativoventricular block, indicating that conduction tissue lies in this area. The technic of closure is described, using noncompressed polyvinyl-formal sponge. The over-all incidence of complete repair was 20 out of 36 patients. In the last 25 patients, by the technic mentioned above, complete repair was achieved in 18 patients.

Enséberg

CORONARY ARTERY DISEASE


The observation of Manning, McEachern, and Hall that the mortality following coronary artery ligation was much greater in unanesthetized than in anesthetized dogs, led to the proposal that in the former, the area of myocardium deprived of blood induced a reflex constriction of the coronary bed. The experiments reported herein were performed on anesthetized dogs with continuous measurements of flow in the right coronary, left anterior descending, and left circumflex arteries. When 1 of the arteries was occluded for 1 to 2 minutes, there was no evidence for a reflex constriction of the other two arteries. These experiments do not rule out completely the possibility of reflex constriction because the vessels might have been denervated by the cannulation.

Aviado


The results of a systematic investigation of 250 consecutive patients with definite coronary artery disease are reported. Using leads 2, V5-V6 or V3-V6 in the Master "two-step exercise test," the authors believe an RS-T depression of more than 0.5 mm. in any lead is the criterion of a positive test. Minor T-wave changes alone are of no or little significance, although T-wave inversion is probably abnormal. Transient arrhythmias likewise have little significance. In 142 of the 250 patients the single test demonstrated electrocardiographic evidence of interference with the coronary circulation. In 100 of the 108 remaining patients the single test was negative, but the double test was abnormal. In only 8 instances (3.2 per cent) were both tests normal. A negative double Master "two-
"step exercise test" is valuable in diagnosis, since it practically excludes the presence of a disturbed coronary circulation. This test is important in patients whose chest pain is not typically anginal in character and whose resting electrocardiogram is normal or borderline. The Master "two-step exercise test" is only a diagnostic aid and should not be considered the sole diagnostic criterion of coronary disease.

HARRIS


In 40 cats the right and sometimes the left coronary artery was clamped temporarily while the action potentials of afferent vagal fibers were registered continuously with the electrocardiogram and the arterial and venous pressures. Three-quarters of the animals showed, 5 to 10 seconds after clamping, a fall in arterial pressure and a less pronounced fall in the heart rate; the remaining animals showed tachycardia and transient hypotension. All showed an increase in atrial pressure accompanied by a corresponding increase in the frequency of action potentials from atrial receptors. This reaction was diminished and delayed by respiration of pure oxygen, but was not influenced by bilateral vagotomy. It was therefore held probable that the hypotension and bradycardia accompanying clinical myocardial infarction was not of reflex origin but was caused by myocardial failure.

LEPESCHKIN


The Beck operation for coronary artery disease is a safe and effective method of providing a more adequate distribution of arterial blood supply to the heart. Operation is indicated in patients with a positive diagnosis of coronary artery disease unless there is a specific contraindication. The operation should not be considered as merely a salvage procedure. Best results are obtained by operating early in the course of the disease. The following preoperative classification has been found useful: Group 1. Patients with mild symptoms, usually under 50 years of age who may have a small infarct or mild angina. Group 2. Patients with moderate to severe angina who have one or more infarcts and a normal heart size. Group 3. Patients with extensive muscle damage who may have large hearts and congestive heart failure. Patients with status anginosus. Absolute contraindications include acute myocardial infarction and impending infarction. Severe hypertension, or any other associated disease which, per se, limits life expectancy contraindicates operation. Cardiac enlargement and congestive failure constitute relative contraindications. Pre-treatment with antithyroid drugs appeared to decrease significantly the operative risk in the patient with status anginosus or severe anxiety. Prior to surgery all patients were completely digitalized. Following surgery all patients showed a significant rise in serum transaminase, the peak being reached in 48 hours postoperatively. The great majority of patients undergoing operation were in Group 2. In the last 100 patients there has been no operative mortality. The over-all mortality for 225 operated since January 1951 is less than 5 per cent. Long-term follow-up (6 months to 5 years) reveals a significant increase in longevity for operated patients. Furthermore, 90 per cent were back at full-time or part-time work with little or no limitations.

MAXWELL


Ventricular aneurysm is caused in most instances by myocardial infarction, and it is of serious import. In a clinicopathologic study, 70 per cent of such patients developed heart failure; and 21 per cent had fatal thromboembolism, the latter apparently arising in the aneurysm.

Ventricular aneurysm excision was undertaken by the authors to do away with a thrombogenic focus and also in an effort to improve ventricular function. The operative technic and its experimental application in dogs are described. Seven of 8 patients survived the operation; the one fatality was attributed to embolism from the dislodgment of an intraneurosual thrombus during surgical manipulation. Follow-up data in the other patients are not given. It is concluded that the dismal outlook in ventricular aneurysm medically managed strongly suggests a more aggressive (surgical) treatment of the lesion.

ROGERS


The authors report a statistical analysis of 396 proved cases of first and recurrent myocardial infarction among the members of the Sick Fund of Jewish Labour in Israel who were hospitalized at the Beilinson Hospital during the period of January 1, 1949, to June 30, 1953. Since the cases followed a Poisson distribution, the results of
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this study suggest that the incidence of myocardial infarction is of random nature and not influenced by any weather condition.

SAGALL


The major clinical features in a series of 231 women with proved myocardial infarctions are described. The group as a whole showed an increased frequency of diastolic hypertension. (51.5 per cent), diabetes mellitus (52.6 per cent), an elevated serum cholesterol (44.3 per cent). A positive family history of diabetes, hypertension, or coronary artery disease was present in more than two-thirds of the patients. A strikingly poorer prognosis was noted among the women with diabetes than among the nondiabetic women. Of 156 patients about whom information was available, 13.5 per cent had neither diabetes nor hypertension. Of the 23 women in this group under the age of 50 years, 26.1 per cent had neither disease. Only 2 women, both under 50 years at the time of their first myocardial infarct, did not have diabetes, hypertension, hypercholesteremia, or a positive family history. Coronary artery disease must be seriously considered in women presenting a suggestive clinical picture, particularly in the younger age group, despite the absence of hypertension or diabetes mellitus. Electrocardiographically, the infarcts were localized to the anterior portion in 49 per cent, to the posterior portion in 44.3 per cent and the remainder were septal, high lateral, or anterior and posterior in combination. No conclusions could be made relative to the influence of oophorectomy relative to the occurrence of myocardial infarction. The data in this series indicated that diabetes mellitus was a particularly important factor predisposing to the occurrence of myocardial infarction in women. Hypertension and elevated blood cholesterol values have played apparently a less significant role. In the opinion of the authors, the lipid alterations and the hypertensive tendency which are noted in diabetes cannot completely explain the relationship between diabetes and myocardial infarction.

WENDKOS


The activity of glutamic-oxalacetic transaminase (SGO-T) was studied in 51 persons with body injury to establishing the value of such determinations as a diagnostic test for myocardial infarction in cases of trauma with symptoms which suggest the presence of cardiac injury as well. The patients studied were victims of a variety of accidents admitted to the Harbor General Hospital in California. No elevation of serum-glutamic-oxalacetic transaminase activity was found in 27.5 per cent, whereas this enzyme was elevated in the blood in 72.5 per cent. In 17.7 the elevation was associated with evidence of cardiac trauma. In 55 per cent there was an elevation of this enzyme without evidence of cardiac trauma. In this last group the maximum value for transaminase activity was between 43 and 515 units. In the majority of cases the elevation was explainable by the damage to the skeletal muscle.
In the majority of the cases (70.8 per cent) the transaminase activity rose rapidly and attained a maximum level between the first and the second days after the injury and returned subsequently to normal values in the course of variable periods of time. In 29.2 per cent the transaminase activity rose less rapidly and attained its maximum level between 3 and 6 days. On the basis of these observations it appears that an elevation of activity of transaminase is to be expected in an individual who has suffered moderate or severe body injury. It is concluded that SGO-T activity cannot be used as a specific test of cardiac injury in accident victims, since over 50 per cent of the injured patients showed elevated SGO-T activity unrelated to demonstrable cardiac injury.

**WENDKOS**

**ENDOCARDITIS, MYOCARDITIS, AND PERICARDITIS**


This article reports 2 cases of acute staphylococcal pericarditis in infants, and reviews a series of 27 cases of nontuberculous pericarditis in patients under 20 years of age seen at the Charity Hospital in New Orleans. The organism causing the pericarditis varied, but the commonest was *Staphylococcus aureus*, accounting for 15 of the 27 cases. Usually the pericarditis was part of a generalized infection; septicemia was present in 14 of the children. Staphylococcal pneumonia was the commonest associated lesion, and osteomyelitis second. Diagnosis was difficult, for symptoms are not specific in childhood and reliance must be on physical signs. These were usually cardiac enlargement, a friction rub, or electrocardiographic changes. In general, the courses of these patients fell into 2 patterns. One group showed an acute fulminating disease, primarily bacteremia with multiple systemic abscesses leading rapidly to death. The other group appeared to have some resistance and infection was confined to 1 area, with either pericarditis or osteomyelitis as the main manifestation. The mortality rate was extremely high. Survivors received penicillin or broad spectrum antibiotics, combined with pericardial drainage as definitive therapy. Because of the relative resistance of the organisms to penicillin, the author believes that a broad spectrum antibiotic such as chloramphenicol should be used along with the penicillin until reports on the sensitivity of the organism have been obtained from the laboratory. The author pleads for earlier diagnosis by means of a higher index of suspicion.

**HARVEY**


A new case is presented of chronic constrictive pericarditis resulting from deposition of large masses of cholesterol crystals demonstrated at autopsy. The clinical features were unusual in that the process developed within 4 months, repeated pericardial taps invariably were followed by shock and injection of streptomycin into the pericardial sac lead to hemorrhagic exudation. The roentgenogram showed a localized left-sided enlargement of the heart shadow resembling a cardiac tumor rather than a pericardial process, and the electrocardiogram failed to show evidence of myocardial involvement. As in previously reported cases, the actual cause for the accumulation of cholesterol masses in this particular location remained obscure.

**PICK**


On the basis of 1 personal observation and 25 cases collected from the literature, the authors studied the role of trauma in the etiology of constrictive pericarditis. Close similarity was found in the reaction of pleural and pericardial serous membranes with regard to the response to various types of injury, the development of secondary infection and the ultimate outcome in a constrictive process. The importance of prophylactic treatment consisting in prompt evacuation of blood collecting in the pericardial cavity is emphasized. Once pericardial constriction has developed, the therapy is pericardectomy performed as completely as possible.

**PICK**

**ELECTROCARDIOGRAPHY, VECTORCARDIOGRAPHY, BALLISTOCARDIOGRAPHY, AND OTHER GRAPHIC TECHNICS**


The authors report the electrocardiographic changes, primarily in lead II, which occurred in 29 patients while under hypothermia for surgery. All showed progressive bradycardia with fall in temperature. Rare ventricular and frequent atrial premature beats with wandering pacemaker were seen. Subsequent atrial fibrillation was common. Patients with atrial fibrillation had a lower mortality than those who remained in sinus rhythm.
VENTRICULAR FIBRILLATION OCCURRED IN 21 FREQUENTLY WITHOUT WARNING AND NEARLY ALWAYS IN ASSOCIATION WITH MANIPULATION OF THE HEART OR GREAT VESSELS. THE P-R INTERVAL WAS PROLONGED BUT ONLY SLIGHTLY. PROLONGATION OF THE QRS INTERVAL WAS MORE CONSISTENT AND ABOVE NORMAL IN 13. PROLONGATION OF THE S-T INTERVAL WAS MOST CONSTANT AND MAY BE 30 TO 70 PER CENT ABOVE NORMAL. THE MOST STRIKING FEATURE WAS THE APPEARANCE OF AN INJURY CURRENTLY PRESENT IN 6 AND FOLLOWED BY ATRIAL FIBRILLATION IN 5.

SOLOFF


THE AUTHORS DESCRIBE 4 PATIENTS IN WHOM THE T WAVES, PRIMARILY IN THE RIGHT PRECORDIAL LEADS, TURNED NEGATIVE WITHOUT CARDIAC SYMPTOMS DURING OR FOLLOWING RADIOThERAPY TO THE THORAX AND RETURNED TO NORMAL IN 3 WITHIN WEEKS OF THE CONCLUSION OF RADIOTHERAPY. THE FOURTH DIED WHILE THE T WAVES WERE STILL ABNORMAL. NO CARDIAC CAUSE OF DEATH WAS FOUND. THE AUTHORS BELIEVE THAT THE T-WAVE CHANGES ARE DUE TO RADIATION EFFECTS ON THE HEART.

SOLOFF


THE RESULTS OF ELECTROCARDIOGRAPHIC AND SPATIAL VECTORCARDIOGRAPHIC STUDIES FOLLOWING ACUTE LOCALIZED MYOCARDIAL DESTRUCTION IN 27 DOGS ARE REPORTED. THE MYOCARDIAL DAMAGE WAS PRODUCED IN SOME OF THE DOGS BY BURNING WITH A SOLDERING IRON, ACETYLENE TORCH, OR ELECTROCAUTERY; IN OTHERS, BY LIGATION OF ONE OR MORE BRANCHES OF THE LEFT CORONARY ARTERY; AND IN THE REMAINING GROUP INTO THE PERICARDIAL CAVITY. THE EFFECT ON THE QRS ELECTROCARDIOGRAM OF SUPERFICIAL LOCALIZED MYOCARDIAL DESTRUCTION WAS EITHER NOT DETECTABLE OR, MORE OFTEN, LED TO THE APPEARANCE OF A SMALL DEFORMITY IN THE DIRECTION PREDICTED BY PRESENT-DAY ELECTROCARDIOGRAPHIC CONCEPTS. SIMILARLY, SHIFTS IN S-T VECTORS AND ORIENTATION OF T VECTORS, WHEN RECORDED, WERE IN THE PREDICTED DIRECTION.

SAGALL


SAGALL


SIX CASES OF PSEUDOVENTRICULAR RHYTHMS (2 OF TACHYCARDIA AND 4 OF FIBRILLATION) IN PATIENTS WITH THE SO-CALLED WOLFF-PARKINSON-WHITE SYNDROME OF SHORT P-R INTERVALS AND SLURRED-UP R DELTA WAVES, SLIGHTLY BROAD QRS COMPLEXES IN THE STANDARD AND IN THE PRECORDIAL LEADS ARE REPORTED. THE EXTREMELY RAPID HEART ACTION, REGULAR OR IRREGULAR, OF OVER 200 PER MINUTE IN YOUNG PATIENTS IN WHOM PULSES WERE VISIBLE AND AUDIBLE AND IN WHOM THE BLOOD PRESSURE WAS MAINTAINED SUGGESTED PAROXYSMAL ATRIAL TACHYCARDIA OR FIBRILLATION WITH ACCELERATED ATRIOVENTRICULAR CONDUCTION AS THE BASIC RHYTHM RATHER THAN A TRUE VENTRICULAR SOURCE. THE DIAGNOSIS OF PSEUDOVENTRICULAR TACHYCARDIA WAS INDICATED IN THE ELECTROCARDIOGRAM BY THE PRESENCE OF A HIGH GRADE REGULAR TACHYCARDIA WITH FALSE BUNDLE-BRANCH COMPLEXES WITH REGULARLY PLACED P WAVES ON EACH BROAD QRS, AND OCCASIONALLY A FEW NARROW COMPLEXES. THE DIAGNOSTIC CRITERIA OF PSEUDOVENTRICULAR FIBRILLATION DUE TO ATRIAL FIBRILLATION WITH FALSE BUNDLE-BRANCH BLOCK INCLUDE PAROXYSMS OF AN ABSOLUTELY IRREGULAR RHYTHM WITH NO P WAVES AND OCCASIONAL SHORT RUNS OF NARROW QRS INTERVALS AND VERY HIGH VENTRICULAR RATES OF OVER 200. THE PROGNOSIS IN THESE PATIENTS IS GOOD BUT IN A RARE CASE THE PATIENT HAS DIED IN AN ATTACK. THE DRUG OF CHOICE APPEARS TO BE PROCAINE AMIDE IN 0.25-TO 1.0-GM. DOSES INTRAVENOUSLY, UP TO 2 GM. IN 24 HOURS. IT SHOULD BE GIVEN SLOWLY WITH CONSTANT ELECTROCARDIOGRAPHIC MONITORING AND FREQUENT BLOOD PRESSURE DETERMINATIONS AND STOPPED AFTER CONVERSION OF THE DISORDER OR WHEN TOXIC BROADENING OF THE QRS INTERVALS APPEAR OR IF THE BLOOD PRESSURE DROPS SIGNIFICANTLY.
server is considered to be positive in sign, he argues that in vectorecardiography the frontal plane should be regarded as from the "front"; the sagittal plane should be regarded as from the "left"; the horizontal (coronal or transverse) plane should be regarded as from "below"; and horizontal plane vectorecardiograms should be depicted with their anterior aspect shown at the top of the diagram, viewed as from below.

Sagall


The authors demonstrate in this study in normal human beings that the recording of the arterial sounds commonly utilized in the measurement of the blood pressure on a phonocardiogram simultaneously with an electrocardiogram allows for the construction of a calibrated ascending limb of the arterial pulse wave as well as providing a measure of the time of arrival of the pulse wave at the artery and of the relative rates of transmission of the wave. These data, the obtaining of which previously required intra-arterial puncture, have value in diagnosis and in the assay of procedures and drugs affecting hemodynamic states. By intra-arterial puncture technics, the Q-K time (the interval from the onset of the QRS complex until the registration of the onset of the sound at the brachial artery) was shown to be related to the arrival time of the pulse wave at the artery under the cuff. The Q-K time also was found to be unaffected by changes in the blood flow through the extremity compressed by the cuff, but to be shortened and the slope of the upstroke of the pulse wave to be made more steep by generalized exertion, epinephrine, and norepinephrine. Analysis suggested that these latter changes might be manifestations of an increase in pulse-wave velocity.

Sagall


In 24 patients with uncomplicated atrial septal defects, 6 persistent ostium primum and 18 ostium secundum, the electrocardiographic findings were correlated with the location and size of the defect, the degree of pulmonic hypertension, and the ratio of pulmonic to systemic blood flow. Left axis deviation and signs of left ventricular hypertrophy in 3 patients indicated a persistent ostium primum with cleft mitral valve and mitral insufficiency. In 18 of the remaining 21 patients without left ventricular enlargement, right axis deviation and right ventricular hypertrophy appeared. In 15 patients (63 per cent) there was an RSR' pattern in lead 1 but in only 2 was QRS prolonged beyond 0.12 second. The increased incidence of QRS duration in the "high normal" range in patients with RSR'-V, and right ventricular hypertrophy suggests that a conduction defect may play a part in its pathogenesis. No useful correlation was found between electrocardiograms and pressure-flow measurements. Prolongation of the P-R interval was present in 4 of 6 patients with persistent ostium primum but in only 2 of 18 with persistent ostium secundum.

Kurland


The evaluation of cardiac murmurs in childhood is difficult because there is frequent occurrence of innocent murmurs. A study is presented to define some of the physical characteristics of major groups of organic and innocent cardiac murmurs in children. The 2 major innocent murmurs are the "twang-string murmur" and the "pulmonic systolic murmur." Spectrophonocardiographs were made of children with organic valvular disease and with innocent murmurs. The frequencies of vibration of these murmurs were determined. The innocent murmurs of childhood had frequencies the upper limits of which were 370 cycles per second. The groups of organic murmurs had maximum frequencies ranging from 800 to 1300 cycles per second.

Harvey


The authors present a study of the electrocardiograms and vectoccardiograms of 30 well-authenticated cases of interatrial septal defect. In 18 patients the right-sided precordial leads showed an rSR' configuration. In 5 this pattern was due to complete right bundle-brachect block; in 9 to incomplete right bundle-brachect block; in 3 to incomplete right bundle-brachect block with right ventricular hypertrophy; and in 1 was associated with a QRS duration of less than 0.08 sec-
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Sagall


The authors describe an electrocardiographic abnormality, recorded in the recumbent position, in 13 persons with healthy hearts. This abnormality consisted of depression of ST, and to a lesser extent of ST,, ST, and ST; not influenced by posture or exercise. R was taller than R, which was taller than R. All of these persons had a characteristic cardiac silhouette. In the anterior view, on deep inspiration, the left costophrenic junction moved to the left and the inferior vena cava was exposed on the right as the heart and the diaphragm parted, which was even better seen in the right oblique position. In the left oblique view, the heart appeared suspended by the great vessels above and anchored below by the inferior vena cava. This electrocardiographic and radiologic combination is called the syndrome of the suspended heart. It is important that this electrocardiographic component should not be regarded as a sign of heart disease even if the patient complains of chest pain.

Soloff


This study was based on 16 patients with unilateral right ventricular hypertrophy substantiated by pathologic examination. The ages ranged from 7 weeks to 65 years, and etiologies were congenital, pulmonary and rheumatic heart disease. Vectorcardiograms based on the cube system were characteristic of right ventricular hypertrophy in every case. The QRS loops were mainly directed anteriorly, more to the right than normal, and either superiorly or inferiorly. In the horizontal plane the QRS loops were inscribed in the clockwise direction (types I and II), figure-of-eight (type III), or counterclockwise (type IV). In this series of cases the electrocardiograms revealed right ventricular hypertrophy in 14. The authors believe that this study emphasizes the validity of the cube system of spatial vectorcardiography in the diagnosis of right ventricular hypertrophy. It also demonstrates the usefulness of the electrocardiographic criteria employed.

Hypertension


This derivative of theophylline elicited a pronounced depressor effect in dogs without decreasing renal blood flow. Cardiac output was increased, so that the cause for the hypotension was entirely systemic vasodilatation. This compound is being tried clinically for its hypotensive effect, particularly because of its good oral absorption.

Aviado


The authors describe the clinical findings and those at necropsy of 11 patients with solitary pulmonary hypertension. All were females and all but 1 was under 40 years at death. The first and dominant symptom was dyspnea, which progressed rapidly. Six had associated angina and 5 syncope. Cyanosis was a late finding and was due to a low cardiac output and polythemia possibly originating from bronchopulmonary shunts. Clubbing was absent. All had sinus rhythm, right ventricular hypertrophy, and an accentuated pulmonic second sound. A triple rhythm was audible in 6 and at times a systolic apical murmur was present. Catheterization revealed a high pulmonary artery and a normal pulmonary capillary pressure and a low cardiac output. Radiologic examination revealed enlargement of the right heart, dilatation of the pulmonary artery, and oligemic lungs. The average span of life after the onset of symptoms was 21 1/2 years. Necropsy confirmed the presence of cardiac hypertrophy due predominantly to the right heart. The pulmonary artery trunk and its main branches were dilated. Pul-
monary thrombosis may be present. The pulmonary arteriogram clearly portrayed the seat of narrowing or occlusion and the peripheral branches had a pruned appearance. Bronchopulmonary communications were seen. The most significant histologic finding was in the muscular arteries and arterioles, where an obstructive intimal proliferative reaction was present. At these sites the medial coat was hypoplastic or aplastic. At times this type of hypoplasia was present without intimal hyperplasia suggesting an atherosclerosis of the muscular arteries.

SOLOFF


Among 28 subjects with and without hypertension, the group with high blood pressure had significantly greater sodium intake (as measured by urinary outputs) than the group of nonhypertensives. This observed difference is believed to be unrelated to variations in sodium sweat, since both groups had sedentary occupations. The correlation between high-salt intake and hypertension does not necessarily establish the dependency of one on the other but such a cause-effect relationship is heavily implicated.

AVIADO


The blood flow in both hands of 39 normotensive and 25 hypertensive patients was measured separately after the injection into 1 brachial artery of minute amounts of epinephrine insufficient to cause either symptoms or perceptible effects on the heart or blood pressure. The same concentration of epinephrine tended to constriict the hypertensive patients more. The degree of sensitivity was generally related to the severity of the hypertensive process. The reaction of some benign hypertensive patients fell within the normal range and the greatest sensitivity to epinephrine was found in those with malignant hypertension.

SOLOFF


This study was concerned with the measurement of total exchangeable sodium in normotensive and hypertensive subjects with radioactive sodium-24 and the determination of extracellular space in the same subjects by the inulin method. Subjects with cardiac or renal disease or other disorders capable of altering water and sodium distribution were excluded. The mean plasma sodium concentration and ratio between inulin space and sodium space were essentially the same in normotensive men and women. There was no clear evidence of enlargement of the inulin space nor an increase of total exchangeable sodium in patients with essential hypertension. The author points out that a major difficulty in studies of water and sodium metabolism is the lack of a satisfactory reference point for the expression of body compartments. The use of the fat-free body as a reference point would solve this problem but there is no satisfactory method for its measurement at the present time. Measurement of the extracellular space also presents difficulties, since the inulin space appears to be smaller than the true extracellular space and it is not certain that the percentage of the true space measured by the inulin method is the same under normal and pathologic conditions. The author points out that a more dynamic investigation of water and sodium metabolism in human essential hypertension, such as study of comparative responses of normal hypertensive subjects to salt restriction may be a more profitable line of investigation.

ROSENBAUM


A detailed case report is presented of a 6-year-old boy with symptoms of a pheochromocytoma cured by surgical removal of the tumor. A maternal aunt and cousin (mother and son), had had pheochromocytomas with paroxysmal hypertension. In another family pheochromocytomas were also discovered in 2 female siblings aged 8 and 6 respectively. Subsequent to successful surgical removal of the tumors in the children, the identical diagnosis was made in the mother in whom pheochromocytomas were also demonstrated at the time of surgery. Pheochromocytoma in childhood is discussed and attention drawn to the familial occurrence of the disease. It is pointed out that sustained hypertension is the rule in childhood with pheochromocytomas. Further, the organs of Zuckerkandl are commonly the site of tumors in childhood. The chief diagnostic point, the authors believe, is the detection of increased catechol amines either in the blood or in the urine. The postoperative management of cases is reviewed.

HARVEY
ABSTRACTS

METABOLIC EFFECTS ON CIRCULATION


Adrenal vein blood from dogs with right heart failure and from others with constriction of the thoracic inferior vena cava was compared with that of normal controls. Aldosterone activity was increased in both test objects in adrenal venous blood but not in systemic blood. It is concluded that the increased aldosterone in adrenal vein blood is secreted aldosterone.

OPPENHEIMER


Because of the complexity of methods presently available for the measurement of urinary catechol amines, this study was undertaken with the object of evolving a relatively simple clinical determination. A fluorimetric method is described for estimation of the total combined epinephrine and norepinephrine in urine based on the ferriyanide-oxidation method of von Euler. Comparison of results obtained by bioassay with those of fluorimetry showed no significant difference.

MAXWELL


An experimental study using 21 adult mongrel dogs, 8 serving as controls, in whom homogeneous myocardial infarcts were produced in the posterior papillary muscle is presented. The changes that occur, during the first 24 hours after ligation, in the activity and concentration of 3 intracellular enzymes are described. The enzymes studied were glutamic oxaloacetic transaminase (GOT), lactic dehydrogenase (LDH), and succinic dehydrogenase (SDH). After an initial period of little or no decrease in enzyme activity, lasting 40 to 70 minutes with GOT, 2 hours with LDH and 4 to 5 hours with SDH, the tissue levels of all 3 enzymes rapidly decreased until levels of 30 to 50 per cent of normal were reached 12 to 15 hours after ligation. The curve of tissue-enzyme loss is compared to that of an earlier study dealing with potassium loss, and explanations for the various observed time lags are offered.

MAXWELL

PHARMACOLOGY


Earlier attempts to demonstrate inhibition of transport of tetraethylammonium (TEA) ion by basic substances were not successful in the intact dog because in the dosages used these bases produced severe hemodynamic changes that made interpretation of results impossible. Present attempts using dog renal slices showed specific depression of transport of TEA ion by a number of organic bases which are also actively transported by the kidney. The additional evidence presented suggests that this inhibition of TEA transport is of the competitive type.

AVIADO


The baroreceptors in the carotid sinuses and aortic arch are responsible for the major component of the bradycardic responses to intravenous injection of this sympathomimetic drug in anesthetized dogs. When these receptors are selectively denervated, the cardiac slowing is significantly reduced in intensity. The slight bradycardic response that persists after carotid-aortic denervation is not due to direct action of the drug on the medullary centers, sinoatrial node, or on the coronary and pulmonary sensory receptors (responsible for the Bezold-Jarisch reflex). The remaining alternative explanation is that stretch receptors in the cardiac wall are activated by the rise in atrial and ventricular pressures accompanying the systemic pressor action of methoxamine. The changes in heart rate brought about by this drug are therefore entirely reflex in nature.

AVIADO


The potassium ion has been implicated in the etiology of shock. Four cardiac glycosides (digitoxin, k-strophanthin, ouabain, and acetyldigoxin) were found to exert a protective effect against death from tumbler shock in mice. The time course of protection is not similar to the cardiogenic action of the glycosides, but does parallel their effect on serum potassium levels. This is interpreted to indicate that the protective effect of the glycosides is not directly on the heart but upon potassium balance. Available information in the literature indicates that cardiac glycosides govern the rate of potassium re-entry into the cell.

AVIADO

The similarities in circulatory effects between sparteine and quinidine include antiaccelerator activity (blockade of cardiac chronotropic action of epinephrine). Their effect on the skeletal muscle was investigated in terms of antagonizing the veratrine response (sustained contraction following electric stimulation of frog sartorius treated with veratridine). The antiarrhythmic activity of sparteine appears to be of the same order of potency as quinidine and of veratridine (another veratrum alkaloid). The antiaccelerator activity of sparteine, on the other hand, is only 1/260 that of veratridine. The basic mechanisms of the 2 actions are probably unrelated.

Aviado


The main signs and sources of cardiovascular strain in unmodified electroconvulsive therapy are cardiac arrhythmias (which may be vagal or extravagal in origin), paroxysmal hypertension, increased work of the heart, the Valsalva phenomenon, and hypoxia. The majority of the fatalities reported during or immediately after electroconvulsive therapy have been attributed to cardiovascular disturbances. The arrhythmias produced in treatment are the result of the electric stimulation of the brain, which sets into action a series of neurogenic or neuroendocrine responses. The vagal arrhythmias, which occur in about 30 per cent of nonatropinized patients, are characterized by marked slowing and occasional standstill of the heart and are preventable by adequate atropinization. In 40 per cent of the treatments with full atropinization there were rhythm disturbances necessarily classified as extravagal. Quinidine, chlorpromazine, and tetraethylammonium chloride have been used in attempting to prevent the extravagal arrhythmias. Tetraethylammonium chloride appears to be the most promising in this respect. It also alleviates the parasympathetic rise in arterial pressure induced by the electric stimulus.

Harris


Fifteen normal persons were subjected to hypoxia through respiration of a 6 per cent oxygen mixture for 6 minutes, before and 10 minutes after intravenous injection of 25 mg. of chlorpromazine. After chlorpromazine the lowering of the T wave and the depression of the S-T segment that appeared previously no longer appeared in 8 persons and was less pronounced in 2. In 4 patients with angina pectoris 25 mg. 3 times daily for 5 to 7 days caused disappearance of the complaints in 2 and reduction of their intensity in 2; depression of the S-T segment after exercise was prevented in 2 and reduced in 1 patient.

Lepeschkin


The left ventricle takes up Rb" 45 per cent faster than the right ventricle or atria. Inner parts of the right ventricle took up Rb" faster than the outer portion of the same ventricle. Pitressin and norepinephrine were observed to be associated with a more rapid uptake in the inner than in the outer portion of the left ventricle. Both pitressin and norepinephrine produced changes in uptake that resembled their previously established action on blood flow through the coronary arteries.

Oppenheimer


The initial myocardial clearance of plasma Rb" was observed to have a mean normal value of 70 ml. per 100 Gm. of ventricle. The standard error was 14 ml. per 100 Gm. of ventricle. Mean clearance over 30 minutes was 50 ml. with a standard error of 10 ml. The opinion was expressed that estimates of myocardial clearance were not suitable for detection of rapid uptake. However, the method does reliably reflect slow uptakes. This statement is not true of turnover rates. Pitressin decreased and norepinephrine increased the initial plasma Rb" clearance.

Oppenheimer


The direct injection of relatively small doses of digitalis glycosides (lanatoside C, Digoxin, and digitoxin) into the lateral ventricle through a previously placed cannula was found in unas
ABSTRACTS

Sortizalized cats to induce central nervous system excitation and cardiac arrhythmias. These efforts were accentuated rather than antagonized by potassium. It is postulated that these actions might be due to effects on central synaptic transmission involving acetylcholine. The authors also point out that these observations might explain some of the contradictory reports in the literature regarding the efficacy of potassium administration in the treatment of digitalis overdose.

Sagar


The authors studied heart block produced in the guinea pig by adenosine, acetylcholine, and vagal stimulation, and the changes in this response brought about by ouabain. Guinea pigs were anesthetized with urethan (1.75 Gm. per Kg.). Acetylcholine chloride (100 µg. per ml.) and adenosine (1 mg. per ml.) were injected through a left atrial cannula. The right or left vagus was stimulated with square wave impulses. Vagal stimulation, acetylcholine and adenosine doses were adjusted to produce heart block lasting for about 4 seconds. Ouabain was dissolved in 0.9 per cent sodium chloride; a dose of 80 µg. per Kg. was used. Injection of ouabain potentiated the response to adenosine and acetylcholine, but did not affect the response to vagal stimulation. If doses of 65 to 190 µg. per Kg. were given the response to adenosine, acetylcholine, and vagal stimulation changed from heart block to ectopic impulse formation, originating in the ventricles. The action of acethylcholine was confined to a direct action on the myocardium. Potentiation of acetylcholine by ouabain occurred even in the presence of hexamethonium; it is, therefore, not due to sensitization of the ganglia.

Scherf


The authors studied the effects of doses of epinephrine spanning the dosage from minimal to maximal blood pressure effects and compared the influence of various anesthetic agents upon these responses. The 4 anesthetic agents used were ether, chloralose, pentobarbital, and barbital. The dogs treated were maintained at as nearly the same depth of anesthesia as possible. Pentobarbital sodium was given in a dose of 380 mg. per Kg.; barbital sodium, 280 mg. per Kg.; chloralose, 110 mg. per Kg., and ether to maintain stage III, plane 3 anesthesia. Blood pressure was recorded from the right femoral artery with a mercury manometer and graded doses of l-epinephrine ranging from 0.1 to 10.0 mg. of l-epinephrine base per Kg. were injected.

At the highest doses studied, ether produced the greatest depression of the epinephrine response upon blood pressure. There were no significant differences between responses obtained under chloralose, barbital, and pentobarbital anesthesia, but there was a significant difference between the responses under pentobarbital and barbital anesthesia. At the intermediate dosage levels dogs under chloralose showed a greater response to epinephrine than that seen under any other anesthetic agent. The epinephrine dose responses were characteristic of the anesthetic employed.

Scherf

PHYSICAL SIGNS


Of 34,863 school children aged 5 through 16 years in Sydney, routine health examination in 1955 disclosed a cardiac murmur in 467 (1.34 per cent). Three hundred and sixty-four of these were re-examined by 2 cardiologists; and, when organic heart disease was suspected, electrocardiographic and radiologic study was done. It was found that 36 had rheumatic heart disease, 72 had congenital heart disease, 239 had innocent systolic murmurs, and 17 had normal hearts with no murmur. The incidence of organic heart disease in this survey (4.2 per 1,000) was similar to that of comparable surveys in New York (5.0 per 1,000), in San Francisco (3.6-4.4 per 1,000) and in Toronto (3.6 per 1,000). However, the proportion of congenital heart disease was greater in the present survey (67 per cent) than in the other surveys (45 to 58 per cent) that were done years earlier.

Rogers


Of 228 school children with heart murmurs investigated at the Royal Alexandra Hospital for Children, 145 were considered to have innocent systolic murmurs; and of these, 96 were regarded as being of aortic origin, although this point is speculative.

This murmur was brief and middystolic in time. It was soft or moderate in intensity and was usually best heard at the mid or lower left sternal border, but occasionally it was loudest at the apex or in the aortic area. In nearly one half
of the patients it had a squeaky or musical character that distinguished it from the innocent pulmonic murmur. Organic mitral systolic murmurs differ by being pansystolic, by being heard in the axilla and, most importantly, by failing to be audible in the aortic area. The murmur of ventricular septal defect or of aortic stenosis is ordinarily louder, longer, accompanied by a thrill and is associated with other evidence of cardiovascular disease.

**Rogers**


In certain individuals pressure on the eyeball causes the column of blood in the retinal veins, as visualized with the ophthalmoscope, to become granular and then to form into larger discrete particles that move slowly toward the disk. The phenomenon occurred in certain diseases, in pregnancy, and (in mild form) in menstruation. Its usefulness appeared to be similar to that of the elevated sedimentation rate and the 2 phenomena were often but not invariably associated. Furthermore, it was sometimes associated with elevated serum globulin. The author proposes this test for the screening of patients with few or unconvincing symptoms.

**Physiology**


In 10 normal persons and 13 patients with disturbances of the arterial circulation the blood flow through the calf, determined calorimetrically, showed in some cases a continuous increase for the duration of the infusion, while in others the increase was temporary. Still others showed oscillations of blood flow at a rate of about 1 in 2 minutes, which gradually decreased in amplitude; during these oscillations the flow reached values below the level before beginning the infusion. These differences can be best explained by a local counter-regulation of blood flow.

**Lepeschkin**


During registration of pressures with fluid transmission it is important to place the transducer at the exact level of the catheter opening. This can be determined algebraically from the linear displacement of the catheter shadow on the roentgen film caused by a given displacement of the tube. The normal intraesophageal pressure, measured in this way, oscillated from near 0 in expiration to —9 cm. of water in inspiration and the base line of the pulmonary artery pressure showed corresponding oscillations. The extramural pressure near the intracardiac catheter was determined by subtracting from the intraesophageal pressure the vertical distance between the esophageal and the cardiae catheters. The transmural pressure, determined by subtracting the extramural pressure from the absolute intracardiac pressure, was considerably higher than these absolute pressures, especially in patients with dyspnea.

**Lepeschkin**


The curves representing the ventricular and atrial systolic and diastolic volumes of the isolated, perfused frog heart in relation to the filling pressure showed a higher course when the measurements were repeated. This corresponded to a decrease of diastolic tonus and systolic force of contraction. The trend was greater in rana esculent a than in rana temporaria. If the atrioventricular valves became insufficient or if the atrioventricular border was lightly ligated, the volume curves were displaced downward at medium filling pressures, while at low pressures the diastolic curve was displaced upward, the systolic curve downward. Repetition of the measurements under these conditions showed the same or even greater increase in contractility. These changes of myocardial tonus were not apparent in the quiescent ventricle, and were attributed to mechanical stimulation of nervous receptors in the atrium and ventricle.

**Lepeschkin**


Dogs were hemorrhaged to a blood pressure of 50 mm. Hg and then transfused with an equal volume of dextran. Pyruvic and lactic acid values rose following bleeding but fell on transfusion. The injection of dextran also caused a fall in blood cholesterol, serum calcium, hemoglobin, and cell counts, which could all be due to the expected decrease in concentration when the blood volume was increased.

**Aviado**
ABSTRACTS

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