ABSTRACTS
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Abstracts

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BACTERIAL ENDOCARDITIS
A case is presented of a patient with bacteremia due to Streptococcus viridans and Brucella abortus. It is probable that the patient had brucellosis with bacterial endocarditis due to Streptococcus viridans, although endocarditis due to both organisms cannot be ruled out. The patient recovered after therapy which included chlortetracycline (Aureomycin), streptomycin, and sulfadiazine and has remained well.

BERNSTEIN

A case of bacterial endocarditis due to an Enterococcus was treated successfully with a combination of erythromycin, chlortetracycline, and streptomycin. This combination was found in vivo and in vitro to exhibit bacteriostatic potentiation and a bactericidal additive effect against the causative strain of Enterococcus. This combination of antibiotics was more bacteriostatic than penicillin and streptomycin in five other strains of enterococci. It was also more bactericidal than penicillin and streptomycin against three of these five strains. These results suggest that when a case of bacterial endocarditis due to enterococcus does not respond to penicillin and streptomycin the combination of erythromycin and chlortetracycline or of erythromycin, chlortetracycline, and streptomycin might be of benefit.

BERNSTEIN

BLOOD COAGULATION
The effect of hypothermia on the plasma and cell volume of blood, bleeding time, and clotting time was studied on 44 mongrel dogs. In well controlled experiments it was found that hypothermia to 23 to 25 C. caused a statistically significant prolongation in bleeding and clotting times.

Harvey

A method is presented for the extraction of heparin from human tissues. Results of tissue analysis show differences in the content of heparin in adult tissue and tissue from the new born.

Harvey

In rabbits with experimentally induced hypercholesterolemia of marked degree, the development of aortic atherosclerosis was not altered by the administration of depoheparin in 10 mg. doses intramuscularly three times weekly for eight weeks.

WESSLER

CONGENITAL ANOMALIES
Maxwell, G. G. and Crompton, C. W.: The Taussig-Bing Syndrome. A Report of Two Further Cases,

Taussig and Bing in 1949 described a new congenital heart syndrome in which the aorta arises entirely from the right ventricle, with the pulmonary artery originating from the left chamber while straddling a ventricular septal defect. The authors present two new cases. One had almost complete coarctation of the aorta between the left common carotid and the left subclavian artery, with patent ductus. Associated with this was deep cyanosis of the right upper extremity and absent pulse on the left. Angiocardiography is probably the best method of definitive diagnosis in the Taussig-Bing syndrome since the levoposition of the pulmonary artery is readily demonstrable.

HARRIS


The hereditary tendency in angiomatous disease of the nervous system has been noted by all observers who have studied the condition now known as hemangiomatosis (Lindau’s disease). Pathological specimens of patients with vascular tumors of the nervous system indicates these are capillary-cavernous hemangiomas often associated with cysts. In time they may accumulate lipid material and resemble hypernephroma. Treatment depends on the location of the tumor and its growth potential. The occurrence of these tumors is known in a single family through seven generations. Their presence must be suspected in members of any family with the diagnosis of hemangiomatosis (Lindau’s disease). The disease is transmitted as a Mendelian dominant, is notsex linked, and is one of the few inherited neoplasms of man.

KITCHELL

CONGESTIVE HEART FAILURE


Thiamine deficiency has been demonstrated in congestive heart failure by various direct and indirect means. Wohl and associates determined the content of thiamine and cocarboxylase (the active form of thiamine) in various tissues of patients with and without cardiac failure. The heart, liver and kidney tissues were examined in 12 cases of long-standing failure who received the usual treatment but no supplementary vitamins. The results were compared with 10 non-cardiac patients who died from brain tumor, coronary occlusion, cerebral hemorrhage. In all three tissues a lower concentration of total thiamine and cocarboxylase was found in patients with heart failure as compared with those who died of other causes. Statistical differences were significant only in the heart (for both substances) and in liver (for thiamine alone).

This indication of thiamine deficiency suggests that inadequate intake, poor absorption or enhanced excretion (as by diuretics) of the vitamin may be involved. The possible influence of the reduced thiamine-cocarboxylase content of heart muscle on myocardial metabolism deserves further study.

WAIFE

CORONARY ARTERY DISEASE


The authors described a method for studying the coronary arterial network in small animals and presented the results of ligating one or both main coronary arteries. Using such a procedure, myocardial infarction with survival resulted in a high percentage of cases in the mouse, hamster, rat and guinea pig.

It was concluded that despite various disadvantages imposed by the smallness of rodents, the described method of coronary occlusion produces a test infarct which is more nearly standard than any currently available.

ABRAMSON


Although the committee for the evaluation of anticoagulants of the American Heart Association recommended in its initial report in 1948 that “anticoagulant therapy should be used in all cases of coronary thrombosis with myocardial infarction unless a definite contraindication exists,” the American Heart Association itself has never officially recommended routine anticoagulant therapy. It appears there is more disagreement now regarding the correct management of these patients than when the report originally was published. This article poses 21 questions which are commonly asked about anticoagulants and gives detailed answers. It is pointed out that the process of intravascular thrombosis is extremely complex and involves both unknown and known factors. To this problem is added the problem of which patient to treat. The solution of the last problem would lead to more rational therapy in which possibly 10 per cent of patients would be treated with 100 per cent effectiveness instead of routine treatment in all patients which may be effective only in 10 per cent of the cases.

KITCHELL

Clinical and electrocardiographic records of 12 patients who sustained a posterior infarction followed by an anterior infarction were studied. A new anterior infarct superimposed upon an old posterior infarct showed the conventional serial pattern changes without undue delay. The serial electrocardiographic defects of the newer infarct materially changed the residual pattern of the old infarct.

Accurate diagnosis of the second infarction (anterior), and the previous posterior, depends upon the availability of serial electrocardiograms. The residual defects were those of both, of only the older posterior, or of only the anterior, or there were no defects of either infarction.

BERNSTEIN


A man, aged 31 years who suffered an acute myocardial infarction and died on the seventh day of illness is described in detail. The postmortem examination disclosed evidence of infarction in the anterior and lateral aspects of the left ventricle and the anterior wall of the left atrium including the appendage. A mural thrombus was attached to the endocardium on the anterolateral wall of the appendage. The localization of the areas of infarction was suspected ante mortem on the basis of electrocardiographic changes.

The changes in the electrocardiogram which are said to be suggestive of atrial infarction include an elevation or depression of the PR segment, depending upon the localization of the zone of atrial infarction, and the sudden development of atrial dysrythmias. The complications of atrial infarction include the various atrial dysrythmias, mural thrombi with resultant embolic phenomena and aneurysmal dilatation of the atrial wall, with subsequent rupture.

ROSENBAUM


It appears that anticoagulant therapy is neither necessary or desirable for patients who sustain their first acute attack of myocardial infarction and present no unfavorable criteria for recovery at the time of first examination. However, the appearance of poor prognostic signs in these patients should be regarded as a clear indication for the use of anticoagulants. Only about 30 percent of all patients require anticoagulant therapy but this low figure should not detract from the established value of such treatment in “poor risk” cases. The age of the patient should not be considered an important factor indicating or contraindicating the use of anticoagulants in acute myocardial infarction. There is already sufficient evidence to justify “prognostic classification” at the beginning of an attack as a means of selecting patients for anticoagulant therapy in acute myocardial infarction.

KITCHELL

The history of coronary artery disease may be divided into 3 periods. First is the period of clinical recognition which dates back about 40 years. Second is the period of revascularization which began in the experimental laboratory in 1932 and which has received slow but steady recognition. Third is the period of prevention which is for the future. Only a small beginning has been made in the experimental laboratory in prevention. The causes of death in coronary disease are of two types: mechanism death and muscle death. Surgical operations cannot stop the occlusive process or restore degenerated myocardium. Operation can prevent death by increasing the supply of blood by only 2–3 cubic centimeters in trigger areas which may set off a mechanism disturbance.

Two operations to increase blood flow are established on the basis of the experimental work. The number 1 operation consists of abrasion of the epicardium and lining of the peripheral portion, application of an inflammatory agent (0.2 Gm. of powdered asbestos) to these surfaces, partial occlusion of the coronary sinus where it enters the right auricle, and grafting of the peripheral portion and mediastinal fat to the surface of the heart. The number 2 operation consists of first shunting arterial blood into the coronary sinus by a free vein graft between the aorta and the coronary sinus or by direct anastomosis between these structures. Two or three weeks later the second stage of this operation is done and consists of partial occlusion of the coronary sinus where it enters the right auricle. This partial occlusion raises the blood pressure in the sinus and produces retrograde flow. Experiments with the ligation-mortality-infarct method have established the fact that these operations reduce both the mortality and the size of the infarct after occlusions providing the operation is done before the artery is ligated. In evaluating these operations for humans, the authors believe the most acceptable type of patient is the lean person in his forties or fifties who has had the disease for a year or more, having pain but still able to get around. Operation is not done within six months of an infarct. Patients with heart failure and patients in whom the heart is giving way and enlarging are not candidates for operation. Patients with status anginosis and with moderate enlargement of the heart are acceptable. It appears now that 4 out of 5 patients return to work after operation with little or no pain and the risk of operation has been reduced. At the time of this writing, of 27 patients operated on in 1954, one died from thoracotomy alone and one died after a coronary operation on the second day. These patients had severe degenerative disease of the heart.

Kitchell

Johnson, A. S., Frnenschmid, P. G. and Fulton, H.: Visualization of Coronary Sinus Graft and Venous


Thirty operations were performed in dogs and a Beck II aortico-coronary sinus fistula was produced. In nine of these retrograde aortographies was performed by introducing contrast medium into the left common carotid artery, and eight exposures were made at half second intervals. The results in two of these aortographies were technically unsatisfactory. Two other dogs died, one from cerebral edema, the other from gross hemorrhages at the site of the graft (four days postoperatively). In the remainder the coronary sinus graft and venous pathways were adequately visualized.

One third of the animals were digitalized, and the second stage of the operation (where the coronary sinus is narrowed) was omitted. None of these animals developed congestive heart failure. In another third of the series, where no digitalis was administered congestive heart failure was frequent. In the third group both stages of the operation were performed at the same time, the results were good. The authors recommend elimination of the second stage of the operation.

Schwedel


Changes in the plasma cholinesterase activity were observed in seven patients suffering from acute myocardial infarction. The studies were made over periods ranging from 10 to 36 days. The cholinesterase estimations were made according to Michel's original electrometric method. In all of the cases studied there was a fall in the cholinesterase activity of the plasma after myocardial infarction with an increase occurring during the patient's recovery. There was a clear correlation between the plasma cholinesterase activity and the leucocyte sedimentation rate with decreased values of the former corresponding to increased values of the latter and vice versa. There was no clear correlation between the plasma cholinesterase activity and the leucocyte changes nor was the plasma cholinesterase activity altered by the administration of morphine or atropine. In the febrile cases there was a greater fall in the plasma cholinesterase activity and a more marked increase in the erythrocyte sedimentation rate than in the non-febrile cases. The author expressed the opinion that this test is of value in diagnosis and also in prognosis in myocardial infarction since a continual decrease in plasma cholinesterase activity is an unfavorable sign whereas rising values indicate that recovery is proceeding.

Rosenbaum

The author studied a series of 369 patients having Dupuytren's contracture in an attempt to determine possible etiologic factors. He noted that the greatest number of cases was in patients between the ages of 55 and 75. Tuberculosis was believed to have some significance in the development of the lesion. However, neither sex, occupation, arthritis, diabetes, epilepsy nor myocardial disease could be implicated as possible causes for the disorder.


This report is based upon the study of 545 autopsied cases of recent myocardial infarction, 79 of which were associated with hemopericardium. Slightly less than half of them were observed prior to the first use of anticoagulants in 1946. Of the 302 cases treated after 1946, 71 received anticoagulants and 241 were not so treated. The incidence of hemopericardium with or without myocardial rupture was not significantly different in the two periods in the patients who did not receive anticoagulants. However, in those who did receive anticoagulants, there was a threefold rise in the prevalence of hemopericardium without rupture and a twofold increase in the occurrence of myocardial rupture. There was no difference in the time elapsed between the onset of symptoms of myocardial infarction and rupture in the treated and the untreated groups.

Mural thrombi occurred with equal frequency in the treated and untreated groups, a feature that made improbable the hypothesis that altered coagulation failed to accomplish sealing of a small defect or tear which might be the initial lesion of a myocardial rupture. In a single case, death resulted from massive hemopericardium with tamponade without myocardial rupture in a patient whose prothrombin concentration was reduced to a point below 10 per cent with Dicumarol. In another patient treated with Dicumarol, but with prothrombin levels in the therapeutic range, death resulted from tamponade due to hemorrhage from a coronary artery which ruptured at the site of the thrombus. It is emphasized that the risks, as well as the advantages of anticoagulant therapy of acute myocardial infarction, must be borne in mind.

**Rosenbaum**

**ELECTROCARDIOGRAPHY**


The authors reviewed their material of simultaneous pressure and electrocardiographic recordings in 633 cases submitted to cardiac catheterization with respect to incidence and dynamic effects of cardiac arrhythmias occurring in the course of the procedure, and their potential dangers. There were no fatalities. In practically all cases ventricular premature systoles were induced by the catheter. There were several instances of more severe types of arrhythmia, viz., runs of ventricular tachycardia or auricular fibrillation or flutter invariably with rapid termination without embarrassing the patient. The same was true for occasional onset of right bundle branch block or of A-V dissociation. In some cases the disturbances of rhythm started before the catheter entered the cavities of the heart which is ascribed by the authors to a "particular irritability of the heart" in certain patients. The conclusions arrived at from this study are that cardiac catheterization potentially can create dangerous situations because of the induction of a severe arrhythmia, but on the whole can be considered a benign procedure in cardiac diagnosis.

**Pick**


The authors report electrocardiographic findings in 70 cases with calcereous alterations of the aortic valve, 21 proven at autopsy, the rest radiologically. Eleven cases showed an entirely normal tracing or a borderline pattern. Definite abnormalities found in the others consisted almost invariably in signs of left ventricular hypertrophy, associated or complicated by alterations suggesting diffuse subendo- cardial ischemia or complicated by intraventricular and A-V conduction defects. The latter complications are variable but permit the differentiation from certain other conditions causing a left heart strain pattern. Thus, according to the authors, a T inversion in the left precordial leads is hardly found in pure rheumatic aortic insufficiency, and develops in hypertension only when the latter is complicated by coronary disease, or when hypertension takes a rapid progressive "malignant" course. On the other hand, in syphilitic aortic regurgitation the electrocardiogram frequently resembles that seen in calcific aortic stenosis.

The electrocardiographic pattern of calcific aortic stenosis appears to be determined by two factors, a permanent one caused by the obstacle to left ventricular outflow and a labile functional factor depending on the degree of impairment of coronary circulation developing and varying in the course of the disease.

**Pick**

One of the common artefacts that make electrocardiographic interpretation difficult is due to tremor of the somatic muscles. A simple technic for elimination of the disturbing effect of tremor involves the use of a set of self-retaining electrodes such as the one described by Welsh. The electrodes are applied to the shoulders and thighs of the patient instead of on the extremities. This is technically satisfactory since an electrode placed anywhere on an extremity records as though it were at the junction of the extremity with the trunk.

Kitchell


Electrocardiograms recorded following introduction of a venous catheter tipped by an electrode into the coronary sinus, are described and illustrated. The procedure was performed, by chance or by purpose, without accident in 37 subjects with various types of abnormalities in the conventional electrocardiographic leads.

The obtained records resemble, in general, electrograms obtained in animals and in man directly on the surface or the cavities of the heart. The method has the advantage of recording left ventricular potentials without the danger associated with retrograde catheterization of the left heart. The close contact of the electrode, introduced into cardiac veins with the surface of the various chambers, permits determination of the time characteristic of the intrinsic deflections in various locations. The actual duration of auricular and ventricular complexes can be exactly measured and corrections made for measurements in ordinary leads. Further advantages consist of establishing more precise criteria for hypertrophy of single chambers, in particular of the right ventricle, differentiation of hypertrophy from conduction defects of other etiology, and recognition of combinations of the two, or hypertrophy in more than a single chamber.

Pick

ENDOCRINE EFFECTS ON CIRCULATION


The distribution of water, sodium and potassium in the intra- and extracellular compartments of heart and skeletal muscle was studied in two groups of nephrectomized rats, in one of which adrenalectomy had also been performed. The animals were kept on a mixed diet, with either tap water or 0.5 per cent saline. Body extracellular fluid volume increased in all groups approximately equally. In the groups drinking water, there was evidence for an extrarenal action of the adrenals in controlling osmolality of the expanded fluid volume. This was probably accomplished by withdrawal of sodium from skeletal muscle and partly by depressing the desire for water. The effects on blood pressure were variable within all groups, except that the nephrectomized group drinking 0.5 per cent saline became significantly hypertensive. It appeared that the adrenals, acting in the absence of the kidneys, withdrew sodium from the cells to maintain the level of extracellular sodium, and in these circumstances, renopral hypertension occurred.

Enselberg


Glycosides in certain concentrations are known to increase the respiration of heart muscle slices of some species. The effect of nine cardiac steroids plus epinephrine in various molar concentrations ranging from $1 \times 10^{-8}$ to $1 \times 10^{-4}$ was studied on the heart muscle respiration of a single species (cat). All steroids caused a sustained increase in cardiac respiration, but the onset and peak of the increase depended on the glycoside concentration, the higher concentrations causing both to occur at an earlier time. The potency of these drugs varies in the following order from most active to least active: ouabain, cymarin, desacetylanghinin, acetyltanghinin, strophanthinidin, strophanthinidin-3-benzoate, strophanthinidin acid, thevetin and uzarin. Epinephrine and ascorbic acid failed to cause any change in the respiration of cat heart muscle.

These results suggest a fair correlation between in vivo cardio-toxic action and in vitro respiratory response of these compounds. In addition, small changes in their chemical structure caused great changes in their activity.

Wechsler


Using bioassay methods it is possible to measure sodium-retaining activity of material extracted from the urine. There is evidence that this material closely resembles the corticoid, aldosterone. Significant activity was observed in urinary extracts from edematous patients with lipemic nephrosis, hepatic cirrhosis and cardiac failure. The level of sodium-retaining activity seemed to be related to the sodium output, rather than to a specific disease, urine flow or state of hydration.
The stimulus to the hormone production does not appear to be pituitary corticotrophin but rather “inadequacy” of the circulation including depletion of plasma or extracellular volume.

Waife


Hypotension was induced in intact rats by dietary deprivation of potassium. Cortisone administration to such rats rapidly restored their blood pressures to normotensive levels. This study suggests that the restorative effect of cortisone upon blood pressure of potassium-depleted, hypotensive rats is not accounted for by augmentation of vascular responsiveness to pressor substances.

Bernstein


Changes in the basal metabolic rate in patients with Addison's disease were studied. It was found that the basal metabolism was abnormally low in these patients prior to treatment. When sodium chloride alone was given the metabolism became normal. When the diet contained a sufficient quantity of sodium chloride the addition of Doca or cortisone had no appreciable effect upon metabolism. When the metabolism had been restored to normal with a combination of sodium chloride and hormones and the hormones were withdrawn, the metabolism continued to be normal in two cases and became lower in a severe case, being restored to normal later when hormones were added once more. In view of these observations, the effect of sodium chloride deficiency upon basal metabolism was studied in three normal subjects. Each subject was placed on a strict saltless diet for 10 days and then subjected to daily Turkish baths for 6 to 10 days. This is said to have lowered the basal metabolism in all three subjects with immediate recovery after sodium chloride consumption. The author concludes that this effect is mediated through influence upon capillary activity and tissue flow. The question is raised that a surplus in the daily consumption of sodium chloride may cause a pathological disturbance of the capillaries although no experimental evidence is brought out bearing on this particular point in this communication.

Rosenbaum

HYPERTENSION


Reporting a controlled study of the effects of hydralazine in the hospital treatment of twenty-five patients with essential hypertension, the authors achieved a significant reduction in blood pressure in seventeen patients (68 per cent) over an average of thirteen weeks. There was regression of such changes as hypertensive retinopathy and cardiac failure in less than 25 per cent of these patients. Side reactions in most, and tolerance in some patients, require careful regulation of dosage and supportive measures. Hydralazine probably should not be used in patients with evidence of coronary or cerebral artery disease. Comparison with treatment by low sodium diet reveals hydralazine to be of somewhat lesser therapeutic potency. This advantage may be compensated by the greater ease of management of the drug.

Harris


A four-year investigation of the Kempner rice regimen in the treatment of hypertension conducted in a hospital environment under controlled conditions indicates that the effective anti-hypertensive principle is the restriction of sodium ion. In patients with essential hypertension in whom beneficial effects of stringent NaCl deprivation have been obtained, clinical improvement may be preserved on a more liberal diet than the Kempner rice regimen. Addition of 3 Gm. of NaCl daily to the rice diet from the time of its institution prevented any lowering of blood pressure. In patients with a significant anti-hypertensive response to the rice or special low-sodium diets the addition of 0.5 Gm. NaCl daily did not usually elevate the blood pressure. Addition of larger amounts of NaCl usually did evoke significant rises in blood pressure. In patients with a favorable response to the unmodified regimen no loss of beneficial effects was noted when 12 to 50 Gm. per day of low-sodium protein, 20 to 40 Gm. per day of fat and 200 Gm. per day of vegetables were added singly or together to the diet. Decreases in blood pressure similar to those obtained with the rice diet occurred in three patients who were given a special low-sodium diet without previous treatment with the Kempner regimen.

Harris


The author reviews his experience with supradiaphragmatic splenectomy section for essential
hypertension and makes particular reference to a series of 268 cases in which the dissection was carried from the twelfth dorsal to, or above, the sixth dorsal segment as a one-stage procedure. This was done by Dr. M. M. Peet in a period from 1946 to 1949. The operative mortality in this group was 3 per cent. Of these patients, 241 were followed for five to eight years. During this period, 57 died, 101 had good results and 33 had an excellent result as indicated by a normal blood pressure. It is mentioned that when patients with severe headache are subjected to splanchnic section, the complaint almost invariably disappears even when the blood pressure is not reduced. The author feels that if the blood pressure is extremely high or is tending to climb, especially in men, and if it does not respond to medical treatment, operation should be advised, even in patients between the ages of 50 and 55 years, if symptoms are severe. It is felt that it is still not proved that it is necessary to carry the dissection below the diaphragm to remove lumbar ganglia to produce a maximum lowering of the blood pressure. It is mentioned that “total sympathectomy” may be advantageous in patients with angina pectoris, tachycardia and vasospastic states of the upper extremities. Splanchnic section should be performed with caution in patients with peptic ulcer or severe gall-bladder disease. Chyllothorax occurred as a complication in 8 cases of approximately 2500 subjected to supradiaphragmatic splanchnic section.

Rosenbaum


Enough potent antihypertensive substances are now available to lower the elevated blood pressure in all cases of arterial hypertension effectively. The main questions are “How should it be controlled?” “To what extent?” and “What are the hazards of control?” In controlling the severe stages of hypertension the neurogenic sympathetic influence must be blocked or abolished and the pressor substances in the blood simultaneously inactivated. Acting on the central nervous system are Rauwolfia serpentina and its alkaloid, reserpine. Hexamethionium and pentapyrroldinium block the ganglionic transmission of sympathetic and parasympathetic impulses, presumably by competing with some natural quaternary ammonium compounds. The desirable effect is upon the sympathetic ganglia, the undesirable upon the parasympathetic. Protoveratrine acts upon the parasympathetic nervous system in some manner not thoroughly understood, possibly upon the higher centers, the carotid sinus or vagus. The net result is stimulation. The drug also acts upon the vomiting center in doses close to therapeutic ones. Hydralazine, acting on vascular smooth muscle or kidney, apparently controls the nephrogenic factor. Pharentasin is directly inactivated by this agent and the pressor action of some but not all primary amines inhibited in a manner not understood. This drug affects the neurogenic factor little if at all, except in very large doses. Renal vasodilatation in the face of a lowered blood pressure occurs. The known actions of the hydrazines include binding of certain heavy trace metals, combination with sulfhydryl compounds, and attachment to carbonyl groups. Amino acid decarboxylase is inhibited in vitro.

Using hexamethonium and hydralazine in combination (Hyphex), Schroeder presents the results of their use in 204 severe hypertensive patients. Severe benign and malignant hypertension regressed into mild or moderate stages in all cases adequately treated. Reserpine was also useful. Combination therapy of two or more drugs were usually required. Limits of effectiveness of the method lay in the production of renal insufficiency.

Harris


A colony of rabbits was raised using as original breeding stock naturally occurring hypertensive rabbits of hybrid strains. Careful measurements of blood pressures were made on these rabbits over several years time. It was found that there was a high incidence of elevated systolic blood pressure in the offspring of these rabbits. This systolic rise is characterized by only moderate elevation, naturally occurring fluctuation, and increasing height with advancing age.

Harvey


Cross circulation was effected in dogs by connecting the central end of the aorta of the one dog with the peripheral end of the other dog and vice versa. Simultaneous carotid and femoral pressures were recorded. Injection of a circulatory hypertensive hormone (nor-adrenalin) into the femoral vein of one dog caused increase in the carotid pressure of the treated dog followed by increase in the femoral pressure of the untreated dog. The femoral pressure of the treated dog was unaffected. Quite different, however, was the response to stimulation of the central end of the cut vagus in the one dog. In this situation the pressure in the stimulated dog of both the carotid and femoral arteries rises followed by a less marked rise in the pressure of the femoral artery of the unstimulated dog. The authors believe this is evidence that there is a hypertensive
substance liberated from the arterial walls themselves.

Harvey


The ability of the bitartrate salt of Pentapyrrolidinium to lower blood pressure of a group of hypertensive patients was studied and the duration of its effect was compared with the duration of effect of a comparable dose of hexamethonium. Pentapyrrolidinium bitartrate did not consistently produce a more prolonged effect than hexamethonium; in several instances duration of effect was less.

Although side effects are not specifically included in the data, they did occur with both drugs in a few instances, and consisted mainly of lightheadedness which was experienced by several patients on standing. The response of the hypertensive patients to the ganglionic blocking agents varied widely.

Simon


Pentapyrrolidinium bitartrate which is a ganglionic blocking agent with potent hypotensive properties has been employed in treatment of 24 patients. By giving this drug either by mouth or by subcutaneous injection the authors have been successful in reducing significantly the blood pressure of 23 of 24 patients with severe hypertension so treated. Thirteen hypertensive patients have been under treatment with pentapyrrolidinium for periods of 1 to 7 months and satisfactory control of the blood pressure has been maintained in all. This has been accompanied by symptomatic improvement, restoration of cardiac compensation when previously impaired and regression in the hypertensive changes in the retinas of most of the patients.

The incidence and severity of side reactions to pentapyrrolidinium which include constipation, orthostatic weakness and dryness of the mouth, have been disappointingly great. From this study they have concluded that the use of pentapyrrolidinium should be restricted to patients with severe hypertension that has failed to respond to simpler treatment and should be initiated only for hospitalized patients by physicians familiar with the capriciousness of ganglionic blocking agents.

Simon


The effect upon the blood pressure of chlorpromazine was investigated in ten adults with benign essential hypertension. The drug was administered intramuscularly. There was no effect of the blood pressure taken in the recumbent position, but there was lowering of the systolic pressure in all, upon standing, which persisted for four hours. There was also a lowering of the diastolic pressure in six of these individuals.

Harvey

Fremont, R. E.: Hypertensive Crisis and Severe Myocardial Ischemia Induced by Piperoxan, with Comments on the Differential Diagnosis and Treatment of Hypertensive Crises. Angiology 5: 381 (Oct.), 1954.

A patient with hypertension and established coronary artery disease with old myocardial infarction developed electrocardiographic evidence of myocardial ischemia after receiving piperoxan intravenously. The hazards of this drug in patients with coronary artery disease is discussed.

Wessler


Studies were made on groups of adrenalectomized rats, drinking either water or 1.5 per cent saline, and treated with DOCA, cortisone, or a combination of both. The blood pressure response to cortisone differed from that to DOCA in that it was more uniform, occurred more quickly, and remained at a maximum level. In groups of rats drinking 1.5 per cent saline, simultaneous treatment with DOCA and cortisone resulted in greater hypertension than expected from either steroid alone. This effect was also observed in animals drinking water, and in animals with intact adrenals.

Electrolyte disturbances occurred as expected. For example, adrenalectomized rats drinking water showed a fall in extracellular fluid volume and plasma sodium, and there was no evidence of entry of sodium into heart or skeletal muscle. Other electrolyte studies pointed out the lability of intracellular sodium and potassium in skeletal muscle as compared with cardiac muscle. It appears that expansion of the extracellular fluid volume is not an essential for the development of hypertension. Nor is there evidence that intracellular hydration is concerned with hypertension. Though there is no consistent pattern of fluid electrolyte disturbance in steroid hypertension, it is noted that there is one disturbance common to three types of experimental hypertension (renal, adrenal steroid, and renoprival)—that is a relatively higher extracellular
than intracellular sodium concentration in the heart muscle. Whether this has causal relationship to hypertension is not known.

Enselberg

Pathologic Physiology


A study was made to clarify the mechanisms responsible for the dumping or postgastrectomy syndrome (the sensation of fullness and churning in the epigastrium followed by or associated with weakness, sweating, tachycardia, tachypnea, pallor and an elevated blood pressure). Hypertonic solutions or a test meal were given to 10 patients who had undergone total gastrectomy, four who had had subtotal gastrectomies and one who had a feeding jejunostomy. Six patients with intact stomachs were used as controls.

Intrajejunal administration of hypertonic solutions caused an acute decrease in circulating blood volume resulting from a shift of plasma water into the intestinal lumen. Electrocardiographic alterations and symptomatology typical of the dumping syndrome were noted coincidental with the decrease in blood volume. Similar changes did not occur in patients with intact stomachs who were given equivalent amounts of hypertonic solution.

It was suggested that the acute drop in blood volume, with subsequent stimulation of presso-receptors associated with regulation of arterial blood pressure, was implicated in the sympathetic component of the dumping syndrome.

Abramson


In these experiments "neural dogs" may be defined as follows: exercising legs which are connected to the body only by nerves. Another dog, connected to the exercising legs only by vessels is designated a "humoral dog." Cardiac output of neural dogs increases more than that of intact controls during exercise. A-V oxygen differences and ventilation-perfusion ratios are decreased. In the humoral dogs the output is also increased. Here however, the A-V oxygen differences are increased. This last is interpreted to mean that humoral factors alone are insufficient to regulate output during exercise. A failure of the peripheral circulation results.

Oppenheimer


It was demonstrated that when normotensive dogs were rendered hypertensive by the intravenous administration of norepinephrine, a significant reduction in glomerular filtration rate and renal plasma flow occurred. Comparable studies were done in nine normotensive humans using norepinephrine. A reduction in renal plasma flow occurred when these patients were rendered hypertensive, but glomerular filtration rate was not similarly reduced.

Norepinephrine is effective in improving renal function in normovolemic shock and in some cases of hemorrhagic shock.

Determination of glomerular filtration rate as related to mean blood pressure reduction was accomplished in 17 patients with untreated hypertension. In both the hypertensive and the normotensive patients, there was a decrease in glomerular filtration rate as the blood pressure was reduced. In patients with hypertension, when the blood pressure is lowered into a normal range (mean blood pressure of 95 mm. of mercury), the glomerular filtration rate is depressed far below the control value. In comparison, when the blood pressure of the normotensive group is reduced to a hypotensive range (mean blood pressure of 71 mm. of mercury), the glomerular filtration rate remains well within the range of normal and shows only a 14 per cent reduction from the control value.

Bernstein


The chronic physiologic and pathologic changes following experimental pulmonary stenosis were studied in a series of 29 dogs. The valvular changes were produced by the application of fuming nitric acid to the pulmonary cusps. Of the series, four died in right heart failure. Three of these showed a pronounced rise in right ventricular pressure but no change in pulmonary artery pressure. In all the animals, autopsy revealed right ventricular hypertrophy and inelasticity of the proximal portion of the pulmonary artery, with narrowing of the vessel immediately distal to the insertion of the cusps.

Abramson


In patients with prolonged elevation of P$_{CO_2}$ the respiratory center loses its normal degree of
sensitivity to carbon dioxide. Hypoxia then becomes
the dominant stimulus to respiration. Breathing
99.6 per cent oxygen removes this hypoxic stimula-
tion to respiration and decreases significantly the
respiratory minute volume and effective alveolar
ventilation. Subsequently the $P_{a}CO_{2}$ becomes
elevated and the pH of the blood is depressed to a
lower level. Uncompensated respiratory acidosis
supervenes. In the more diseased states coma ensues.
Morphine and barbiturates in small doses may
depress the minute volume and effective alveolar
ventilation in patients with pulmonary emphysema.
Morphine adversely affects patients with emphysema
in three ways: (1) The respiratory center in the
presence of morphine responds less rapidly to higher
levels of $P_{a}CO_{2}$ and a lower pH. (2) The carotid
body fails to stimulate respiration normally in the
presence of further hypoxemia. (3) The central
nervous system is depressed to the extent that the
Hering-Breuer reflex fails adequately to assist
respiration in the normal way. Respiratory acidosis
with coma readily develops in these patients be-
cause they retain large quantities of carbon dioxide
in the pulmonary alveoli and arterial blood.

HARRIS

Kouvenhoven, W. B. and Milnor, W. P.: Treatment
of Ventricular Fibrillation Using a Capacitor
Discharge. J. Appl. Physiol. 7: 253 (Nov.), 1954.
The purpose of this investigation was to develop a
simple effective capacitor discharge apparatus for
the treatment of ventricular fibrillation without
performing a thoracotomy.

Capacitor discharges were passed directly through
the heart of open chested dogs by means of electrodes
placed on the right and left ventricle and by means
of electrodes fastened to opposite sides of the chest
in closed chest dogs. Ventricular fibrillation was
produced and then defibrillation was attempted by
these capacitor discharges.

In closed chest dogs, capacitor discharges of
greater energy (500 watt-seconds) were required for
successful defibrillation than in the open chested
dogs (5 watt-seconds). These results were obtained
when the fibrillation persisted for less than 40
seconds. Low energy capacitor discharges were
more likely to produce ventricular fibrillation than high
energy discharges.

WECHSLER

Denson, J. S. and Joseph, S. I.: Cardiac Rhythm
and Endotracheal Intubation—a Clarification.
Anesthesiology 15: 650 (Nov.), 1954.
The authors obtained continuous electrocardio-
graphic tracings during 110 intubations of the
trachea in patients under cyclopropane anesthesia.
In 106 instances, no change in cardiac rhythm was
observed either during laryngoscopy or with the
passage of the tube through the vocal cords into
the trachea. The four instances of arrhythmias
observed at this time in two patients were related
to apnea rather than to passage of the airway into
the trachea. In 87 patients, there was no change in
the rhythm during the period immediately following
intubation, and in 19, ventricular arrhythmias
appeared six seconds to four minutes after intuba-
tion. In all of the cases, the original rhythm was
restored only by increasing or improving pulmonary
ventilation (adequate supply of oxygen and elimina-
tion of carbon dioxide). On the basis of these
observations, it is postulated that the significant
factors responsible for the arrhythmias observed
with endotracheal intubation are either carbon
dioxide excess, oxygen deficiency, or both, and not
reflex mechanisms as has been commonly believed.

SAGALL

Smith, J. A., Glassman, M., Lind, A. H., Post, M.,
Sohn, H. and Warren, S.: Effects of Ouabain on
Beat and Oxygen Consumption of Embryonic
Embryonic chicken hearts, dissected free and placed
in a Ringer bath, were observed and by a suitable
arrangement oxygen consumption measured. Oua-
bain, added to the bath in low concentrations, caused
a rise in oxygen consumption proportional to the
concentration. In higher concentrations it not only
increased oxygen consumption, but caused an in-
crease in the rate of the beat and finally irregularities
in its rhythm. Atropine, added to the bath, de-
creased the severity of these irregularities without
altering oxygen consumption.

HARVEY

von Ahn, B.: The Acute Effect of Tobacco Smoking
and Nicotine on the Electrocardiogram Especially
During Induced Hypoxia. Acta med. scandinav.
The author reviews the literature pertaining to
the effect of tobacco upon the heart and the elec-
trocardiogram. From the reports recorded, smoking in
most cases produces an increase in heart rate with
a simultaneous flattening of the T waves not
exceeding 1 to 2 mm. in the standard limb leads.
It is believed that these changes are the result of
increased sympathetic tone rather than to coronary
insufficiency. The author reports his observations
on a group of 59 subjects ranging from 20 to 28
years in age and a second group of 27 patients
ranging from 38 to 57 years in age. Studies were
made during hypoxia, cigarette and cigar tests both
with and without hypoxia, following the intravenous
injection of nicotine during hypoxia and with
exercise on a bicycle ergometer during hypoxia.
Control observations were carried out in all in-
stances. In a 17 to 18 minute hypoxia test breathing
a mixture of 6.5 per cent oxygen, 4.5 per cent
carbon dioxide and 89 per cent nitrogen, a spon-
taneous flattening of the T waves was recording which was designated the time-factor, and which occurred in spite of constant heart rate and constant oxygen saturation. Smoking during hypoxia resulted in a slight or moderate increase in heart rate with a simultaneous flattening of the T waves and a slight depression of the S-T segment. The intravenous injection of 1 to 3 mg. of nicotine produced essentially the same changes as smoking but also resulted in increased hyperventilation and, in the larger doses, euphoria or other evidence of intoxication. Arrhythmias consisting of extrasystoles were observed rarely during smoking with hypoxia. The effect of smoking or nicotine during hypoxia is considered in part "physiologic" through stimulation of the sympathetic ganglia and in part "pathologic" in that it may cause through some nervous and humoral mechanism a reduction in coronary flow to the point at which coronary insufficiency develops during the hypoxia test.

The author is of the opinion that the electrocardiographic changes associated with smoking are due to increased sympathetic tone. This belief is supported by the observation that the "pathological" electrocardiographic changes of heavy smoking or nicotine can be simulated by the injection of adrenaline. Furthermore, in certain cases the development of electrocardiographic changes usually provoked by smoking can be almost completely prevented by the use of dicyclohexylamine. Exercise produced flattening of the T waves similar to that after nicotine in one-half of the cases studied and in the other half there was more marked decrease in the height of the T waves after exercise. It was concluded that the electrocardiographic changes induced by smoking or the injection of nicotine during hypoxia were due chiefly to the simultaneous increase in the heart rate. In the occasional cases in which heavy smoking or the injection of nicotine resulted in flattening of the T waves without associated increase in heart rate, the response was attributed to increased adrenal secretion. However, in the rare cases of acute nicotine poisoning which have been recorded in which the changes observed have included serious arrhythmias, various forms of heart block and, rarely, changes in the R-T segment together with abnormally high, sharp T waves, it is believed that the alterations are due to some electrolyte imbalance, possibly hypopotassemia. The author is doubtful that the electrocardiographic changes observed in persons with clinically healthy hearts following smoking or the injection of nicotine are of coronary origin.

A distinction is made between "tobacco angina" and "angina pectoris precipitated by tobacco-smoking." The former is said to be common in heavy smokers, both normal persons and those with cardiac disease; it does not develop in immediate association with smoking, it lasts for one to several hours, is of long duration and is not of coronary origin. The latter is a rare syndrome occurring only in patients with coronary artery disease, always develops in immediate relation to tobacco-smoking, is characterized by pains clearly of coronary origin and associated with pathological electrocardiographic changes.

Rosenbaum


Pulmonary arterial hypertension results from either an increase in pulmonary blood flow with relatively normal resistance or, conversely, of an augmented pulmonary vascular resistance with relatively normal or even diminished pulmonary blood flow. This paper presents a group of seven patients with maximal increase in pulmonary vascular resistance who comprise a clinically homogeneous group. They gave a history of exertional dyspnea; early cyanosis was noted in all but one. The only constant cardiac finding on physical examination was the marked accentuation of the second pulmonic sound. X-rays and electrocardiograms revealed right ventricular hypertrophy. The pulmonary vasculature was prominent at the hilum and normal or diminished at the periphery of the lung fields. All cases showed pulmonary arterial hypertension with increase in pulmonary vascular resistance to at least systemic levels. Arterial unsaturation was present in all. The clinical picture resembles that of essential pulmonary hypertension except that the authors do not exclude patients with congenital heart disease. The common denominator in all their patients was the maximally increased pulmonary vascular resistance, i.e., pulmonary vascular obstruction. In the differential diagnosis of this syndrome, congenital heart disease patients with large left to right shunts, with or without pulmonary arterial hypertension, are most important to consider. This group can be distinguished from the pulmonary vascular obstruction syndrome by the x-ray finding of significant cardiac enlargement and the uniformly plethoric lung fields. This group must also be distinguished from patients with "secondary" increase in pulmonary arteriolar resistance or valvular pulmonic stenosis and patent foramen ovale or a ventricular septal defect. The authors suggest that patients with maximally increased pulmonary vascular resistance should be classified as a separate group, irrespective of whether or not they have congenital heart disease. No known treatment exerts significant influence on the course or prognosis of pulmonary vascular obstruction.

Harris
ABSTRACTS

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