ABSTRACTS
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ATHEROSCLEROSIS

Kuwabara, T., and Cogan, D.: Experimental
Aberrant Lipogenesis. Arch. Path. 67: 34
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As with previously described experiments using oleate, sodium palmitate and sodium stearate were injected into the corneas of living rabbits and into excised corneal buttons, which were then incubated, or added to the serum in which corneal buttons or liver buttons were incubated. After a suitable incubation period sections were made and studied with appropriate stains, which indicated that palmitate and stearate resulted in the formation of a crystalline substance in the tissue cells analogous to the formation of sudanophilic globules in cells exposed to oleates. Autoradiographs with radioactive palmitate showed that palmitate anion was incorporated in the cells. When sodium stearate or palmitate were added to a medium containing oleates the cells developed both a sudanophilic and crystalline lipid, suggesting that the effects were additive and apparently independent with no evidence of inhibition of activity. Similar findings were noted in the liver experiments. While identification of the end products was not made, it appeared that they had the histochemical properties of neutral fats and phospholipids.

MAXWELL


The degree of saturation and the fatty acid distribution of dietary fat are reputedly important in affecting serum lipid levels. The reported study was designed to determine the effects of a known atherogenic diet on serum lipid levels in rats with source of fat and presence or absence of cholesterol as the only variables. In general, the serum level of cholesterol was correspondingly elevated by increasing saturation of the dietary fat and, furthermore, dietary cholesterol augments this effect. Elevation was transient for the less saturated oils but was more sustained for highly saturated oils. In general, serum phospholipid values paralleled those of cholesterol. Only by feeding fats with the lowest iodine number was there an elevation of phospholipid levels to especially high values as compared with serum cholesterol. The cholesterol phospholipid ratio showed no difference between groups fed high iodine number oils with or without dietary cholesterol. The more saturated fats showed elevation of ratios in groups with added cholesterol above groups fed no cholesterol. Highly saturated fats fed alone had a lowering effect on the cholesterol phospholipid ratio.

KRAUSE


Epinephrine is important in the physiology of fat mobilization and the plasma unesterified fatty acid is the major fat transport mechanism in-

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volved in this effect. Furthermore, it has been demonstrated that increased triglyceride lipolysis in fat depots follows epinephrine injection and that unesterified fatty acids are released. No data have been obtained on plasma lipemia clearing activity or on heparin levels. Since the heparin lipoprotein lipase system probably plays a role in removal of dietary lipemia and perhaps in tissue triglyceride lipolysis, these studies were designed to supply data on the effect of epinephrine upon plasma optical density, unesterified fatty acids, lipemia clearing, and heparin levels. The data were obtained by using 0.1-0.2 ml. of 1:1000 epinephrine intravenously in 9 dogs, and 1 ml. of 1:1000 epinephrine solution diluted with 100 ml. of saline as a continuous intravenous infusion for 20 minutes in 4 individuals. There was no change in the plasma optical density nor lipemia clearing activity. Unesterified fatty acids were definitely increased in both the dogs and human subjects. Circulating heparin was increased in 3 of the 4 individuals studied. It was concluded that elevation of unesterified fatty acids did not occur as a result of enhanced plasma triglyceride lipolysis, and that the rise in heparin was probably part of a stress reaction unrelated, in this instance, to its role in fat transport.

KRAUSE


Alterations in the pattern of aortic injury and repair produced by the administration of cortisone plus dietary cholesterol were studied in white rabbits. Six animals maintained on 15 mg. of cortisone acetate daily showed diffuse fatty liver, muscle necrosis and calcification, pulmonary infections, kidney abscesses, and swelling and degeneration of the cells in the zona fasciculata, but no changes in arteries. Another group received the same dosage of cortisone plus 1 Gm. of oral cholesterol daily and again showed neither gross nor microscopic atherosclerotic changes, although in a previous study the authors had shown that on an identical diet, but without cortisone, animals developed microscopic and gross aortic intimal lesions well before the end of the 2 month experimental period. Another group was subjected to aortic injury by needling the aorta and were in addition given cortisone. In this group very little regenerative activity and no marginal inflammatory reaction were observed in the first 10 days following trauma. In this group there was noted delayed and atypical inflammatory and reparative reaction within the injured aortic segment. The largest group of animals consisted of hypercholesteremic and cortisone-injected rabbits with traumatized aortas. Lesions in this group were also characterized by atypical changes and a striking lack of lipophages such as was found in cortisone-injected animals with trauma. This absence of lipophages is true only at the high cortisone levels which in the control group produced the various visceral lesions. When cortisone dosage was less, the animals tended to show the changes characteristic of trauma with cholesterol alone, which are not described in this article, reference being made to previous publications by the authors. It is suggested by the authors that the lack of histofeucy elements in the cortisone-injected animals might explain the observed retardation of atherogenesis.

MAXWELL

BLOOD COAGULATION AND THROMBOEMBOLISM


The treatment of 382 patients with anticoagulant drugs is described with particular attention directed to 305 who received aenecoumarin (Sintrom). Aenecoumarin was found to be a more satisfactory agent than either bishydroxy- coumarin or ethyl biscoumacetate in clinical use. Its duration of effect was substantially shorter than that of bishydroxycoumarin but still was sufficiently long for satisfactory maintenance of effect on a single daily dose. Therapeutic hypoprothrombinemia could be obtained in 2 to 3 days with aenecoumarin and usually could easily be reversed by discontinuing the drug without adding vitamin K. The dose of aenecoumarin employed in this study was considerably lower than that recommended elsewhere. The optimum loading dose was 11 to 25 mg. over a period of 18 to 60 hours, and an average of 3.6 mg. daily was found to be a satisfactory maintenance dose. Hemorrhagic and thromboembolic accidents were infrequent in this series. The Quick method for determining prothrombin time was an adequate measure of the efficacy of anticoagulant therapy. In the 287 patients with coronary artery disease the mortality appeared to be markedly reduced by anticoagulant therapy.

SAGALL

In the opinion of many authorities heparin is a more desirable anticoagulant than the oral coumarin derivatives. However, because of the disadvantage of repeated intravenous injections, heparin has not had widespread use. Attempts to use heparin in a depository form have demonstrated this method to be painful and erratic in action. When used intramuscularly in a concentrated aqueous solution, heparin causes much pain and occasionally hematomas. In this study, 34 patients received subcutaneous injections of 1 ml. of a concentrated aqueous solution of heparin (200 mg. per ml.). Therapeutic anticoagulation was obtained within 2 hours in all but 5 patients and within 4 hours in all but 1 patient. At the end of 8 hours, the anticoagulation effect began to taper off but was still at a therapeutic range in 27 patients. Only 7 patients showed satisfactory anticoagulant effect at the end of 12 hours. Eighteen patients were given 150 mg. of heparin subcutaneously every 12 hours for a 3-day period. This regimen produced a constant therapeutic anticoagulant effect. One patient developed slight hemoptysis and another exhibited ecchymoses at the injection site. This comparative lack of untoward reactions made it unnecessary to perform repeated tests of the coagulation time. Since this method of heparin administration was simple, painless, and safe, it seemed a practical way to carry out anticoagulant therapy. The procedure may be carried out by lay people or may even be self-administered under the supervision of a physician.

KRAUSE

CONGENITAL ANOMALIES


Five cases of a stenosing lesion of the aorta situated above the aortic valve have been found in the literature and this report deals with 1 additional case described in detail. The clinical picture has been one of congestive failure, chest pain, and systolic and diastolic murmurs. The average age of survival is reported as 39 years. Rheumatic endocarditis was found in 1 case. In 3 others there have been associated anomalies such as Marfan's syndrome, bicuspid aortic valve, and congenital aortic aneurysm. In the patient reported here a systolic murmur was noted from the age of 3 months, left ventricular enlargement from the age of 3 years, and an aortic diastolic murmur at 10 years. For 5 months prior to admission, there had been definite anginal distress. A systolic murmur was heard at the right second intercostal space with radiation to the neck and back. An early diastolic murmur was noted at the left sternal border in the third and fourth intercostal spaces. An attempt was made at surgical repair employing cardiac bypass. The lesion consisted of a thick circular ridge that narrowed the aorta just above the sinus of Valsalva. All 3 cusps were thickened and the right coronary cusp was adherent to the aorta covering the orifice of the right coronary artery. These thickened tissues consisted largely of increase in collagenous fibers and cellular connective tissue rich in basophilic ground-substance. The obstructing ring seemed to be continuous with the aortic media. Dilatation of the ring was followed by intractable dilatation of the left ventricle and it was believed that an increased degree of aortic insufficiency had been produced as a result of the fixation of the right aortic cusp to the aortic wall in the open position. Because of the gravity of the prognosis in these cases it is felt that surgery should be attempted. Therapy of choice at this time is manual dilatation or actual excision of the obstructing ring if possible. It may be that angiocardiography and left heart catheterization will permit a more accurate diagnosis preoperatively in those cases of aortic valve disease that present unusual variations of history and physical findings from the average case.

LEVINSO

CONGESTIVE HEART FAILURE


The mean value of serum $a$-ketoglutaric acid in normal subjects was found to be $0.211 \pm 0.093$ mg. per cent. An increase in this value was found in some patients with congestive heart failure and the rise in $a$-ketoglutaric acid levels was shown statistically to be related to the degree of failure. Serum pyruvic levels, studied in the same patients, were not found to relate to the degree of failure.

BRACHFELD

CORONARY ARTERY DISEASE


Catron, a monamine oxidase inhibitor related to amphetamine, was administered for as long as 9 months to 31 patients having severe angina
pectoris. The most satisfactory dose was 6.25 mg. given twice daily. Moderate or marked improvement was noted in 23 patients, usually beginning several days after onset of therapy. Electrocardiographic improvement was not seen, and the mechanism of Catron's action is unknown. Side effects were observed in 13 patients, including principally postural hypotension in 5 and insomnia or jitteriness in 6. These effects usually became tolerable when the dosage was lowered. Catron was deemed to be worthy of extensive trial in angina pectoris.

Rogers


This paper consists of the presentation of a case of a 41-year-old woman who died suddenly and in whom a dissecting hemorrhage in the mediae of the ramis interventricularis posterior of the right coronary artery was found. Associated with this hemorrhage were periadventitial inflammatory infiltrates suggestive of polyarteritis, but similar infiltrates were not found in any other arteries examined at autopsy.

Maxwell


The rat demonstrates spontaneous coronary lesions with age, consisting usually of lipomatous intimal lesions or diffuse fibrosis and hyperplasia. In these experiments a Moenekeberg type of medial sclerosis as well as calcification, splitting of the internal elastic membrane and pronounced degrees of proliferation and lipid accumulation in the subintimal layer were noted. Frequently thrombosis and occlusion of the arterial lumen were seen in the latter. Cardiac infarction was distinguished from cardiac focal necrosis by a wall of leukocytes surrounding the necrotic tissue. The rats used in these experiments were either younger than 2 years at the time of sacrifice or died before reaching this age, so that spontaneous changes were rarely seen. Cholesterol feeding alone induced only lipomatous changes, probably due to the ability of the rat to metabolize exogenous cholesterol efficiently. Exposure to cold only increased lipomatous changes. The incidence of coronary lesions was not affected by adrenalectomy. The addition of viosterol to the cholesterol diet produced a Moenekeberg type of medial sclerosis with death usually due to nephrocalcinosis. When thiouracil was added to the above regime, 64 per cent had severe atherosclerosis. The omission of viosterol reduced the severity of these lesions. One third of the rats in the cholesterol-fed, viosterol and thiouracil added, regime had coronary occlusion caused by severe atherosclerosis; one-half of these had myocardial infarrets. It appeared that vascular injury, as induced by viosterol, was necessary to produce significant atherosclerosis in the rat. Peculiarities of the coronary circulation or differences in the clotting mechanism were given as the explanation for the relatively low incidence of myocardial infarction in those rats having a coronary occlusion. The term "vascular injury" is an intangible quantity. It is not intended that these findings be applied directly to human pathology. The data do not support the vascularization theory of atherosclerosis, since there are no vaso vasorum in the rat.

Levinson


A 21-year-old woman died suddenly on the fourth postpartum day following the delivery of a stillborn baby at the fortieth week of gestation. The postpartum course was characterized by hypokaliemia, which was recognized on the third day postpartum. (The serum potassium taken immediately after death was 2.1 meq. per ml.) An electrocardiogram taken on the third day showed frequent ventricular ectopic beats, transient first-stage atrioventricular block and a Q-T (or Q-U) interval of 0.62 second. The S-T segment was markedly depressed and upwardly concave in all the standard and unipolar limb leads except aVF, and in the precordial leads from V3 to V6. The T wave was terminally upright in all leads in which the S-T segment was depressed. The record was considered to be consistent with hypokaliemia. At autopsy there was a recent subendocardial infarct in the left ventricle and interventricular septum. There was coronary arteriosclerosis with marked stenosis of the anterior descending branch of the left coronary artery. There was moderate arteriosclerosis of the aorta. The values of serum cholesterol had not been obtained in this patient. There was no family history of significance. There was no previous evidence of long-standing hypokaliemia in the patient or the family. However, no blood relative had been found. It is suggested that the hypokaliemia aggravated the coronary artery disease and contributed to the fatal outcome in this patient.

Sheps

ABSTRACTS
ELECTROCARDIOGRAPHY, VECTORCARDIOGRAPHY, BALLISTOCARDIOGRAPHY, AND OTHER GRAPHIC TECHNICS


The results of plethysmographic studies in over 100 patients having various cardiovascular lesions were compared with those in normal subjects. A direct-writing electronic plethysmograph was used on the digits, and a different instrument was used for segmental limb studies. The important pulse wave characteristics from several areas were depicted and described including crest time, rate of rise of anaerobic limb, wave amplitude, and pulse ratio between arm and leg, half rise time, presence of a dicrotic notch, rate of volume change, and inclination time. Distal to an obstruction (e.g., from arteriosclerosis) the waves were low and rounded, had delayed rise, crest, and inclination times, tended to lose the dicrotic notch, and showed harmonic vector abnormalities. High cardiac output states showed waves increased in amplitude with more rapid rise and fall times and an accelerated pulse velocity. Proper evaluation of the tracings was found useful both in diagnosis and in following the effects of treatment of a variety of circulatory disorders.


Experience with 400 patients having electrocardiograms before and after various types of effort is described, and 14 illustrated case histories are presented. While the exertion was preferably performed on a treadmill, the use of a 20-inch step test was found to be satisfactory. Increments of work were carried out until electrocardiographic abnormalities appeared or until the patient demonstrated an adequate effort tolerance. In selected instances, the electrocardiographic response to breathing 100 per cent oxygen (attempting to reverse ischemic changes), to Levy’s anoxia test, to ingesting 100 Gm. of glucose or 1.5 Gm. of potassium chloride, or to hyperventilation was tested as a supplementary study. Each electrocardiographic change after work was examined in order to assess its significance. The results of these evaluations may provide objective evidence of coronary insufficiency, especially when the symptoms are atypical.


In angina pectoris, electrocardiographic leads overlying the ischemic myocardium usually show S-T segment depression, but occasionally S-T elevation is found (variant form). These phenomena were investigated clinically and also in a series of dog experiments in which the S-T elevation was produced by ligation of the coronary artery and S-T depression was induced by hypotension. The S-T deviations were only apparent and actually represented T-P segment deviations. S-T elevation, but not depression, was promptly abolished by washing the surface.
of the ischemic heart with physiologic saline. Analysis of the ischemic myocardium producing S-T depression showed a decrease in intracellular sodium and an increase in intracellular potassium. An increased cardiac potassium uptake during S-T depression was confirmed by calculating the extraction of the ion from the perfusing blood. That intracellular potassium migration was closely related to S-T depression was demonstrated by the latter's appearance soon after 5 per cent glucose solution was injected into a ligated coronary artery. Injection into a coronary artery of hypertonic sodium or of hypotonic potassium solutions produced S-T depressions, and vice versa, apparently by altering the gradient of each ion across the cell membrane. The classical concepts of cardiac injury currents were examined in the light of the present findings. The S-T depression was thought to be due to the influences of ischemia on the subepicardial muscle. Prominent among these influences were the increase in intracellular potassium content and the increase in potassium ion gradient with resultant increase in resting membrane potential. That the S-T depression was not reciprocal to subendocardial ischemia was maintained from theoretical considerations and from electrocardiograms made via intracavitary leads. Whether S-T elevation represented merely a more severe degree of ischemia was being studied further.

Rogers


Case reports are presented of 2 infants who exhibited signs of sinoatrial block due to vagal stimulation. The first patient had a large cystic goiter (due to congenital myxedema) that stimulated the carotid sinus; vagal stimulation in the second infant was caused by a dilated thoracic stomach (consequent to an esophagogastrostomy for repair of an esophageal atresia). The authors recommended the use of atropine for therapy and prophylaxis of arrhythmias produced by vagal stimulation but, in addition, they noted that the bradycardia produced by vagal stimulation might also be treated with epinephrine or other sympathomimetic drugs such as Isuprel.

Karpman


A case is described of a 72-year-old man with uremic pericarditis in which the electrocardiogram showed nodal rhythm with retrograde P waves and occasional extrasystoles with a P-R interval of 0.10 second throughout the electrocardiogram. An independent set of deflections, apparently atrial in origin, of low voltage (0.1 mV) was seen. These deflections were unrelated to the nodal rhythm and they occurred irregularly at intervals varying between 1.2 and 2.45 seconds. These waves were seen in limb leads, except in lead I, and were particularly evident in leads II and III, where they were upright and occasionally diphasic. These deflections were indiscernible in chest leads. Each P wave was followed by a burst of rapid oscillations (rate about 2,500 per minute) lasting for 0.20 second up to 1 second and even more. These oscillations varied in amplitude, contour, and spacing, suggesting that they were caused by a fibrillatory activity. These reports were made photographically, on different occasions and in different rooms, with a cathode-ray oscillograph and a mirror galvanometer. Records were taken simultaneously, in the same rooms and with the same machines from other patients, this way discarding artifacts as an explanation to the superadded activity. The nature of the phenomenon is discussed. The author believes that it represents circumferential atrial fibrillation similar to the ease reported by Deitz and co-workers.

Brachfeld


Five patients with Wolff-Parkinson-White syndrome (4 in young athletes, one in a 42-year-old nurse) are described in detail. The Wolff-Parkinson-White syndrome was persistent in 1 patient and transient in the remaining ones. In all patients, clinical examination, supplemented by ergo-spirometry in 2 instances, gave normal results with respect to the cardiovascular system. A significant incidence of signs of autonomic nervous disorders was found. The medical assessment from the point of view of athletes is discussed. In accordance with the opinion of others, the presence of a Wolff-Parkinson-White syndrome in otherwise healthy young subjects is not regarded as indicating cardiac disease.

Brachfeld


The peripheral pulses in the legs of 11 normal subjects and 11 patients with arteriosclerosis recorded by an infrarot pulse oscillograph before and after exercise showed increased amplitude and systolic slope of the pulse at high (thigh or calf) levels and diminution at low (foot or toe) levels. These results indicated that with exercise
the blood was diverted to the working muscle and the blood flow to the distal parts was decreased. After sympathectomy the proportions of the pre-exercise and post-exercise readings were unchanged, despite favorable results. This finding indicated that vasospasm played no part in the exercise response. The phenomenon of diminution of the pedal pulses in patients exhibiting claudication but with palpable pulses was confirmed. In these patients claudication did not result from arterial spasm, but was due to partial occlusion at aortic or iliac levels with resultant inadequate flow for the demands of exercise. The shift of blood away from the foot and toes during exercise explains why some patients develop pain in these parts on walking and indicates caution in the use of exercise for the ischemic foot.

SAGALL

HYPERTENSION

The author presents a case report of a 26-year-old woman who died with acute pulmonary edema and a temperature of 107 F. 1 hour and 20 minutes after the delivery of her third child. All pregnancies had been normal with no toxemias and no recorded hypertension. At postmortem examination a pheochromocytoma was found in the right adrenal gland. Her only symptoms had been recurrent epigastric pain and palpitations. Previous reports of pheochromocytoma in pregnancy are reviewed and diagnosis is discussed.

MAXWELL


A method for the estimation of angiotensin in blood of dogs is described by utilization of only 50 ml. of arterial blood, thereby eliminating the criticism, previously made of other methods for angiotensin estimation, that the large volumes of blood required produced hypotension, which in turn elicited a renin response with formation of more angiotensin. Blood samples were collected into ethanol and angiotensin was removed from the filtrates by the resin Dowex 50-X2. On elution with alkali, a solution was obtained that could be further concentrated and assayed for its pressor action by intravenous injection into small nephrectomized rats. The method was tested by adding 10 rat units of angiotensin to 50 ml. of heparinized dog blood just prior to extraction with ethanol, while another 50 ml. of the same blood was processed simultaneously using the pressor value thus obtained as a blank for the first sample. The data presented indicated complete recovery of the added angiotensin. Addition of epinephrine or norepinephrine to blood produced no additional pressor activity, indicating that the catecholamines were destroyed during the processing. Added pepsitensin was completely recoverable, whereas added tyramine and vasopressin were recoverable only to the extent of 15 per cent of the added amounts.

MAXWELL

Langford, H. G., and Snively, J. R.: Effect of DCA on Development of Renopival Hypertension. Am. J. Physiol. 196: 449 (Feb.), 1959. The administration of desoxycorticosterone acetate (DCA) to nephrectomized dogs drinking 1 per cent saline accelerated the development of hypertension. In nephrectomized rats given 0.9 per cent saline intraperitoneally it was shown that this hypertension was not due to increased sodium intake or dehydration.

KAYDEN


This study was undertaken to clarify conflicting reports on the incidence, etiology, morbidity, and mortality from hypertension in the Bantu and the Coloured. The data indicated that hypertension and its complications were a common cause for hospital admission in Johannesburg and that these cases carried a high mortality. Females were more commonly afflicted than males. Renal disease was a common underlying cause. Compared with the European, hypertension presented at a similar age, but was more serious in the female, and the cause of death was more evenly distributed between heart failure, cerebrovascular accidents, and uremia. Endocrine causes of hypertension were rare. Electrocardiographic changes commonly showed evidence of left ventricular hypertrophy, even among the milder cases, and perhaps malnutrition was partially responsible for this.

KRAUSE

METABOLIC EFFECTS ON CIRCULATION

An intravenous infusion in conscious dogs of a large dose of norepinephrine (0.51-0.85 mg./
Kg.) or epinephrine (0.55-0.92 mg./Kg.) resulted in an elevation in serum glutamic oxaloacetic transaminase (SGO-T), which reached a peak in about 6 hours and subsided within 2 to 3 days. Serum glutamic pyruvic transaminase (SGP-T) and serum alkaline phosphatase increased more gradually and subsided more slowly. Pathologic studies confirmed the myocardial and hepatic damage suggested by the elevated serum enzyme levels. Subcutaneous injection of 1 mg./Kg. of epinephrine-in-oil produced less severe pathologic changes, but resulted in a gradual increase during the first day in SGO-T, SGP-T and serum alkaline phosphatase with peak levels considerably higher than those following the intravenous infusions. Markedly elevated serum enzyme levels, suggesting cellular damage with altered permeability, occurred even in animals showing no significant myocardial hypersensitivity and no significant myocardial and hepatic changes demonstrable by the usual histologic methods. Dibenzyline, an adrenergic blocking agent, prevented the rise in serum transaminase but not the rise in serum alkaline phosphatase.

KAYDEN

PHARMACOLOGY


The intravenous administration of phenoxybenzamine (Dibenzyline) to lightly anesthetized dogs markedly raised the arterial epinephrine and norepinephrine concentrations, an effect which was heightened by hemorrhagic hypotension. Under the same test conditions, adrenalectomized dogs showed rises only in norepinephrine concentration. It appeared that phenoxybenzamine induced the release of epinephrine from the adrenal gland and that at least part of the norepinephrine rise was of extra-adrenal origin.

ROGERS


The intravenous injection of phenoxybenzamine hydrochloride (Dibenzyline) into anesthetized dogs was followed by hypotension and by a marked increase in urinary epinephrine and norepinephrine excretion. Both effects were prevented by pretreatment with hexamethonium. Metacholine-induced hypotension produced a moderate increase in urinary epinephrine output but no change in norepinephrine. Acetylcholine-induced diuresis of epinephrine was unaffected by phenoxybenzamine but that of norepinephrine was increased. During infusion of epinephrine or norepinephrine, phenoxybenzamine increased the excretion of both amines. It was thought that phenoxybenzamine increased epinephrine output by stimulating the adrenal gland, at least partly by producing hypotension; the increased norepinephrine output was otherwise unexplained.

ROGERS


Since the assay of vitamin K in the vitamin-deficient chick estimates dietary activity, the present method was developed to estimate antithrombinopenic effect. Rats were fed warfarin until the prothombin time was increased tenfold. Then various vitamin K products were administered and their effect estimated by a "bedside" prothrombin test and a micromethod proconvertin determination. A specially processed vitamin K₁ preparation produced an optimal effect within 30 minutes. Two proprietary K₁ preparations were considerably less active, while vitamin K₃ and its water-soluble analogues in large doses showed no activity after 2 hours. Statistical analyses of the results are presented.

ROGERS


Ventricular premature beats or tachycardia was induced in dogs by ligation of a coronary artery, by injecting zine hydroxide solution into the myocardium, by administering digitalis, or by infusing amodiaquin. In each case, intravenous or intramuscular methoxamine (Vasoxyl) 0.5 to 1 mg. per Kg. promptly suppressed the arrhythmia for periods up to 60 minutes. Similar results were obtained when 5 to 25 mg. of methoxamine in 5 per cent dextrose solution was given to 14 patients having ventricular arrhythmia due to various types of heart disease with or without hypotension. The antiarrhythmic effect of the drug in some instances was achieved without a pressor effect.

ROGERS
ABSTRACTS


Clinical and biochemical observations are recorded on 15 patients following the oral administration of hydrochlorothiazide. The dosage was usually 50 mg. 4 times daily. The dietary sodium was limited to 200 mg. daily. The drug was well tolerated. There was a marked increase in excretion of sodium and chloride which began as early as 1 hour and reached a peak in 3 to 4 hours following the administration of the drug. One patient developed significant hyponatremia and hypochloremia associated with weakness. In 1 further instance significant hypopotassemia was produced. These changes were temporary. Potassium excretion was only slightly increased. The amount of diuresis and consequent weight loss varied with the degree of preexisting edema. Hydrochlorothiazide was antihypertensive in patients with an elevated blood pressure. One patient developed a temporary asymptomatic hyperuricemia. These observations confirm the use of hydrochlorothiazide as a potent well-tolerated saluretic drug.

Sheps


Quinidine hydrochloride administered intravenously to dogs in doses of 30 to 37 mg. per Kg. produced the following changes, which were spontaneously reversible within 35 minutes: prolongation of P-R and QRS intervals, S-T depression, slowing of heart rate, and moderate lowering of blood pressure. The intravenous administration of 20 to 180 ml. of molar sodium lactate solution gradually corrected these quinidine effects beginning within 2 minutes and ending in 20 minutes. Larger doses of quinidine produced sinoatrial arrest, atrioventricular nodal rhythm, hypotension, and finally ventricular fibrillation or arrest. Lactate therapy partially reversed some of these changes but only temporarily. The possible mechanisms of these phenomena are discussed.

Rogers

PHYSIOLOGY


Potassium administration can antagonize the toxic effects of digitalis. Patients receiving digitalis may exhibit digitalis toxicity when their potassium intake is restricted and over-digitalized patients may respond successfully to potassium administration. The experiments reported were designed to determine whether digitalis could antagonize the effects of potassium toxicity on the myocardium. Accordingly, potassium-enriched solutions were used to perfuse 30 isolated turtle hearts; this caused diminished strength of isometric contractions. This decrease in strength of contraction was progressive with increasing concentration of potassium until generally asystole occurred. Digitalis did not protect against the development of asystole, but did sustain the strength of myocardial contraction.

Krause


Open-chest anesthetized dogs were prepared for measurement of total coronary flow and myocardial oxygen consumption. The effects of continuously infused intravenous L-epinephrine and L-norepinephrine (5 gamma/Kg./min.) were determined and compared with control values. When catecholamines were infused at any fixed cardiac output, cardiac oxygen consumption rose in association with increases in blood pressure and heart rate, while cardiac external mechanical efficiency declined. The product of mean blood pressure and heart rate have consistently correlated with myocardial oxygen consumption over a wide range of cardiac output, blood pressure, and heart rate. The significance of this value was considered also in view of the changes brought about by catecholamines in this relationship. The decline in the coronary arteriovenous oxygen difference, the percentage of oxygen extracted by the heart, and the rise in coronary venous oxygen, were all attributed to a direct action of catecholamines on the coronary vessels. Despite their new levels, the coronary venous content oxygen, and the coronary arteriovenous oxygen differences remained fairly constant as the cardiac output and its oxygen requirement varied during catecholamine infusion.

Kayden


The effects of dinitrophenol (DNP) on the electrical activity of single cells of the sinus node, right atrium, and atrioventricular node, were studied with microelectrodes in rabbits. The drug caused an initial tachycardia followed
by a bradycardia, a decrease in the duration of the action potential, a decrease of the resting potential, and a decrease in the slope of diastolic depolarization of pacemaker tissues. A complete inhibition of the electrical activity was observed in 45 minutes after the addition of DNP to the perfusion fluid. A significant recovery of the electrical activity was obtained with the use of a system with DNP and ATP (adenosine triphosphate). The incomplete loss of the resting potential noted with DNP suggested that at least a fraction of the resting potential was independent of the energy supplied by oxidative phosphorylation.

**KAYDEN**


The concentration of magnesium-28 in heart muscle is greater than in skeletal muscle. The interventricular septum was found to have an even greater ability to concentrate magnesium-28 compared to the right and left ventricular walls. The analysis of the isolated Purkinje system in 2 calves made it unlikely that the distribution of this specialized tissue was the explanation for the distribution of magnesium-28 in the different portions of the ventricles.

**KAYDEN**


As the colonic temperature of the rat was lowered, the heart rate and cardiac output fell linearly with the temperature. The arterial pressure did not fall linearly, indicating an increase of total peripheral resistance. The increase of hematocrit ratio and the effect of cold on blood pressure combined to increase the in vitro viscosity threefold as the colonic temperature approached 15 C. It appears from these data that the increase in viscosity of the blood is the important factor in the increase in total resistance to flow.

**KAYDEN**

**RENNAL AND ELECTROLYTE EFFECTS ON THE CIRCULATION**


Sodium salts (NaCl0.4, Na2SO4, Na2HPO4) administered by gavage frequently produced cardiac necroses in rats on a potassium-deficient diet, an effect previously noted in corticoid-treated animals. Severe muscular cramps also occurred in those receiving the perchlorate and the phosphate salts. Both skeletal and cardiac muscular effects were prevented by concomitant administration of potassium chloride or, to a lesser degree, of magnesium chloride. Neither cramps nor necroses were induced by gavage with comparable quantities of sodium chloride alone, indicating that the union was important in producing these muscular changes.

**ROGERS**


This study evaluated the comparative effects of chlorothiazide and a mercurial diuretic (mersalyl sodium and theophylline) on osmolar clearance “free” water clearance, glomerular filtration rate, and renal excretion of sodium, potassium, and chloride. Each compound was given intravenously in a concentration sufficient to produce a marked diuretic response. Chlorothiazide had a more rapid onset of action than mersalyl. Chlorothiazide was an effective diuretic even in the presence of a significant decrease in glomerular filtration rate, indicating a direct tubular response. In moderately hydrated dogs, chlorothiazide produced no change in “free” water clearance and a moderate increase in osmolar clearance. Mersalyl increased “free” water clearance and greatly increased osmolar clearance. In dogs undergoing maximal water diuresis both diuretics produced a significant increase in osmolar clearance and no significant change in “free” water clearance.

**RINZLER**


Isoproterenol (1 mg. per Kg.) and pitressin (0-1-1.0 unit per animal) were administered to rats. Variations in sodium concentration in the tissues of the aorta were studied and correlated with the blood pressure levels. The observed variations in aorta sodium support the theory recently proposed by others that during blood pressure changes, sodium ion moves into and out of vascular muscle cells. However, the changes were much too small to account for the shifts of sodium postulated by these workers. The authors propose the following working hypothesis: the rise in aorta sodium concentration and blood pressure represent an increase in intracellular sodium and aortic contraction is accompanied by depletion of potassium.

**BRACHFELD**
ABSTRACTS


To test the hypothesis that experimental animals with hypertension and renal arteriolar disease may have an increased susceptibility to induced pyelonephritis, the author compared the incidence of pyelonephritis in a control group of unilaterally nephrectomized rats to which intravenous inoculations of Escherichia coli were given to the incidence in a similarly prepared group in which hypertension had been induced with desoxytocicosterone and saline prior to bacterial injection. The experimental hypertension was found to be characterized by diffuse arteriolar sclerosis and dilatation of the renal tubules. Microscopic and bacterial studies were performed on the remaining kidneys at the time of sacrifice of the animals, which varied from 2 to 15 days following bacterial injection except in those who appeared to be dying during the first 2 days following induced infection. The desoxytocicosterone and saline caused hypertension in about 2 weeks and soon thereafter vascular disease developed. In the first group studied 7 out of 12 hypertensive rats and none of the 12 control animals showed evidence of renal infection (defined as a colony count of greater than 1 million colonies per gram of kidney tissue). In a second group the number of bacteria injected was chosen so that it would not cause infection in a significant number of controls. Here, 16 to 21 hypertensive rats and only 3 of 21 control animals developed pyelonephritis, while 9 hypertensive animals had macroscopic abscesses, 2 had microscopic abscesses, and 3 had infiltrates of inflammatory cells. Two of the infected control animals had macroscopic abscesses. Other organs were not infected, and the difference between the incidence of pyelonephritis in the control and hypertensive groups was found to be statistically highly significant although the author believed that the study did not elucidate the nature of the factor or factors causing this difference.

FREEDBERG


In 21 patients with coarctation of the aorta, 25 normotensive men, and 29 men with essential hypertension, measurements of effective renal plasma flow with sodium para-aminohippurate glomerular filtration rate by inulin or sodium thiosulfate clearance, and brachial and femoral arterial pressure levels were made. Segmental renovascular resistance values were calculated from the formula of Gomez. When compared with normotensive patients, the coarctation group showed characteristic damping of the pressure pulse waves in the femoral artery, but a virtually identical mean blood pressure. The filtration fraction was increased in the coarctation group and there was a similar increase in the net efferent renal vascular resistance. All other measured functions were identical to the normal group. When compared with the male essential hypertensive patients, the patients with coarctation had a significantly lower brachial arterial diastolic pressure but comparable systolic and mean pressure levels. Femoral arterial pressure in all phases was very significantly lower in the coarctation group. Glomerular filtration rate and effective renal plasma flow were significantly higher in the coarctation group, while total renal vascular resistance was greatly increased in the essential hypertensive patients. A comparison between the normotensive and essential hypertensive groups showed significant differences in all renal hemodynamic functions tested except glomerular filtration rate. Four patients with coarctation and congestive heart failure were studied and found to have hemodynamic changes characteristic of patients with mild congestive heart failure from other causes with decreased effective renal plasma flow, normal glomerular filtration rate, high filtration fraction, and increased postglomerular renal vascular resistance. It is concluded by the authors that the data presented demonstrates that renal circulation in uncomplicated patients with coarctation of the aorta is essentially normal and that there is no evidence to support the view that there is generalized systemic arteriolar constriction in patients with coarctation of the aorta.

MAXWELL

RHEUMATIC FEVER


Throat cultures were made at monthly intervals on 232 children ages 6 through 9 throughout the academic year in 2 schools in Miami, Florida. Similar throat cultures at random times throughout the study period were taken from 1,200 other children in the same age group in 48 other schools. Forty-five per cent of an average of 305
children harbored group A beta hemolytic streptococci at least once in the 8-month study period. Monthly isolation rates for the small and large groups were similar at approximately 14 per cent. A small but significant decrease in recovery of the streptococci was found with advance in age. Variation in recovery of group A beta hemolytic streptococci with sex was as follows: age 6 to 7, male greater than female; age 7 to 8, male equal to female; age 8 to 9, female greater than male.

Maxwell

**ROENTGENOLOGY**


A 20-year-old woman showed in the regular frontal plane roentgenogram a right pulmonary vein leading to the inferior vena cava, at the junction between diaphragm and the right atrium; this vein was more clearly visualized by means of tomography and angiocardiography. Angiocardiography also disclosed a hypoplastic right pulmonary artery and an atrial septal defect. A bronchogram showed absence of the bronchi of the right middle lobe and hypoplastic bronchi of the lower lobe.

Lepeschkin


After dye injection into the pulmonary artery through a catheter, late filling of the right ventricle from the left ventricle through the ventricular septal defect may be demonstrated by means of serial roentgenograms in 2 planes (especially in the lateral plane). In isolated septal defect this filling occurs in systole but in the presence of tricuspid atresia the filling occurs in diastole. Injection of dye into the right ventricle under pressure may produce a transient small right-to-left shunt in diastole. A pronounced shunt under these conditions, however, is suggestive of additional pulmonary stenosis, pulmonary hypertension, or dextroposition of the aorta. Tetralogy of Fallot is characterized by the appearance of a dense levogram with secondary filling of the pulmonary artery. If both aorta and pulmonary artery become visualized, greater dye concentration in the pulmonary artery suggests an Eisenmenger complex. A considerable difference in the systolic and diastolic diameters of the pulmonary artery suggests pulmonary hypertension.

Lepeschkin


Serial angiocardiography of the persistent ductus arteriosus can be of help when this cannot be catheterized directly or when anomalies are suspected. Injection of dye through the catheter into the pulmonary artery rather than into the right ventricle results more easily in visualization of the ductus, which usually becomes filled in diastole because of increased pulmonary artery pressure as a result of the injection. The ascending aorta remains free of dye, and this makes it possible to rule out an aortcopulmonary communication. Sometimes the ductus may become filled from the aorta later; late filling of the pulmonary artery is indirect proof of patency. Another indirect proof is localized or diffused dye dilution in the pulmonary artery near the ductus, which appears usually in late diastole. When the pulmonary artery shows late filling through the ductus, systolic dye dilution from the right ventricle can be observed.

Lepeschkin


A 14-year-old girl showed during fluoroscopy a heavily calcified body in the region of the right atrium, showing a circular vibratory movement to the left with every heart beat. An operation, carried out on the basis of the roentgenologic diagnosis, disclosed a calcified free thrombus the size of a nut, attached to the wall of the right atrium near the dorsolateral insertion of the inferior vena cava by means of a narrow pedicle.

Lepeschkin


The radiologic demonstration of calcified aortic and mitral valves has assumed prognostic importance with the advent of valvotomy. The authors reviewed their experience with tomography and fluoroscopy in 20 patients with aortic valve calcification and 15 patients with mitral valve calcification. They concluded that tomography was more reliable than fluoroscopy, since with tomography calcification was detected more frequently and its site located with more certainty. The form of the calcification was useful in distinguishing each valve, since aortic valve calcification took the form of a channel or ring and mitral valve calcification usually resembled an irregular star.

Paul
ABSTRACTS

SURGERY AND CARDIOVASCULAR DISEASE


This operative group consisted of 21 patients with ventricular septal defects corrected by open-heart surgery using extracorporeal circulation. The clinical features, cardiac catheterization data, surgical technic, and operative results were reviewed. Of the 15 patients with a ventricular septal defect as the sole lesion only 1 died. The main hazard with closure was the presence of severe pulmonary vascular disease. If the pulmonary resistance was high enough to cause an obvious right-to-left shunt with an arterial oxygen saturation below 85 per cent with or without cyanosis or clubbing, then closure of the ventricular septal defect was contraindicated. The most important associated defect was a patent ductus for it rendered percutaneous impossible. Therefore, if this lesion was suspected to coexist with the septal defect, retrograde aortography had to be accomplished before surgical correction of the septal defect was undertaken.

KRAUSE


In 13 patients with patent ductus arteriosus followed postoperatively for as long as 5 years, the preoperative and postoperative radiographic findings were compared with clinical and laboratory examination. Because of the marked circulatory instability the radiographic examinations with the patient upright gave a false picture after operation. Cardiac volume (as determined from the films with the patient lying down) was found to be greater among patients with associated pulmonary hypertension. Postoperatively the cardiac volume consistently diminished with the maximum diminution being found after about 9 months. This suggested that preoperative enlargement of the left heart in cases of patent ductus arteriosus without pulmonary hypertension was caused by an increase in residual blood volume—a compensatory cardiac enlargement. The enlargement of the right atrium and right ventricle among patients with associated pulmonary hypertension was considered to be due to myogenic dilatation with latent cardiac insufficiency. Continued observation postoperatively showed recurrence of cardiac enlargement after the initial diminution in heart size, but at a size below the preoperative level in all instances. With associated pulmonary hypertension the heart remained enlarged beyond normal limits; in the group with uncomplicated patent ductus arteriosus the increased heart size was still within the normal limits of cardiac volume relative to body weight. These results indicate that surgical closure of a patent ductus arteriosus should be performed before pulmonary hypertension has developed.

SAGALL


The author describes his experience with the results of operation in the tetralogy of Fallot. The operative procedures primarily used were: subclavian pulmonary anastomosis or a modification of this, and Brock's direct operations of pulmonary valvotomy or infundibular resection or both. Good results were maintained in 80 per cent after anastomotic and in 89 per cent after direct operations. The long-term advantage of the direct operation was particularly evident for only one half as many deaths occurred and half as many lost all their improvement in the group who underwent the direct operation when compared to the anastomotic group. When improvement was lost after a good postoperative result several factors were responsible. First of all the patient still was left with a tetralogy, though the stenosis had been to some extent relieved, directly or indirectly. Cerebral complications were responsible for more than a third of the deaths; the heart could not support the increased pulmonary flow and the increased activity that it allowed in another third; but in the final third the cause was not directly related to the heart condition or the operation. In many patients who lost their improvement after anastomosis, the deterioration was due to closure of the anastomosis. In others, after either operation, the loss of improvement was due to the stenosis progressing. After anastomosis, increasing difficulty in hearing a continuous murmur was a bad sign and usually meant that the anastomosis was closing. The auscultatory signs after the direct operation were not as helpful. Usually the heart increased in size within a few weeks after a successful operation. On the average, the cardiothoracic ratio increased by one tenth (49 to 54 per cent) and remained at this level for 8 to 10 years. There were no drawbacks to some increase in the size of the smaller hearts, generally about 10 per cent.
The goal was a limited increase, large enough to indicate a reasonable pulmonary blood flow that would permit the patient more activity, but not large enough to throw undue strain on the heart. Neither of these procedures is curative, for of course the ventricular septal defect remains and the right ventricle is working against the systemic pressure. There is reason to antici-

Krause


This report describes the use of an arterial prosthesis manufactured from Dacron yarn woven in such a manner that the most important quality of elasticity is retained and the resulting tube elongates and flexes without deformity. Arterial bypasses were placed between the upper thoracic and lower abdominal aortas of 21 dogs; and in 10 such animals autopsied up to 9 months following surgery, the prosthesis was found to be intact. On specimens removed up to 3 months following insertion, the pseudointima appeared patchy although prostheses studied after this period of time had developed a smooth and intact pseudointima. Microscopically, almost a complete lack of cellular exudation was seen around the implants; and most significantly when compared to stretch Nylon, which showed poor durability, the tensile strength of the graft remained unchanged during the 9-month period. Eleven of the animals were alive with functioning prostheses between 5 and 11 months following surgery. In discussing the surgical technique involved in inserting the prosthesis, the authors stress the necessity of minimally coating the Dacron tube with blood to prevent excessive oozing, heat sealing the end of the prosthesis to prevent unraveling and very gently handling the fabric to obviate separation of threads. In 43 clinical cases Dacron grafts were used in the aortoiliac and femoral-popliteal areas and although the results were slightly inferior to those in which homografts were used (80 per cent of the Dacron group were patent at the time of the last examination), the authors believed that the difference in results was largely due to the fact that the arterial disease in the cases in which the synthetic was used was more advanced and diffuse. They point out that the advantage of the plastic prosthesis should become apparent when the results are viewed in the long term, since deterioration should be significantly less.

Freedberg


Seventy human hearts were studied by injection of Vinylite into the coronary arteries, followed by hydrochloric acid corrosion. This provided a spatially oriented preparation of the heart chambers and vessels. In 4 different surgical procedures the above method was used to demonstrate the topography of the coronary arteries and how by disturbance of blood supply in these instances arrhythmias and conduction defects may develop. The first is the purse-string repair for mitral insufficiency. In this instance the blood supply to the sinoatrial node may be occluded when the suture is passed into the right atrium. In 60 per cent the SA nodal artery arises from the right coronary and in the other 40 per cent from the proximal portion of the left coronary artery. Consequences of occlusion of this vessel may be sinus arrest, atrial fibrillation, or other atrial arrhythmias. Posteriorly there are 2 hazards where the suture is passed out below the A-V valves. First, the artery to the AV node which in this study arose from the right coronary may be occluded. Consequences of this may be complete or incomplete atrioventricular block. Second, the posterior descending coronary artery which is not visible on the surface may be occluded with possible consequences of a posterior myocardial infarction. The second surgical tech-

Levinson

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The perfusion records of 350 cases of clinical cardiopulmonary bypass procedures, using helix reservoir bubble oxygenator and sigmamotor pump, were analyzed. The changes induced were in general a function of time. The cyanotic patients had a mean duration of perfusion time of 46 minutes and the acyanotic patients 27.5 minutes. Analyses were made of plasma hemoglobin, cardiotomy loss, post-operative red blood cell survival, platelet counts and arterial pH. The rate of plasma hemoglobin formation in the cyanotic and acyanotic patients was about the same. In all of the patients the final plasma hemoglobin values were below that likely to cause any harm. No ill effects were observed. A decrease in platelet counts occurred immediately with return to normal in a few days. No bleeding could be attributed to a defect in the clotting mechanism but rather to defective hemostasis. The bleeding problems in the post perfusion period could usually be traced to inadequately cleaned and sterilized perfusion equipment, blood incompatibilities, or inadequate hemostasis. Mild decreases in the patient’s hemoglobin were noted in the post-operative period. This was attributed to hemodilution with resumption of oral intake of fluid. Significant changes in pH were not noted by setting the arterial pump at 50 to 100 ml. per Kg. of body weight per minute. It is recommended to start at lower levels with increase of arterial output of the pump as necessary to maintain normal electroencephalograms and mean systemic blood pressures.

Levinson


One hundred and twenty infants under the age of 1 year were operated upon for congenital malformations of the heart or great vessels on an emergency or semi-emergency basis because of severe cardiac decompensation or anoxemia. Thirteen infants were under the age of 1 month, and 9 survived. In 38 infants the operation necessitated the use of a pump oxygenator for temporary cardiopulmonary bypass. Eighty-three per cent of the infants survived operation and were improved. Twenty-nine infants with ventricular septal defect were operated upon using temporary cardiopulmonary bypass. Forty-one per cent of the infants died following closure of the defect. This mortality rate is 6 times that of the same procedure in patients over the age of 2. Because of this, surgical therapy should be postponed until after the age of 2 if at all possible. Twenty-eight infants with a provisional diagnosis of tetralogy of Fallot were operated...
up and anastomotic procedures carried out. The immediate mortality was 21 per cent. The survivors nearly all had immediate and striking improvement. Because the anastomosis may not increase in size with the growth of the infant, it is possible to interrupt the anastomosis and perform direct repair if the infant gets into difficulty at a later age. Severe cardiac decompensation due to coarctation of the aorta necessitated operation in 14 infants under the age of 1 year. The coarctation was of the predural type in 4 infants and these all died. The remainder had postduetal coarctation and did well. Patent ductus arteriosus was found at operation in association with coarctation in all patients. Nine infants with patent ductus arteriosus in whom cardiac failure was of sufficient severity to justify closure of the ductus were operated upon. Three died in the postoperative period. Five of the survivors were greatly benefited while the sixth improved only moderately. The latter had a ventricular septal defect. In infants with an additional left to right shunt at the atrial or ventricular level, interruption of a patent ductus may result in sufficient improvement to allow delay of the definitive intracardiac procedure. In addition the experience with transposition of the great vessels, tricuspid atresia, aortic stenosis, pulmonic stenosis, and anomalous pulmonary venous drainage was reviewed. A decision to operate on all of these patients was based on the impression that survival was not possible otherwise.

Sheps


Autogenous vein, homologous artery, and synthetic heterografts were used as peripheral shunt arteriografts in dogs. Arteriografts were subsequently done in intervals and postmortem examination of the grafts done when the arteriogram showed occlusion of the graft, or at a predetermined time if the graft remained patent. Sixteen of 42 (36 per cent) vein grafts thrombosed prior to sacrifice. These were end-to-side femoral or ilio-femoral. The majorit of the thromboses occurred in the first few dogs. Fourteen of 43 (23 per cent) homografts were thrombosed. These were placed in the same location. Forty-eight of 68 (71 per cent) of the synthetic grafts using 5 different materials thrombosed. Microscopic examination revealed that the autogenous veins consisted of living tissue with fibrous thickening of all layers, while homografts became fibrous tubes with broken elastic fibers enclosed in the smooth muscle layer but with no thickening of the wall. The synthetics were noted for the thickness of the neo-intima, which was thought to enhance thrombosis. The absence of an aneurysmal dilatation of autogenous veins was mentioned, and an explanation attempted in terms of the La Plaes law.

Maxwell


There is need for replacement or bypass of vital veins in portal hypertension, malignancy, trauma, superior vena cava syndrome and congenital heart disease where there is total anomalous pulmonary venous drainage or high interatrial septal defect with anomalous pulmonary venous drainage to the superior vena cava. Most of this work has been done in dogs. Aortic homografts, synthetics and venous autografts have usually resulted in constriction in short periods of time. These authors in a previous report had used Ivalon as a prosthesis with resultant constriction or complete obstruction of the grafts in all instances. In the present report they employed aortic homografts in 11 dogs. Of these, 7 had constriction or complete obstruction of the graft. In 13 dogs Ivalon in 2 layers with Lucite rings between them was used as a graft. Of these only 4 had constriction or obstruction. It is pointed out that in 3 of these the obstruction or constriction occurred at the end of the graft where a Lucite ring had not been included in the sutures. It is felt that the relative success of the Ivalon-Lucite graft is due to the fact that this graft does not collapse in the presence of the relatively low pressure in the veins. The latter is thought to be the cause for failure of the other types of grafts. It was interesting that in 1 of the dogs, where complete obstruction of the graft occurred, that the large collateral channel that developed did not prevent ascites although the dog lived for 10 months. This collateral was well demonstrated on a venogram. After 10 months of the original 13 dogs with Ivalon-Lucite grafts were alive and free of obstruction or ascites. Only 3 of the 11 dogs with aortic homografts were alive at the end of 10 months and 1 of these had ascites.

Levinson


Fifteen fresh equine common carotid arteries were lyophilized and subsequently reconstituted by immersing the arteries in isotonic saline solu-
tion until soft and pliable. These arteries were then grafted into the abdominal aortas of 15 mongrel dogs replacing a segment of the aorta 3 cm. long between the renal arteries and the bifurcation. Two of the heterografts were removed after 15 days; 2 after 60 days; and the remainder after 15 months. The 2 grafts examined 15 days after placement showed good healing along the suture lines and no significant growth change in the walls of the grafts. In the 2 removed after 60 days there was slight dilatation of the grafts. The graft lumen was one-fourth more spacious than that of the proximal and distal portions of the aorta. Of the 11 grafts left in place for 15 months, 1 was completely occluded by a thrombus and in the others there was aneurysmal dilatation of varying degrees so that in some instances the lumen was almost tripled. Microscopic examination revealed that the host tissue had apparently completely replaced the graft. Examination of the lyophilized equine common carotid artery revealed serious damage to the muscular media by the lyophilizing process. It was concluded that the injury weakened the wall and thereby resulted in the dilatation.

MAXWELL


Previous observations of synthetic thoracic aortic grafts in 84 dogs over periods up to 2 years had shown that those of Ivalon sponge deteriorated rapidly leading to aneurysm and rupture, that Nylon grafts lost 80 per cent of their strength by 6 months and up to 95 per cent after 2 years, and that grafts of Orlon, Dacron or Teflon lost little strength after 1 year. The present report describes the status of the grafts in 10 dogs 2 to 3 years after their placement. All grafts were patent. Two Nylon grafts ruptured while 1 Nylon graft, and 2 each of Orlon and Dacron presented hematomas from delayed bleedings. One Nylon graft and 2 Teflon grafts had healed well. Therefore, Teflon was considered to be the synthetic material of choice and superior to homografts for replacing vessels larger than 9 mm. in diameter.

The paper consists of a case presentation of a 19-year-old woman, with a history suggestive of acute rheumatic fever 24 months prior to death. Symptoms suggestive of a left cerebral embolus occurred 18 months before death, and thereafter she followed a nonremitting downhill course with symptoms of rheumatic heart disease and the eventual development of atrial fibrillation. The patient died after an embolectomy, which was necessitated by development of arterial occlusion in both lower extremities following attempted left atrial catheterization. Autopsy revealed multicentric bilateral cardiac myxoma. All pedicles of all the tumors were continuous with the fibrous tissue of the limbus of the foramen ovale. There were in addition old and recent infarcts of the kidney, spleen, lungs, and brain. There was no evidence of there ever having been a rheumatic episode except for the finding of an interstitial myocarditis. The pathogenesis of cardiac myxomas is discussed, and the authors conclude that cardiac myxomas are true neoplasms arising without relation to prior thrombi.

MAXWELL


Of 133 patients with penetrating wounds of the heart, 60 arrived alive at the hospital and were treated, with a mortality of 16.7 per cent. The remaining 73 persons were dead on arrival. The majority of the injuries were by stabbing. Acute pericardial tamponade or severe extra-pericardial hemorrhage was the most frequent complication. Mortality was greater with extra-pericardial hemorrhage alone than with tamponade alone. Either a ventricle or great arterial vessel was penetrated in nearly all the fatal cases. Other complications included lesions such as laceration of coronary arteries with myocardial infarction, damage to intracardiac or great vessel valves, or division of the conduction system.

Two patients of the group with tamponade treated nonoperatively developed chronic constrictive pericarditis requiring decortication. Experimental observations were quoted which demonstrated an exponential relationship between pericardial volume and pericardial pressure. The rising pericardial pressure acts as an external pressure counteracting that of the intraventricular venous filling pressure in diastole. The ventricular chambers inside the pericardium can then fill only very little as the cost of very high filling pressures. The circulation ceases at the maximal static pressure which the over-all circulatory system is capable of reaching without its ventricular pumps. This pressure is 17 cm. of water on the

ROGERS

UNCOMMON FORMS OF HEART DISEASE

average, given a normal blood volume. Given a greater or lesser blood volume the value of peri-
cardial pressure at which the circulation of blood ceases is somewhat higher or lower accordingly.
At any level of mild to moderate tamponade, an increase in blood volume definitely raises aortic
pressure and cardiac output, but does little at levels of severe tamponade. Similarly, sympa-
thomimetic amines administered during tampon-
ade produce some hemodynamic benefit by aug-
menting myocardial contractility and peripheral
vascular smooth muscle tone. The most efficacious
treatment of acute cardiac tamponade as implied
from these experimental studies is peri cardiac
aspiration, intravenous blood volume expanders,
and intravenous or intracardiac stimulants. In
some cases thoracotomy for evacuation of the
pericardium and suture of the cardiac wound may
be necessary. Operative treatment should be
quickly resorted to for the more serious com-
plication of severe extrapericardial hemorrhage,
and those instances when the initial non-operative
treatments are proved inadequate for definitive
therapy. The low incidence of chronic constrictive
pericarditis following the management of acute
tamponade by pericardial aspiration alone
is not great enough to contraindicate the use of
non-operative therapy.

SHEPPS

Sirak, H. D., Hosier, D. M., and Clatworthy,
H. W., Jr.: Defects of the Interventricular
Septum in Infancy: A Two-Stage Approach
to Their Surgical Correction. New England J.

The authors propose a 2-stage approach to
the surgical correction of interventricular septal
defects in infancy and report the first patient
to be successfully treated by this method. The
first stage of the procedure was performed in
infancy and consisted of narrowing of the pul-
monary artery by a band of plastic cloth. This
maneuver increased the right ventricular outflow
resistance, thereby reducing the left-to-right shunt across the ventricle. Thus the work of
the left ventricle was decreased, the systemic
circulation was improved and the lung vasula-
ture was spared. After the child had grown large
enough to tolerate open heart surgery, a cor-
rective repair was performed as the second
stage. At this time the septal defect was closed
and the constriction removed from the pulmo-
nary artery. By this approach it may be possi-
ble to increase both the immediate and the ul-
timate salvage rate for defects of the interven-
tricular septum in infants and still to avoid
the high mortality of open-heart surgery in
infancy.

SAGALL

Carlier, J., and Lejeune-Ledant, G.: Transmission
of Left Atrial Waves to “Pulmonary Capil-
ary” Positions in Dogs with Open Thorax. Acta

The effects of thoracotomy on transmission
of left atrial pressure to catheters wedged in
the pulmonary arteries were studied in 11 dogs.
There was a close similarity of atrial and “capill-
ary” pressure curves with regard to the mean
pressure and the positive waves; negative waves
were sometimes damped in the wedge positions.
Opening of the chest did not alter the pressure
curves on the right side but caused damping of
the curves from the left pulmonary artery.

PICK

Septum. Surg., Gynec. & Obst. 108: 175 (Feb.),
1959.

A 7-year experience with a modified Broek-
type pulmonic valvulotomy in 46 patients was
described. The stenosis appeared to be valvular
in 34 patients, infundibular in 6, and combined
in 6. The subjective response was good to excel-
lent in 37, fair or poor in 5, undetermined in
3, and 1 patient died of heart failure 8 months
postoperatively. The systolic gradient across
the pulmonic valve decreased from a preoperative
average of 102 mm. Hg to 44 mm. Hg immedi-
ately after valvulotomy. Three and one-half
years later this gradient (in 21 patients) was
33 mm. Hg. The change in gradient had not
always correlated with other evidence of response
to operation. While better hemodynamic results
have been obtained by open techniques, the over-
all benefit derived from the simpler closed opera-
tion warrants its continued use in isolated valvu-
lar pulmonic stenosis in the author’s opinion.

ROGERS

Foster, J. H., Berzins, T., and Scott, H. W., Jr.: An Experimental Study of Arterial Replace-
cement in the Presence of Bacterial Infection.
Abdominal paraaortic infection was incited
in dogs by injecting a saline suspension of
feces. Forty-eight hours later, 4 cm. of adjacent
aorta was replaced by a frozen homograft or
by a woven Nylon prosthesis. When antibo-
dies were not given or were given only after graft-
ing, nearly all animals died. When antibo-
dies were begun 24 hours before grafting, 45 per
cent of those receiving a prosthesis survived and
16 per cent of those homografted survived.
Better results attended the use of more inten-
sive antibiotic therapy. Deaths usually resulted
from peritonitis when a prosthesis was used and from hemorrhage when a homograft was used. Among the survivors, thrombosis of the graft occurred in 14 per cent; and evidence of residual infection was found as late as 18 months postoperatively in 25 per cent of the prosthesis group but in none of the homograft group. It was concluded that in the presence of local infection a synthetic prosthesis was superior to a homograft in terms of survival and also for maintenance of aortic continuity; nevertheless it could act as a focus of chronic infection.

ROGERS


In a review of autopsy material for a 10-year period at the Massachusetts General Hospital, Boston, undertaken to determine what percentage of patients with bowel infarction could be considered anatomically salvageable by reconstructive vascular surgery, 31 cases were selected for study. Nineteen had fresh occlusions of the superior mesenteric artery or its branches, 3 had old occlusions, and 9 had no demonstrable occlusions. No unequivocal differences in the clinical findings were found in these 3 groups. Of the 19 patients with fresh occlusions at least 15 had arterial obstructions that could have been corrected surgically or were sufficiently distal to allow a small resection of bowel. The importance of a functional element in the cause of bowel infarction and the therapeutic implications are discussed.

SAGALL


A 37-year-old woman suddenly complained of palpitation and dyspnea, and developed a loud continuous murmur and thrill in the mesocardiac region. Cardiac catheterization showed a left-to-right shunt with pulmonary hypertension. Because of increasing right ventricular failure the patient was operated upon and rupture of the sinus of Valsalva into the right atrium was found. The defect was corrected. A disk oxygenator was used, and the heart arrested by potassium citrate. All clinical symptoms disappeared within 6 months. This is the eighth reported case successfully treated.

LEPESCHKIN

VALVULAR HEART DISEASE


The characteristic clinical, electrocardiographic, and roentgenographic findings of aortic stenosis are described. Four degrees of severity of the condition are differentiated on the basis of the most important clinical symptoms, namely, angina pectoris, syncope, decreased exercise tolerance, and easy fatigability. Group I cases are in the symptom-free stage and show a pressure gradient across the aortic valve of 0 to 40 mm. Hg. Group II patients have moderate symptoms and a pressure gradient of 40 to 80 mm. Hg. Group III and IV patients suffer marked physical limitations and show a pressure gradient across the aortic valve of more than 80 mm. Hg. Group IV patients also present definite evidence of left and even right ventricular failure. The indications for surgery and the various methods of surgical treatment are briefly reviewed and discussed. Data from the author's series of 24 patients operated upon via the transventricular route indicate good results in 4, unsatisfactory results in 2, and 5 deaths occurring shortly after the operation.

SAGALL

VASCULAR DISEASE


The small vessels of the dermis and subcutis of the human fingertip and abdomen obtained by means of punch biopsies were studied with the electron microscope. Two distinctive types of capillaries were found. The ordinary thin-walled capillaries were seen predominantly in the more fatty areas and occasionally among the dense bundles of collagenous fibers of the dermis. These closely resembled the capillaries found in muscle, pancreas, and other organs, and their predominant function apparently was concerned with the exchange of fluid. A second type of vessel never previously reported was found in the vicinity of sweat glands. These vessels were lined by endothelial cells that were thicker than typical endothelium and contained cytoplasmic elements, suggesting that they are actively contractile. It appeared unlikely that these vessels had any important role in the exchange of fluid, and the authors suggested that these vessels by their contractile property played a role in the regulation of the temperature.

The cardiovascular and renal adjustments in blood flow that occurred immediately following the opening of a bilateral femoral arteriovenous fistula were investigated in dogs anesthetized with pentobarbital or morphine and pentobarbital. The volume of blood flow through the arteriovenous fistula averaged 53 per cent of the control cardiac output; however, the cardiac output increased only an average of 27 per cent upon opening the fistula. Since the increment by which the cardiac output increased was only about 51 per cent of the fistula shunt flow, a deficit in body flow occurred. The most prominent renal adjustment associated with opening the fistula was a decrease in renal blood flow and this was more prominent in the animals medicated with morphine (average decrease was 46 per cent). The authors concluded from this comparison of the per cent reduction in renal blood flow with the per cent reduction in blood flow through the systemic capillary beds that there was no indication that the renal vascular bed shared disproportionately in the circulatory deficit.

PAUL


Dissecting aortic aneurysm was found in 13 of 1,100 consecutive autopsies; 1 additional case was proved by aortography in a woman with Marfan's syndrome. Nine patients had hypertension, 2 patients had aortic stenosis, and 2 had previous thoracic trauma. In 2 patients rupture occurred in the descending aorta, in 3 at the arch and in 8 near the valves; in 6 of the latter a diastolic murmur of aortic regurgitation was heard. Eight patients showed chest pain, appearing suddenly and usually radiating to the back, neck, or right side. Pericardial friction rub was found in 1, peripheral arterial occlusion in 3, spinal signs in 2 patients. The electrocardiogram was typical of pericarditis in 1 and showed terminal T wave inversion without S-T segment displacement in V1-4 in 2 patients; in 1 of these the left coronary artery was compressed by the hematoma, but in the other the coronaries were not involved. Survival of more than 6 months occurred in only 1 of 7 patients with sudden onset of symptoms but in all of 6 patients with gradual onset.

LEPESCHKIN


A 30-year-old man had shown for many years marked systolic and diastolic hypertension in the upper but not the lower extremities and sinus bradycardia with only left ventricular hypertrophy in the electrocardiogram. Aortography revealed marked aortic stenosis immediately above the origin of the renal arteries. The patient died after unsuccessful operation and at autopsy this stenosis was shown to have a length of 7 cm. As the renal inulin clearance was normal, the hypertension is considered to result from the stenosis itself rather than from any resulting renal ischemia.

LEPESCHKIN


The structure and course of the subclavian arteries and their branches were studied in 400 cadavers. The findings were presented in detail along with numerous illustrations of the variations encountered. The surgical relationships of each major vessel were discussed.

ROGERS


Nicotine was administered intraarterially via the left brachial artery in 13 experiments on 11 healthy subjects. Blood flow in the corresponding hand (and in a few patients in the right hand) was measured with a venous occlusion plethysmograph. No correlation between the smoking habits of the subjects and the sensitivity to nicotine vasoconstriction was apparent. Nicotine was found to cause vasoconstriction in the hand when injected into the brachial artery. In general, the amount of nicotine assumed to be absorbed during smoking (about 2 mg of nicotine bitartrate per minute) was sufficient to cause vasoconstriction via a local mechanism. Sympatholytic and ganglion-blocking agents abolished the effect of nicotine. This appeared consistent with the assumption that nicotine caused a release of sympathomimetic agents from the chromaffin system in the human skin, but could also be explained by the existence of a peripheral nervous plexus containing ganglion cells.

KRAUSE

Arteriovenous fistulae have been reported following numerous surgical procedures. These seem to occur most commonly when there is mass ligation of arteries and veins particularly when the vessels are ligated with transfixed sutures. The use of needles, wires, pins, and devices for immobilization of bones near the anatomic course of blood vessels has also been a source of such fistulae. This report deals with the occurrence of a fistula between the splenic artery and vein following splenectomy in a 16-year-old boy for congenital hemolytic icterus. The only clinical manifestation was a loud, continuous, machinery type murmur found on routine physical examination. This murmur was located over an area 6 by 6 cm. in the posterior axillary line in the left posterior thorax at the level of the tenth rib. The diagnosis was established 2 years after the splenectomy. The fistula was successfully isolated and excised. Following removal there was no slowing of the pulse. Examinations postoperatively have revealed absence of the bruit. The importance of isolation and individual ligation of blood vessels the size of the splenic artery and vein is emphasized.

Levinson


Since the widespread use of angiography, thrombosis of the common and internal carotid arteries have been often demonstrated. The author reports spontaneous thrombosis of the external carotid artery, confirmed by angiogram in a 65-year-old man. The occlusion in this patient apparently caused severe pain on the right side of the head and numbness of the face. Ordinarily, therapeutic ligation of the external carotid artery for severe epistaxis will cause few or no symptoms. However, in this case the collateral circulation was probably inadequate and hence symptoms occurred with the thrombosis.

Krause


Alterations in the peripheral circulation occurring in the course of bowel function were studied by estimating peripheral venous pressure, segmental digital arterial blood flow, and peripheral vascular resistance. Data were obtained from groups of normal and constipated indi-
ividuals. The straining efforts associated with defecation produced an elevation of the pressure in both antecubital and saphenous veins, with an abrupt return to the base value after the termination of the strain. The use of the bedpan in place of the commode increased the incidence of higher pressure elevations in the antecubital vein, but lowered this incidence in the saphenous vein because of the lack of postural dependence of the venous system of the legs. There was a sharp reduction in segmental blood flow with the onset of straining, which persisted for the period of exertion. With the release of the strain there was transient return of blood flow toward control values followed by a second diminution, after which a vasodilatation occurred before the return to the resting state. During controlled exertions, the venous pressure rose proportional to the magnitude of the straining, and the digital blood flow and pulse volumes showed a pattern of change similar to that of the segmental circulation. In addition there was a marked rise in peripheral segmental and digital vascular resistance. The response was greater in the legs and toes than in the arms and fingers. This resistance was terminated at the conclusion of the strain only to be followed by a sharp increase during the post-strain period. Throughout the study the fluctuations among the constipated group were of a greater magnitude and frequency than those observed among the normal subjects. This reflected the greater straining efforts of this group. When a peristaltic stimulant was administered to the constipated group of patients, there were reductions in the magnitude and duration of the changes. The authors relate these excessive alterations in the peripheral circulatory dynamics during defecation to the occasional dislodgement or fragmentation of a thrombus with subsequent embolism, and suggest that the correction of constipation is of particular importance in the prevention of this catastrophe.

**SHEFS**


About 12 per cent of pregnant women develop varicose veins of the vulva. Most women develop these varicosities after the twenty-sixth week of gestation. Multiparous women have a higher incidence than primiparous. Vulval veins become distended from 1 or more of 3 sources of hypertension, namely: the long saphenous vein, the spermatic veins, or the pudendal tributaries of the internal iliac vein. The diagnosis of the various anatomical types of vulval varicosities was discussed. Eradication of these varicosities by surgery, when they caused considerable distress not relieved by other measures, was frequently beneficial and details are given for the surgical approach to each type.

**KRAUSE**


In a search for the causes of the known high mortality of aortic commissurotomy, the author reviewed clinical and autopsy data of 87 patients with isolated calcific aortic stenosis. The investigation revealed a very high incidence of coronary arteriosclerosis in this condition. Normal coronary arteries were present in only about 50 per cent of patients under 50 years of age. Twenty patients had myocardial infarction, attributable in 19 to coronary artery disease. The clinical diagnosis of coronary disease is difficult in the presence of aortic stenosis. It is to be suspected in patients older than 55 years who complain of anginal pain, or give a history suggestive of myocardial infarction, or have an electrocardiogram with an AQRS deviation to -60°.

**PICK**

**OTHER SUBJECTS**


The paper consists of a case report of a young male on whom, 2½ years prior to his death, a diagnosis of "malignaney, possibly of giant follicular type" was made on a biopsy specimen of a supraclavicular lymph node. He received a course of deep x-ray radiation in the hilar region, estimated to be 1860 r, additional radiation of an unknown quantity 1 year prior to death. Four months prior to his terminal admission he received 1,000 r plus 24 mg of nitrogen mustard. Initially he presented with dysphagia, dyspnea, nonproductive cough, cyanosis, tachycardia, tachypnea temperature of 104 F., and leukocytosis. He died with increasing dyspnea, cyanosis with wheezing and rhonchi in both lungs. Autopsy revealed erradiation of all traces of the mediastinal lymphoma. Of particular interest were the lungs which showed a remarkably paucity of air and some edema fluid; microscopically, the alveoli and bronchi were filled with a peculiar pink granular material. Alveolar epithelialization was prominent with considerable infiltration by lymphocytes, plasma cells, and foamy macrophages. Cavitation caused by alveolar wall disintegration was also noted. The arch of the aorta was smooth to the beginning.
of the transverse segment at which point there was an abrupt change characterized by considerable thickening. The intima bore a striking resemblance to changes usually associated with syphilitic aortitis. This lesion extended from a point 1.5 cm. below the arch of the left subclavian for a distance of 10 cm. The mediastinal mass consisted chiefly of dense collagenous fibrous tissue with calcification and necrosis, while the sternal bone marrow showed a complete absence of all cellular elements. The only apparent complications of the aortic lesion were small splenic and renal infarctions resulting from dislodged thrombi that had formed at the site of the aortic lesion. It was thought by the authors that the pulmonary injury was the predominant lethal factor although the aortic lesion was potentially lethal.

MAXWELL


This study describes changes in pulse rate, blood pressure, electrocardiogram, packed cell volume, hemoglobin, blood sugar, serum potassium, and plasma volume using 131I labeled albumin, one hour before and for 1 hour after oral ingestion of 100 ml. of 50 per cent glucose. Ten such studies were performed in patients with peptic ulcer prior to gastrectomy, 17 studies in patients with Polyga gastrectomy, 4 studies in patients before and after conversion from Polyga to Billroth I gastrectomy, and 5 studies in patients with gastrojejunostomy. Subjects with intact stomachs showed an increase in pulse rate, little change in blood pressure, to 4 per cent reduction in plasma volume, while the electrocardiogram was essentially unchanged, after administration of glucose. In postoperative patients pulse rate increased, blood pressure varied inconsistently, and plasma volume decreased 10 to 16 per cent. Changes were similar in all groups, although less marked in the gastrojejunostomy group. Electrocardiographic changes in the postoperative group were more consistent than in the group with intact stomachs. They included T-wave flattening and inversion, and S-T depression in leads II, III and aVF. U-wave formation was also noted. As expected, blood glucose rose in all the groups but no correlation between severity of symptoms and rise in blood sugar or fall in plasma volume was noted. No consistent change was noted in serum potassium.

MAXWELL

REVIEWS IN CARDIOVASCULAR DISEASE


ABSTRACTS

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