ABSTRACTS
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Abstracts

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PULMONARY DISEASES


Two machines useful as mechanical aids to ventilation are described. The first is a rhythmically inflated abdominal belt functioning alternately with mouth inspiratory positive pressure. This apparatus provides a forced expiration in contrast to the passive expiration of inspiratory positive pressure breathing therapy alone. This mechanism increases alveolar ventilation and is useful in patients with severe pulmonary emphysema. It maintained the blood pressure in 1 patient with vasomotor instability. The second apparatus provides alternate and rhythmic electrical neuromuscular stimulation of the diaphragm and lower abdominal muscles. This is a more difficult machine to use. It also provides adequate ventilation in emphysematous patients. It shows promise as an instrument useful in initiating diaphragmatic breathing exercises in those patients whose disease has impaired diaphragmatic motion.

LEPESCHKIN

KARPMAN


Injection of 5 to 6 ml. of 76 per cent Urografin into a pulmonary arterial catheter in the wedge position enabled visualization of the terminal subsegmental arteriolar, capillary, and venous systems 1.5 to 2.5 seconds after injection. After 1 or 2 minutes the dye in the venous system became diluted, but the arterial and capillary systems remained filled as a "stationary angiogram" if the position and pressure of the catheter were not changed. Withdrawal of the catheter caused all dye to disappear. The observation that the stationary angiogram showed a smaller diameter of the arterioles than the immediate angiogram was interpreted as signifying that the increased oxygen saturation of the stationary venous and capillary blood caused a reflex arteriolar constriction. The purpose of this constriction could be to prevent a higher pulmonary flow than is necessary for complete saturation of capillary blood, and pulmonary arteriovenous anastomoses are considered as safety valves preventing excessive pulmonary hypertension. These anastomoses could be seen in terminal angiograms, especially in pulmonary emphysema, where capillary flow is diminished. The reduction in angiographic capillary filling can be used to assess the severity of pulmonary emphysema.


A case is reported of a 28-year-old woman afflicted with pulmonary hypertension who had gone through 1 pregnancy and 1 miscarriage. Histologic studies of the pulmonary arteries with graphic reconstruction of series of the sections revealed polypoid fibrous vascular obstructions resembling small emboli. The authors suggest that postpartum pulmonary hypertension, which has been presumed to be primary, may in fact be secondary to small pulmonary microemboli.

HURRIMANN
RENSO AND ELECTROLYTE EFFECTS
ON THE CIRCULATION


The recovery of the physiologic properties of the heart was studied after the production of cardiac arrest by potassium citrate in isolated dog hearts perfused by a donor dog. During cardiac standstill the heart showed no mechanical or electrical activity. When the excess of potassium was washed out from the heart and perfusion with the donor dog reestablished, the physiologic properties of cardiac tissues recovered generally during the first 15 minutes. The return to control values occurred in the following order: ventricular and atrial conduction velocity; ventricular and atrial excitability, and conduction velocity of the atrioventricular system and refractory periods of the atrium, ventricle, and atrioventricular system. Cardiac contractility usually recovered in 2 stages, an initial rapid one, followed by a period of slower recovery. In some cases, once the perfusion was reestablished, the heart fibrillated or showed relative failure. This was much more evident when excessive doses of potassium citrate were used to induce cardiac arrest. When the heart showed poor contractility after an excessive dose of potassium citrate, its properties recovered with more difficulty. In such cases the use of drugs such as norepinephrine and calcium chloride had a temporary effect on heart rate and contractility; strophanthidin had a more lasting effect upon contractility, and barium chloride had a considerable effect on the automatic properties of the heart. This last drug initiated automatism in some cases in which automatic activity did not recover after coronary perfusion; contractility was increased in a more evident and lasting fashion.


Fibrillation was induced by electric stimulation of isolated rabbit atria suspended in low-potassium media in the presence of acetylcholine. The influx and efflux of K⁺ was measured in various experimental situations. Acetylcholine increased both influx and efflux of potassium, whereas during fibrillation only an increase in efflux was obtained and influx remained essentially unchanged. Thus the authors propose that the changes induced by acetylcholine result from an increase in membrane permeability to potassium that apparently does not occur during fibrillation. They conclude that an inhibition of active potassium uptake is not involved in the initiation of fibrillation and that the process results from a marked increase in sodium permeability.


Electrically induced ventricular fibrillation was studied in the isolated rabbit heart during coronary perfusion with various solutions and at various temperatures. Fibrillation was promoted by lowering the sodium or potassium concentration of the perfusate, by raising the calcium concentration, and by maintaining higher temperatures up to 37°C. These conditions were also associated with an increase in amplitude of the nonfibrillating heart beat. Therefore, it seemed likely that an increased oxygen requirement contributed to effecting spontaneous fibrillation. It was suggested that experiments involving perfusion of the whole heart be done at temperatures of 32°C or lower.


Sodium retention in congestive failure appears to be more dependent on the extent of tubular sodium reabsorption than on a reduction in glomerular filtration rate. Knowledge is lacking of many of the mechanisms by which body sodium content is altered in various states of health and disease, but certain concomitants of congestive heart failure, such as malnutrition, hypoxia, and distortions of the intrarenal circulation, may play a significant part. Over-all volume of body fluids is not the sole factor in sodium retention, since a change of body position can affect sodium excretion. Tubular sodium reabsorption is increased by standing or wearing cuffs about the thighs to pool blood and extracellular fluid volume in the legs. Lying down has the opposite effect, as does the closing of an arteriovenous fistula. Water retention, or hyponatremic edema, in the patient with congestive heart failure, is probably caused by an altered "set" of the mechanisms that control antidiuretic hormone release and the sense of thirst. Treatment with strong salt solution or water restriction or both may be helpful. As a rule, however, greater benefits follow an improvement of myocardial function by giving a little more, or perhaps a little less, digitalis, control of infection or thyrotoxicosis, or greater limitation of the patient’s activity.

Maxwell

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The author studied the effect of changes in the external potassium concentration on the resting potential and on the rate of repolarization of the action potential in isolated rabbit atria. In potassium concentrations between 4 and 11 mM, the calculated regression relating resting potential to potassium concentration had a slope of 56.03±1.77 mV per 10-fold change in potassium. Repolarization was faster in solutions where the potassium concentrations were either low (1.0 to 3.5 mM) or high (10 to 11 mM) as compared to solutions where the concentrations were 5 to 6 mM. The resting potentials remained stable at each potassium concentration for as long as 3 hours, and there was no tendency to revert towards "normal" if the external potassium were changed.

KARPAN

REVIEWS IN CARDIOVASCULAR DISEASE


RHEUMATIC FEVER


An appraisal has been made of the results of valvular surgery in 37 rheumatic patients under 20 years of age. In the past it has been assumed that surgery for rheumatic heart disease should be limited to older patients because of the supposed risk of reactivating the rheumatic infection. No reactivation occurred in any patient reported here and thus it would appear that indications for cardiac surgery in the younger patients are essentially the same as those applied to older persons and should not be influenced by the factor of age with the fear of recurrence of rheumatic activity.

KITCHELL


In a group of 43 adult patients treated for acute rheumatic fever clinical or laboratory evidence of the "rebound phenomenon" appeared in 22 patients. The rebound phenomenon was defined as the occurrence of any one of the following manifestations upon reduction or discontinuation of suppressive drug therapy: fever, elevation of the erythrocyte sedimentation rate, reappearance of C-reactive protein in the blood, arthralgia, arthritis, chest pain, electrocardiographic abnormalities, pericarditis, or congestive heart failure. Of the 22 patients, 14 had 1 rebound, 7 had 2 rebounds, and 1 had 4 rebounds. Fever, arthralgia, and tachycardia were the most common clinical manifestations, with arthritis and pericarditis occurring less frequently. Elevation of the erythrocyte sedimentation rate, reappearance of C-reactive protein were the most frequent laboratory findings. No obvious correlation was found between the rebound phenomenon and the dose or type of drug used for treatment. Salicylates, adrenocortical hormones and a combination of salicylates and hormones were used as treatment. The duration of illness prior to therapy, the duration of therapy, and the mode of withdrawal of the drug did not appear to influence the incidence of the rebound phenomenon. In all patients, re-institution of therapy was effective in controlling the manifestations. The authors believe that the rebound phenomenon is an indication of persistent rheumatic activity and requires prompt therapy.

KAYDEN


A series of 175 biopsy specimens of left atrial appendages removed at mitral valvulotomy revealed all stages in the development and regression of rheumatic lesions. Collections of mucopolysaccharides in the tissue spaces were apparently the earliest lesions. Aschoff nodules were found in the later stages of the rheumatic process and were usually associated with less mucopolysaccharide deposition than was present in the early lesions. Active lesions were found in 64 per cent of the 175 biopsies, whereas the early nonspecific changes occurred in only 9 biopsies. The author concluded that since 47 per cent of
the patients in the series had no history of acute rheumatic fever and all of them had been investigated prior to operation to exclude clinically active disease, it would appear that acute rheumatic fever is only an episode or a series of episodes in a long-continued subclinical disease.

Karpman


Three-hundred and sixty children from the Herrick House in Bartlett, Illinois, were followed from 2 to 14 years after an episode of rheumatic fever. Increasing activity was allowed these children immediately after certain physical findings and laboratory studies (especially temperature, sleeping, pulse rate, leucocyte count, erythrocyte sedimentation rate) approached normal limits. Most of the children were advanced to unlimited physical activity within 2 to 5 months. The authors conclude after thoroughly examining these patients 2 to 14 years after the initial episode of rheumatic fever that prolonged bed rest and restriction of activity after an acute attack of rheumatic fever were not necessary for optimal healing of the injured heart; in fact, the results suggested that the effect of early activity may have been beneficial rather than deleterious.

Karpman


Fifty children with acute rheumatic fever were randomly divided into 2 groups; 1 group was placed on sulfadiazine (0.5 Gm. twice daily) and the other group was placed on erythromycin (100 mg. twice daily). These patients were followed for an average of 19½ months, and it was observed that 7 patients in the sulfadiazine group had positive cultures for group A streptococci whereas there was only 1 such patient in the erythromycin group; 1 patient in the sulfadiazine group developed a recurrence of rheumatic fever. The authors concluded that erythromycin appeared to be superior to sulfadiazine in their study and that it more nearly satisfied the criteria for an ideal long-term prophylactic agent against group A streptococcal infections in patients who have had rheumatic fever.

Karpman

ROENTGENOLOGY


To the present time there has been no simple or reliable method for differentiating mitral stenosis from mitral insufficiency. In the presence of mitral insufficiency curves made at left heart catheterization, with pressure and flow measurements, have been difficult to interpret. The authors used a special catheter, which was introduced by way of the femoral artery, passed into the left ventricle, and placed in the apex. The opaque medium was slowly injected during a period of at least 4 consecutive systoles. In pure mitral stenosis there was no opacification of the left atrium. With mitral insufficiency the opaque medium accumulated in the left atrium and stained it more densely than the left ventricle and the aorta. It was thought that the degree of opacification correlated directly with the degree of mitral insufficiency.

Kitchell


The indications for and the technics used in cineangiography are described and 109 cineangiograms, which included 14 different conditions, are analyzed. The method was particularly useful in diagnosing patent ductus arteriosus in infancy before serious symptoms develop and is urged for every baby with symptoms of a left-to-right shunt. In this series 14 infants had this condition. The intermittent contrast filling and emptying of the pulmonary artery (left oblique position) was characteristic. In infancy, the method's greatest value lies in differentiating septal defects from a patent ductus arteriosus. Following a venous injection in the left oblique position, a dilution defect is seen in the contrast medium in the right atrium or ventricle, indicating the shunt in a simple septal defect. After infancy, cineangiography employed with cardiac catheterization and selective injections will show the location and often the size of septal defects. The right oblique position was preferred for demonstrating valvular, infundibular, or combined stenosis, by a venous or selective injection. An electrocardiographic tracing, combined with cineangiography, makes possible the identification of as many as 10 shunts within 3 seconds, as illustrated in the article. The method was found to be safe and accurate.

Maxwell


It has been possible to estimate the luminal diameter of the coronary arteries in living man by arteriography, but the technic is not well suited...
to routine use and its application is limited because of the hazards involved. In a search for a simpler method, the authors studied 76 hearts post mortem by making roentgenograms of the heart placed directly on an x-ray film. Sixty-one, 80 per cent, showed calcific deposits in the coronary arteries. Coronary calcifications were the most frequent encountered intracardiac radiopaque lesions and were more commonly present than absent in patients over 40 years of age. The most common calcific coronary lesions were 1, 2, and 3 mm. punctate densities, which occurred in groups of 2 to 4 in the proximal portions of the artery. Since coronary calcification has been shown to appear in patients 40 to 60 years of age, there is hope that a roentgenographic method, if discovered, might be useful at a time of life before atherosclerosis has led to ischemic heart disease.

Kitchell


Translumbar aortography, although widely employed, is of great value in clinical appraisal of vascular diseases, is not a simple diagnostic procedure. One complication of this method is the inadvertent injection of contrast material into the wall of the aorta rather than into the lumen of the vessel itself. The roentgen signs of this intramural injection of contrast material are described and the importance of their recognition by everyone performing direct aortography is stressed. In 425 translumbar aortographies intramural injection of some degree occurred in 42 patients. In 3 of these, death resulted either directly or indirectly from the intramural injection, 2 of the patients dying with proved dissecting aneurysms. The other 39 patients of this group had no significant complications. When direct aortography is complicated by an intramural injection the procedure should be discontinued and not attempted for at least 24 hours.

Kitchell


Cardiac mechanics and hemodynamics can be analyzed directly from high-speed cineangiographic records. Cinecardiometry represents graphically the motion of the cardiovascular anatomic structures opacified by contrast medium. The silhouettes of heart chambers and great vessels are precisely drawn directly from the projected images of each frame of the cineangiogram. Diameters and areas are measured chronologically, and volumes of the cardiac cavities are calculated. Densitometry is a photometric method for recording the angiographic density of the cardiovascular structures from each consecutive frame of the cineangiogram. Thus the progression and distribution of the contrast medium peripherally injected into the great vessels and cardiac cavities can be measured. Cineelectrokytography and cinedensitometry are electrokytographic techniques for recording the border motion and the density changes of the cardiovascular structures whether opacified or not by contrast medium. Correlation of tracings recorded with these methods and electrocardiograms, pressures, pneumograms, and so forth, recorded synchronously can represent the cardiac performance in each phase of the cycle. The applications of these methods to cardiovascular investigation and diagnosis are considered.

Kitchell


Levo-angiocardiography obtained by the intravenous injection of contrast medium was compared with thoracic aortography. To obtain a satisfactory levo-angiocardiogram the bolus of contrast medium must be injected within 1 second in high concentration and in an adequate amount. If a left-to-right shunt exists the visualization of the thoracic aorta with a contrast medium was often diminished or unsatisfactory with the levoangiocardiography technique. When visualization of the left heart, the aorta, and demonstration of abnormal communications between the left heart and aorta were desired, in most instances thoracic aortography gave more and better information than the levo-angiogram. The former technique in experienced hands was not associated with greater morality of morbidity than the latter.

Krause


Seven cases of aneurysm of the descending thoracic aorta are reported. Three of these were syphilitic and 4 arteriosclerotic. Four cases were subjected to thoracotomy, 2 having been correctly diagnosed by roentgen findings. The remaining 2 cases were incorrectly diagnosed as bronchogenic cyst and bronchogenic carcinomma respectively prior to surgery. In the remaining 3 cases correct diagnosis was made on routine roentgenographic
examinations. The authors point out that with advances in vascular and thoracic surgery the differentiation of aneurysms from other intrathoracic lesions takes on added significance. Roentgen studies including retrograde aortography, angiocardiography, and laminography will in most instances establish the diagnosis of aneurysm of the descending thoracic aorta.

**Kitchell**


Various technics of coronary arteriography were compared in a colony of 46 mongrel dogs. Injections of Hypaque with an automatic injector through an intraarterial catheter with the tip located at the junction of the brachiocephalic artery and the ascending aorta consistently produced adequate visualization. The technic was improved by the use of temporary aceyctololine cardiac arrest. Electrocardiographic monitoring, serum transaminase determinations, and histologic examinations showed no significant alterations following these procedures and no added hazard with the use of acevyctololine arrest.

**Kitchell**


The volume of the left ventricle both at the period of isometric contraction and at the end of the ejection phase was calculated from 31 angigrams performed on 25 dogs. At the termination of the ejection phase, the residual blood volume was estimated and the stroke volume was calculated by taking the difference between the minimal and maximal volumes of the left ventricle. The mean value for the stroke volume was found to be 60.4±3.4 per cent (with a range of 55-66 per cent) of the end diastolic volume of the left ventricle.

**Karpman**


The cardiac effects of various radiopaque dyes were studied in dogs following intracoronary arterial injection Urokon, Hypaque, Cardiografin, Renografin, and Diodrast (in the descending order of effectiveness) were found to induce cardiac arrhythmias, to produce ST-T wave changes in the electrocardiograms, to depress the contractile force of the heart, to cause a drop in blood pressure, and to increase the coronary blood flow.

**Sagall**


Experiments in dogs showed that rapid injection of 50 ml. of CO₂ (2.5 per cent of cardiac minute volume) for the purpose of visualization of cardiac cavities caused only insignificant side effects, while injection of 200 ml. was lethal. In man, injection of 100 ml. (2.5 per cent of minute volume) through the cubital vein was sufficient for diagnostic purposes but led to no unpleasant side effects; a machinery murmur was heard over the heart for about 20 seconds and the first inspiration after the injection was especially deep. The electrocardiogram showed no change. The injection should not be repeated until roentgen examination shows that any residual bubbles have been absorbed. Possible complications can be minimized by left lateral position of the patient. The method allows detailed visualization of the walls of the vena cava (recognition of infiltration, compression, or thrombosis), and of the right atrium and ventricle (recognition of hypertrophy and dilatation, pericardial fibrosis, aneurysms, tumors, or thrombosis as well as changes in the configuration of tricuspid and pulmonary valves). It should not be used when there is possibility of right-to-left shunt or coronary disease, and should be used with great caution in overload of the right heart.

**Lepeschkin**


Four patients, aged 4, 7, 37, and 52 with aycyanotic tetralogy of Fallot are described. The over-all incidence of the aycyanotic form of the disease is reported as 10 per cent. Such patients may have a mild or moderate pulmonary stenosis with a small or moderate ventricular septal defect. This results in a balanced hemodynamic effect. Others may have dominant ventricular septal defect with a mild infundibular stenosis. This will cause a large left-to-right shunt with an increased pulmonary blood flow. Finally, some may have a dominant pulmonary stenosis. This is usually associated with a small ventricular septal defect and results in a right-to-left shunt. In the classic form the roentgen appearance of the heart reveals a blunted, uptilted apex, concavity of the pulmonary segment, and hypovaseu-
lar lung fields. However, cardiac catheterization data and roentgenograms are presented to confirm the variability of the tetralogy depending upon which lesion is dominant, the pulmonary stenosis or the ventricular septal defect, or whether these lesions “balance” each other.

Krause


With presently developing attempts at direct surgical attacks on lesions of the coronary arteries, effective roentgen methods for visualization of the coronary artery system have become increasingly important. In some patients excellent results have been obtained by the use of catheter thoracae arteriography. The coronary arteries have also been opacified by transthoracic needle puncture of the left or right ventricle. More recently a procedure termed suprasternal thoracae arteriography has been employed. With this method the ascending aorta is punctured via a suprasternal insertion, the needle tip is advanced to a position slightly above the aortic sinuses, and radiopaque medium is inserted rapidly. In some studies cardiac arrest has been induced pharmacologically by acetyl choline in conjunction with catheter or with suprasternal thoracae arteriography. It has become apparent that roentgenologic demonstration of coronary arteries can be accomplished by several methods although none currently available are entirely satisfactory. In experimental animals good results have occasionally been obtained with the use of simultaneous catheter balloon occlusion of the ascending aorta and cardiac arrest. Simultaneous biplane rapid-scan filming during such arteriography is to be preferred to single plane-film study, and cinefluorography would appear to offer an added advantage. There are many technical difficulties in such studies but there is a genuine need for a technique that is efficient, reliable, and without appreciable hazards.

Kitchell


It is noted that usual roentgenographic studies may fail where angiocardiography frequently succeeds in differentiating between intraocular thrombi and intraocular tumors. Five case histories are given where accurate diagnoses through angiocardiography led to successful surgical correction. Twenty-six consecutive cases of rheumatic mitral stenosis were studied by this method with convincing results. Differential diagnosis between intracardiac thrombus and tumor may be lifesaving, and knowledge of the presence of atrial thrombi is important in prognosis and as an indication for mitral valvulotomy in the absence of other findings.

Kitchell


Of 15 persons with congenital heart disease in whom contrast medium was injected into the aorta for diagnostic purposes, the coronary arteries were visualized in all cases, but 1 artery showed defective filling in 5 of these. On the other hand, of 25 persons in whom injection was made into the left ventricle, perfect visualization was attained in all cases. As the catheter can be introduced into the ventricle in 90 per cent of all trials, the latter method is to be preferred. Atrial origin and distribution of the coronary arteries and coronary-splenial arterial anastomosis could be demonstrated by this method. In the present series no unpleasant side effects were observed, but it is possible that these may appear in elderly persons with coronary sclerosis.

Lepeschkin


Compared to arteriography with radiopaque dye, gas insufflation has the advantage that it allows clear visualization of the arterial wall, makes possible the use of thinner cannulas, does not cause tissue irritation through leakage, and can be used also in the presence of iodine hypersensitivity. Oxygen allows a more continuous filling than carbon dioxide. Femoral artery insufflation was carried out with 80 ml. of oxygen in 2 minutes in 55 patients, without any side effects or arterial spasm. However, the gas can bypass a freshly formed embolus, and thus erroneously suggest patency of the artery.

Lepeschkin


A simple and safe procedure was developed with dogs for studying the anatomy and function.
of the aortic valve and the coronary arteries, using a 35-mm. camera, a 5-inch image intensifier, and a contrast medium injected rapidly by means of a mechanical injector. The electrocardiogram was monitored throughout and recorded photographically. A cardiac catheter was passed through the right carotid artery into the ascending aorta with the tip just above the aortic valve leaflets. Eight patients under light sedation were studied by this method. A no. 8 closed-end NIH catheter with 4 side holes was passed under careful x-ray control through a longitudinal incision 5 cm. above the elbow into the right brachial artery and thence to the ascending aorta and positioned about 2 cm. above the aortic valve, as shown by a test injection of 5 ml. of contrast medium. The patient was in the left anterior oblique position. The medium was then injected rapidly through the catheter and films were taken at 32 frames per second. Calcified aortic valves, aortic and mitral regurgitation, and aortic stenosis were studied satisfactorily. The procedure was useful also in defining the anatomy of aneurysms of the ascending aorta or of the sinuses of Valsalva and in visualizing the level of aortic fistulas. Considerable information may thus be obtained when a direct operation is planned.

MAXWELL


The roentgen aspects of cerebral angiography are reviewed in a series of 138 patients under the age of 13. Practically all studies were done by the percutaneous method. The chief indications were suspected intracranial aneurysm or arteriovenous malformation, suspected supratentorial mass lesion, and vascular occlusion or sinus thrombosis. Two-hundred and seven cerebral angiograms were accomplished. In children the circulation time was slightly shorter than in the adult. Filling of the posterior cerebral artery was more common than in adults. The caliber of the intracranial branches of the internal carotid artery was large in children. Relative to the clinoparietal line the middle cerebral artery was situated higher in children. The middle cerebral arteries were lower with advancing age, gradually approaching the adult anatomy. Pathologically, the same abnormalities were encountered as in the adult but in a different incidence. In children the incidence of arteriovenous malformations, subdural hematomas, and cerebral hemiatrophy was higher than in the adult population.

KRAUSE

SURGERY AND CARDIOVASCULAR DISEASE


Ninety-two consecutive patients subjected to mitral commissurotomy between 1951 and 1957 were repeatedly observed in the outpatient clinic by the same group of physicians. Two patients were lost to the study 2 and 3 years postoperatively, respectively. The average observation period after operation for patients surviving more than 1 year was 39 months. Operative mortality was 8 per cent. Deaths occurring after operation during several years brought the total mortality to 28 per cent. Improvement of one or more functional classes (criteria of the New York Heart Association) occurred for at least 1 year in 76 per cent of all patients, but was sustained during the remainder of the observation period in only 47 per cent of the total group. Major adverse factors were mitral insufficiency and production of an inadequate valve opening at operation. Severe valve calcification made satisfactory operation less likely and was often associated with significant mitral insufficiency. Mitral insufficiency also occurred frequently with atrial fibrillation, cardiac enlargement, and severe preoperative disability. Close comparison of prognosis in this group with that of nonsurgically treated persons was impossible; however, it is likely that patients in a given functional class a year after mitral commissurotomy have a less favorable outlook than medically treated patients in the same functional class. Mitral commissurotomy should be recommended to patients with progressive or severe disability from mitral stenosis, if there is no significant apical systolic murmur, mitral valve calcification, cardiac enlargement, and electrocardiographic evidence for mitral insufficiency. New technics for mitral valve surgery may offer significant benefits to patients not meeting these criteria.

KITCHELL


Three types of aortic valves were studied in the dog. Two types were constructed in the descending aorta from aortic media and intima, and contained either 1 valve (original Castro-Villagra) or 2 valves (modified Castro-Villagra). A third type, original with the authors, consisted of invagination of the left subclavian artery,
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which had to be sacrificed. The patency of the constructed valves was confirmed by the maintenance of femoral arterial pressure pulses after rupture of the aortic valves with an instrument designed by the authors.

BRACHFELD


Since atherosclerosis produces angina pectoris commonly by occluding segments of larger coronary arteries with the distal coronary tree ordinarily remaining patent, coronary endarterectomy was viewed as being rational and its technic was elaborated in a series of 80 dogs. Then 9 patients with severe medically intractable angina pectoris and positive exercise electrocardiographic tests were subjected to the operation. The sclerotic occlusions were correctly identified by inspection and palpation in 8 patients and in all a satisfactory back flow of blood was obtained from the distal arteries. In all a cleavage plane was established between the media and the sclerotic plug, which was stripped and snared out with special instruments. The major operative problem in each patient was sluggishness or irritability of the heart, and this responded at times to injections of calcium chloride solution into the left ventricle. Artificial circulatory maintenance was rejected as being of greater trouble than it was worth. Four patients died, all during or soon after operation. Improvement in the 5 survivors ranged from a slight degree to apparently complete recovery, the latter occurring in a patient having an endarterectomy of the right main coronary alone. The operation is being developed, and its possible application to patients with other severe signs of coronary atherosclerosis is considered.

ROGERS


The history of surgery for the stenotic aortic valve is reviewed and a plea is made for the direct vision approach. The advantages and disadvantages of the pump-oxygenator versus inflow occlusion under hypothermia are presented. Review of the autopsy records of 75 patients dying from marked aortic stenosis showed significant concomitant mitral stenosis in 43 per cent, thereby indicating the necessity of this type of patient for exploring the mitral valve at the same operation by a right-sided approach. A direct anterior percutaneous left heart catheterization was used to evaluate the aortic gradient. It was noted that a comparatively low aortic gradient may be found in severe aortic stenosis whenever it is accompanied by significant concomitant mitral stenosis. Case histories of 6 patients undergoing aortic and mitral valvulotomy under direct vision with hypothermia are presented and discussed. The authors believe the technic outlined is safe and if applied to better-risk patients will establish a place for aortic valvulotomy along with other types of intra-cardiac surgery.

KITCHELL


Transbronchial puncture of the left atrium was performed in 76 patients. In 1 instance, the ascending aorta was entered instead of the left atrium. In 18 patients, the catheter could not be passed into the left ventricle. In 10 of these, the inability to enter the left ventricle probably was due to significant mitral insufficiency. There were only 3 important complications with 1 fatality in this series. In 1 patient, the catheter became knotted in the left atrium and had to be removed by thoracotomy. Another patient developed acute cardiac tamponade 1 hour after an uneventful combined left and right heart catheterization. Both patients, however, made uneventful and complete recoveries. A third patient, a 31-year-old man with mitral stenosis and insufficiency with a previous unsuccessful commissurotomy and staphylococcus endocarditis, died 18 hours after an uneventful left atrial puncture. The cause of death was not apparent at autopsy but was thought to be due to cerebral embolization. This patient is the first reported case of fatality following left heart catheterization with the transbronchial method. The various avenues of approach to the left atrium are discussed and the technical aspects of each reviewed. It is concluded that in spite of the 1 fatality encountered the high rate of successful left atrial punctures with the transbronchial method combined with the low over-all morbidity and mortality make this method the preferable technic for left atrial catheterization.

SAGALL

The clinical and laboratory findings of 7 successfully operated patients with tetralogy of Fallot are described in detail. In 3 patients all findings were typical, whereas in 3 angiocardiography did not show early filling of the aorta from the right ventricle; these 3 were, therefore, at first considered as having trilogy of Fallot. In 1 patient, pulmonary stenosis was proved during catheterization, but the shunt was purely left-to-right. However, in these 4 patients the electrocardiogram showed marked right axis deviation and slurred R or RsR' in V_1 as in the first 3 cases, and the pressures in the right ventricle and the aorta were practically identical. These signs are important in the recognition of a tetralogy, as the latter is much easier to correct than infundibular stenosis with intact ventricular septum. The septal defect is usually too large to be repaired without an Ivalon prosthesis. In 2 of the patients transient right ventricular failure occurred after the operation; this was probably due to operative trauma, as in 1 of these incomplete right bundle-branch block become more complete after operation.

LEPESCHKIN


Of 254 patients undergoing mitral valvotomy, 99 had atrial fibrillation preoperatively and 155 had normal sinus rhythm. Of the latter 155 patients, 41 developed atrial fibrillation postoperatively and this was noted as the most common postoperative complication of this procedure. This arrhythmia occurred most commonly from the second to fourth day postoperatively. The majority of these 41 patients had a predominant mitral stenosis. In the 155 patients with normal sinus rhythm preoperatively it was noted that in those receiving digitalis and quinidine only 9 of 55 patients, or 16 per cent, developed atrial fibrillation. In those receiving digitalis alone 13 of 43 patients, or 30 per cent, developed atrial fibrillation. In those receiving quinidine alone, 7 of 20 patients, or 35 per cent, and in those receiving no medication 13 of 37 patients, or 32 per cent, developed atrial fibrillation. Of 98 patients digitalized postoperatively 22, or 22 per cent, fibrillated. Of 57 patients not digitalized, 19, or 33 per cent, fibrillated. Conversion of postoperative fibrillation was accomplished in most instances by quinidization, digitalization alone, digitalis and quinidine, or by pronestyl and digitalis. It was thought that conversion of postoperative fibrillation was important. In 99 patients who fibrillated preoperatively, an attempt was made to convert to sinus rhythm post-operatively in 45. In only 12 was this successful. Preoperatively such attempts were not worthwhile. It was believed by the authors that in the occurrence of postoperative atrial fibrillation local trauma incidental to atriotomy was the most important factor. They usually wait 10 days for healing to occur before attempting conversion. They have as yet not observed embolization after restoration of sinus rhythm. The importance of restoring sinus rhythm was noted particularly in several patients who developed pulmonary edema soon after the onset of atrial fibrillation. It would appear from these studies that the combined use of digitalis and quinidine is definitely indicated for the prophylaxis of postoperative atrial fibrillation. Quinidine is usually continued for several weeks and then gradually reduced to maintenance therapy, which is necessary to prevent recurrences. In only 1 instance was there the development of a ventricular tachycardia. In this case the patient had received banthine, and it was thought that this drug had altered the absorption of quinidine so that a higher blood level than usual developed.

LEVINSON


A new method of augmenting myocardial circulation is described in which thin sheets of Ivalon sponge were placed about the heart after the serous pericardial surface had been scraped away. The effectiveness of this procedure was indicated by experiments in which constriction of the anterior descending and circumflex coronary arteries produced death in an average of 19 days in 18 of 20 control animals, while 19 of 22 animals similarly treated but with Ivalon sponges placed survived for periods of 3 to 14 months. Injection studies in the treated animals showed sizable arterial connections going through the sponges with increased myocardial arterIALIZATION. Histologically, these myocardioms showed a looser structure apparently due to widening of intramyocardial vascular channels. This finding reminded the authors of the primitive hagfish heart, the circulation of which is derived directly from the ventricular cavity. Fourteen poor-risk patients with coronary insufficiency have received this operation without mortality, and their subsequent course is being observed.

ROGERS

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ABSTRACTS
STANFORD WESSLER

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