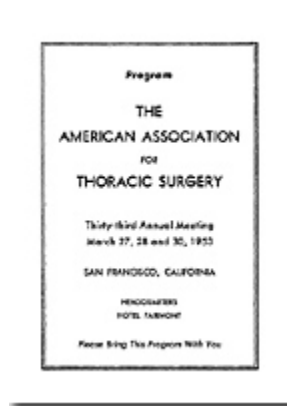


1953 ANNUAL MEETING PROGRAM



The American Association for Thoracic Surgery 1952-1953

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Friday Morning, March 27, 1953

9:00 A.M. Business Meeting.

9:30 A.M. Scientific Session.

1. Unilobar Obstructive Emphysema in Infancy Treated by Lobectomy.

HERBERT SLOAN, Ann Arbor, Mich.

Obstructive emphysema, limited to a single lobe, has been observed by the speaker in four infants. Although there was a history of respiratory infection in two of the infants, this was not present at the time they

were admitted. Localized emphysema is commonplace in the presence of pulmonary infection or an intrabronchial foreign body but has rarely been described in otherwise apparently normal infants.

In each of the four infants the greatly overdistended lobe produced serious respiratory distress. Uniformly the condition was confused at some time with cystic disease of the involved lobe, pneumonia or atelectasis of the adjacent lobes.

Lobectomy was carried out successfully in each of the infants, the youngest having been six days old and the oldest eight months old. Resection of such localized areas of obstructive emphysema has not been reported frequently. Examination of the removed lobes showed marked generalized emphysema, due presumably to a check valve mechanism in the lobar bronchus. The exact etiology of the obstruction has not been determined but congenital abnormalities in the bronchi are probably responsible.

2. Mucocele, Congenital Bronchiectasis and Bronchogenic Cyst.

B. H. RAMSAY and FRANCIS X. BYRON, Los Angeles, Calif.

Mucocele, congenital bronchiectasis and bronchogenic cyst are variants of the same pathologic process. The gross picture of recent surgical cases clearly shows the relationship. One case presented a smooth, thin, translucent septum which completely occluded the left lower lobe superior segmental orifice; as a result, the tributary bronchial tree was distended with clear mucus. The pathology of a second patient involved the middle lobe medial segment; one subsegment showed severe cylindrical bronchiectasis with just a trace of ruptured septum at its orifice; the other subsegment revealed an infected multilocular cystic dilatation beyond a thin septum which obstructed the orifice, a pin-point sized opening being present in the septum.

It appears clear that during bronchial development, temporary interruption of tubular growth results in formation of an atresic area beyond which normal bronchial structure exists. Progressive accumulation of secreted mucus produces cylindrical distension of the blocked bronchial branches—a mucocele. If the atresic area breaks down at an early phase of distension, true congenital bronchiectasis results. If extreme distension occurs before septal rupture, there is cystic dilatation, unilocular or multilocular, and the walls of such have small blind outpouchings which are the dilated terminations of the smaller bronchi.

Other findings of interest include: a. normal inflation-deflation of the alveoli belonging to the obstructed segments; b. the presence of an air-fluid level in one area of bronchial dilatation; c. failure of repeated x-rays to demonstrate the branching mucocele.

3. Hydatid Disease as it Affects the Thoracic Surgeon.

M. P. SUSMAN (*by invitation*), Sydney, Australia

Based on a personal series of 70 cases the life history of the parasite will be presented together with general comments on incidence, sites of infection, radiologic appearances and general difficulties in diagnosis. Cysts of the lung, of the diaphragm, of the heart and of the liver will be considered. The most common are cysts of the lung and here will be discussed indications for operations together with types of operation, the incidence and severity of complications and their treatment.

Cysts of the diaphragm and of the heart are considerably more rare and the differential diagnosis is not always easy. The treatment of these cysts will be considered. Cysts of the liver are described because of their frequent simulation of intrathoracic disease. In addition, intrathoracic complications may develop from cysts of the liver because of erosion into the pleural cavity, the lung, or pericardium. The treatment of these complications will be considered.

4. Surgical Considerations in Focalized Pulmonary Histoplasmosis.

JAMES H. FORSEE and THOMAS F. PUCKETT (*by invitation*),
Denver, Colo.

The frequently encountered so-called round lesion noted on the chest roentgenogram in patients with few or no symptoms and from which tubercle bacilli or coccidioides immitis cannot be isolated is often a manifestation of focalized histoplasmosis. During the past two years 28 patients have had lesions of this nature surgically removed. There is nothing distinctive in the symptomatology, physical examination, or roentgenographic findings. Approximately 40 percent of the patients had resided in Panama, the remainder

having lived in endemic areas including eight different states. The serological findings and skin tests were helpful but inconclusive. Emphasis is placed on the histopathologic interpretations using the Periodic-Acid-Schiff stain which has revealed the specific organism in each instance. The organisms have been cultured from the surgical specimens in only two patients. The observations made at the time of operation, follow-up data, and relationship to other similar round pulmonary lesions is detailed. All lesions were removed by segmental resection or wedge excision except one lobectomy. There were no deaths.

5. Extensive Bronchiectasis: A Clinical and Physiologic Evaluation of the Results of Surgical Treatment.

EDGAR P. MANNIX, JR. (*by invitation*), FRANCIS S. GERBASI (*by invitation*), CHARLES E. O'BRIEN (*by invitation*), and RICHARD H. ADLER (*by invitation*), Forest Hills, N.Y.

We believe that a challenging problem still exists in successfully treating patients with extensive bronchiectasis. Therefore in 1949 at the University of Michigan Hospital a clinical and physiologic study of a group of patients with total unilateral or bilateral bronchiectasis was begun. The physiologic investigations have included the following determinations:

1. Fractionation of lung volumina
2. Maximum breathing capacity
3. Carbon dioxide and oxygen values of arterial blood and exhaled gases at rest and following a standard one minute exercise test.

This report encompasses approximately 14 patients who have already had either a pneumonectomy or bilateral pulmonary resections of from seven to thirteen bronchopulmonary segments. A number of these patients have been studied preoperatively and at various intervals post-operatively. Illustrations of the sequellae of extensive pulmonary resections as well as such additional influences as the presence of incompletely removed bronchial lesions, phrenemphraxis, allergic asthma, and pleural complications will be presented.

6. Decisions in Thoracic Surgery as Influenced by Knowledge of Pulmonary Physiology.

WARRINER WOODRUFF, CARL G. MERKEL and GEORGE W. WRIGHT, Saranac Lake, N.Y.

The need for cognizance of the importance of pulmonary function as one of the basic determinants of surgical therapy in diseases of the respiratory apparatus will be demonstrated by suitable cases. Unfortunate instances will be shown in which surgical therapy was undertaken without an adequate appreciation of the preexisting derangements of pulmonary physiology and knowledge of the effect of surgery. Fundamentals of normal and deranged respiratory physiology specifically related to surgical therapy will be emphasized. Various surgical procedures will be discussed from the point of view of their effect upon pulmonary physiology. By means of illustrative case reports it will be shown how evaluation of pulmonary reserves and attention to physiologic principles can be of aid in (1) avoiding unnecessary damage to the individual; (2) accepting for surgical therapy cases that might otherwise be refused as unwarranted surgical risks; (3) choosing the type of therapy for a given individual which promises to be most effective and yet the most conservative as regards respiratory function.

Friday Afternoon, March 27, 1953

2:00 P.M. Scientific Session.

7. Localization of Radioactivity in the Lung and Thoracic Lymph Nodes.

J. RAY BRYANT (*by invitation*) and HAROLD F. BERG (*by invitation*), Louisville, Ky.

Localization of radioactive gold 198 in specific areas of the lung has been accomplished by instillation of a colloidal solution into terminal bronchi.

Localization of radioactive gold 198 in the lymphatic drainage chain of the lung has also been accomplished by several methods.

The methods used and results will be discussed. Diagrams showing the deposition of activity and photomicrographs showing the resulting histological changes will be presented.

The therapeutic implication of this new approach to tumor therapy will be discussed.

8. The Ability of the Pulmonary Vascular System to Influence the Spread of Tumor Emboli.

EDWIN A. LAWRENCE, DONALD B. MOORE (*by invitation*) and
GEORGE I. BERNSTEIN (*by invitation*), Indianapolis, Ind.

The capacity of the vascular system of the lung either to capture tumor emboli that reach it from the various peripheral venous systems or to permit them to pass on to the arterial blood is not understood. Although it is known that under certain experimental conditions tumor emboli will pass this barrier, the established diameter of pulmonary arteriovenous shunts in normal lungs (160-290 microns in the rabbit and up to 500 microns in the human) would suggest that they could do so with facility greater than ordinarily observed.

The purpose of this communication is to describe experimental procedures with a transplantable tumor in rabbits in which tumor emboli injected into a peripheral vein have been found to pass readily through the vascular bed of the lungs. At this stage in the study all control animals who grew tumor had it in the lungs at autopsy. But 65 percent of them also had tumor in organs, such as liver, kidney and skeletal muscle, that could have been reached only by emboli passing through the lungs.

In contrast to controls, animals that were heparinized at the time of injection sometimes had no tumor at all in the lungs at autopsy, but tumor elsewhere in the body, as in the liver and kidneys. Furthermore, the incidence of organ involvement other than the lung in the experimental group was significantly greater than in the control group.

The passage of tumor emboli through the lungs seems to be dependent upon these factors, at least: (1) character of the tumor suspension; (2) size of the individual tumor emboli; (3) diameter of the pulmonary arteriovenous communications and coagulability of the blood.

9. Bronchial Resection and Anastomosis.

PAUL W. GEBAUER, Honolulu, T.H.

This paper is a report of 14 instances of reparative bronchial surgery, without the use of dermal grafts or artificial prostheses. The patients have been followed for a period of from eight months to two years. There have been no deaths or serious complications. The procedure used most often was excision and anastomosis of main bronchi or of lobar bronchi.

There were 10 instances of healed tuberculous bronchostenosis, two of non-tuberculous bronchial deformity, and two of localized tumor excision. In each instance intact, functional, pulmonary tissue was salvaged, by surgical procedures on diseased bronchi, and the results indicate that the receptiveness of the tracheobronchial tree is comparable to that of the gastro-intestinal and vascular systems.

Brief case summaries are a means of portraying pre-operative studies and treatment. The operative technique is illustrated by a colored movie depicting an anastomosis of the right upper lobe bronchus following excision of a fibrous stenosis and segmental resection.

10. Bronchiolar ("Alveolar Cell") Carcinoma of the Lung.

CLIFFORD F. STOREY, K. P. KNUDTSON (*by invitation*) and
B. E. LAWRENCE (*by invitation*), St. Albans, N.Y.

Bronchiolar carcinoma has also been referred to as terminal bronchiolar carcinoma, alveolar cell carcinoma, pulmonary adenomatosis and other descriptive titles. A histologically similar infectious pulmonary disease of sheep is known as jaagsiekte. These pulmonary neoplasms are interesting, controversial and, while uncommon in comparison with bronchogenic carcinoma, they are not as rare as has been thought. The origin of these tumors and whether they arise multicentrically or from a single primary lesion is debatable. The

relationship between so-called benign pulmonary adenomatosis and bronchiolar carcinoma is not a matter of universal agreement.

This report is based on a detailed study of 36 proved cases of bronchiolar carcinoma. Twenty-eight of these have died and complete postmortem examinations have been carried out in most instances. The eight surviving individuals, treated by surgical procedures varying from segmental resection to total pneumonectomy, are clinically free of disease from one to three years following operation.

Early in the course of this disease there are no characteristic signs or symptoms and no typical roentgenographic changes in the lungs. The early diagnosis usually is dependent upon examination of the excised specimen. The late symptoms are those of pulmonary malignancy in general and, in addition, many patients raise unusually large quantities of clear, watery sputum. There is often a terminal pneumonia. Advanced cases show either complete consolidation of a lobe or entire lung or multiple nodular infiltrations involving one or both lungs. These types are often found in combination.

The study of this series of patients and a review of the literature has convinced us that pulmonary adenomatosis and bronchiolar carcinoma are the same, varying only in degree of malignancy in different patients. Although still indefinite, available evidence indicates that they probably arise in the bronchioles. We could find no convincing evidence in the literature or in our material that these tumors are multi-centric in origin. It appears most probable that they arise from a single focus from which they may spread via the blood stream, the lymphatics or by bronchogenic dissemination.

Hope for patients with this disease lies in the prompt removal of early small suspicious pulmonary lesions of doubtful etiology. Because of the peculiar growth behavior and manner of spread of this neoplasm, conservative resection consisting of lobectomy or even segmental resection appears to be the most rational method of surgical management.

11. The Significance of Pulmonary Hypertension as a Cause of Death Following Pulmonary Resection.

W. E. ADAMS, JOHN F. PERKINS, JR. (*by invitation*) and
ADOLFO FLORES (*by invitation*), Chicago, Ill.

It is well known that pneumonectomy in patients with advanced pathological changes in both lungs is attended by a considerable risk. What are the physiologic changes that lead to a fatal termination following operation in these cases?

Observations:

- (1) When performed in stages, dogs may tolerate reduction in lung capacity by bronchial stenosis or lung resection to as little as 15 percent of normal;
- (2) When capacity reduction is made more rapidly, most animals die within a few hours or days;
- (3) Arterial blood O₂ saturation in dogs with only 15 percent of normal lung capacity remains within a few percent of a normal level. If oxygen is inhaled, the saturation becomes elevated to a normal level;
- (4) Right ventricular and pulmonary arterial pressures become elevated to as much as twice that of normal and are sustained at that level when the lung capacity is reduced to as low as 15 percent;
- (5) Pathological changes in the lungs of dogs that have expired following sudden reduction in lung capacity are those suggestive of cardiac failure.

Conclusions: Pulmonary hypertension is an important factor as a cause of death following pulmonary resection where advanced bilateral pathologic alterations exist preceding operation. If an operation that reduces pulmonary capacity by a considerable degree is necessary in a patient with pulmonary hypertension and can be performed in stages the risk may be materially reduced. Prevention of further reduction in pulmonary capacity due to retained secretions with resultant atelectasis and pneumonitis especially in patients with preoperative pulmonary hypertension is of paramount importance.

12. Prevention of Chest Wall Defects: Use of Tantalum and Steel Mesh.

DONALD B. EFFLER, Cleveland, Ohio

Surgical treatment in malignant neoplasms of the chest wall requires extensive block excision of bony thorax and soft parts. Similar treatment may be necessary for benign tumors and chronic infectious granulomas. Certain lesions of the diaphragm also pose problems of reconstruction after radical excision. Defects of the chest wall following surgery or trauma pose a serious respiratory problem. Prevention of

significant paradoxical motions attributable to elective surgery is mandatory and can be accomplished in most instances.

Methods of surgical reconstruction of chest wall defects are discussed and criticized. Previous attempts with prostheses and foreign material are listed and the methods described. The concept of inert metal in the form of mesh was described by Koontz in 1948. The role of mesh in establishing a firm chest wall is discussed and emphasis is placed on the essential difference between this and other commonly used prostheses.

Clinical experience is based on 20 cases where either tantalum or stainless steel mesh has been employed. The follow-up period varies from 4 years to 6 months. Selected cases are described to illustrate wide excision in chest wall neoplasm with a definitive procedure to prevent subsequent chest wall deformity. Six case histories will be presented to illustrate certain principles of surgical, therapy, chest wall reconstruction, primary closure and skin grafting if indicated.

There have been no complications or failures in this series that may be attributable to the use of mesh. In no instance was it necessary to remove the mesh. Definite advantages have been observed with the use of steel mesh as contrasted to tantalum; such advantages will be briefly discussed as well as the technique of insertion.

Saturday Morning, March 28, 1953

9:00 A.M. Scientific Session.

13. The Present Chaos Which Exists Regarding Pulmonary Resection.

E. J. O'BRIEN and PAUL V. O'ROURKE, Detroit, Mich.

The paper deals with the present confusion existing in resection for pulmonary tuberculosis. It describes Doctor Medlar's excellent contribution but questions all the conclusions that many have drawn from it. Most pathological reports of so-called fibrocaceous lesions found in residues fail to indicate how much of these were mostly fibrotic, and how much caseation existed. Seldom are tubercle bacilli found in these lesions reported viable. Some clinics are resecting everything. We are led to believe that thoracoplasties and other collapse measures in these places are practically obsolete.

Suggestions of present indications for resection shall be attempted. A discussion of complications following unnecessary resection shall be made. Some evaluation of phrenics, pneumothorax, pneumoperitoneum and thoracoplasty will be included. The paper obviously is controversial, but the hope is that discussion will somewhat clear the present chaotic approach to the problem. The difficulties following long term treatment with antibiotics, etc., together with their relationship to resection will be covered.

At present we are in many instances just guessing as to which lesion to resect. It is the hope of the authors that we may all get together on definite indications with our present knowledge of resection, and let the future decide by the number of relapses of small residual lesions after long treatment without resection. We can never know what would have happened to them if we resected all of them indiscriminately. Past experience of reactivation without prolonged antibiotics are of absolutely no value, and we have not yet had enough time to evaluate the present treatment.

14. The Use of Isoniazid as a Prophylactic Anti-Bacterial Agent in Pulmonary Resection for Tuberculosis. A Preliminary Report.

MAX E. CHILDRESS (*by invitation*), MILDRED E. THOREN (*by invitation*)
and ALBERT C. DANIELS (*by invitation*), Weimar, Calif.

It is established that prophylactic antimicrobial therapy for pulmonary resection in tuberculosis is advantageous. Frequently such an advantage is lost, due to previous chemotherapy with resultant resistance of the tubercle bacillus to the chemotherapeutic agent. The desirability of having one or more short acting anti-tuberculosis drugs for pulmonary resection is obvious. Patients whose organisms are streptomycin-resistant may have the benefit of surgery under the protection of the short acting agent. Also, patients who have had no previous antimicrobial therapy may be placed on streptomycin and para-aminosalicylic acid without fear of

developing resistant strains of bacteria to jeopardize a possible later operative procedure. This latter statement implies proper timing in the use of the short acting prophylactic anti-tuberculosis drug.

The present study, which is underway, attempts to answer the following question: "Does isoniazid afford adequate anti-bacterial protection during the operative period and for a postoperative follow-up of two months?"

Approximately 20 patients will be included in this investigation. The majority will have received streptomycin and PAS at one time or another during their illness. Some of them will have developed from a partial to a complete resistance to streptomycin.

All patients in the series are being carried solely on isoniazid during operation and for a postoperative period of two months. The isoniazid is started from twenty-four to forty-eight hours prior to surgery, unless the patient has a copious amount of tracheobronchial secretions. Then the medication is started two weeks prior to surgery in an effort to reduce the volume of these secretions. Two hundred milligrams of isoniazid are given daily by the oral route, except for the first few postoperative days when it is given intramuscularly.

The extent and type of disease will be considered in attempting to answer the question stated above. The final results will be tabulated in terms of postoperative complications due to tuberculosis.

15. The Influence of Long-Term Chemotherapy on the Surgery of Pulmonary Tuberculosis.

JOHN D. STEELE, B. G. NARODICK (*by invitation*) and A. V. CADDEN
(*by invitation*), Milwaukee, Wis.

The use of long-term chemotherapy in the treatment of pulmonary tuberculosis has presented us with entirely new surgical problems. The indications for pulmonary resection and collapse therapy in patients receiving such long-term chemotherapy are not clearly defined at the present time.

Our present program of surgical therapy in the treatment of pulmonary tuberculosis was begun shortly after the report of Ryan, Medlar and Welles before this Association in April 1951. The majority of our patients in this series have had small pulmonary resections after maximum recession of their lesions on chemotherapy. We have considered that the most important question in regard to the lesions so removed has been the viability of tubercle bacilli contained in them.

As of October 15, 1952, 101 resections had been performed on 90 patients having original courses of chemotherapy. The lesions removed at 14 operations appeared insignificant and were not cultured. Of the lesions removed at the time of the remaining 87 thoracotomies, 49 were positive for tubercle bacilli on smear or tissue section and 10 of these were positive on culture. Four of these positive cultures were obtained from lesions of patients who had received from 12 to 18 months of chemotherapy (original courses); 3 were from patients having 8 to 12 months. Breakdown of the positive cultures according to the regimen of SM therapy used showed no significant differences. Of 18 resected specimens from 14 additional patients receiving retreatment courses (interrupted) of chemotherapy, 4 were positive on culture. A few patients had resections after 8 months of INH therapy. The bacteriology will be reported.

The results of cultures from 40 additional operations may be reported by the end of March 1953. By March, approximately 35 patients will have been studied for at least a year following resection. To date there have been 3 patients who have had bacteriologic relapses.

The rather high incidence of operative complications in our series of small resections will be reported. These have required secondary thoracotomies in approximately 10 percent of our patients. Few complications have been serious and there has been no mortality in this series.

In our summary, our current indications for resection and thoracoplasty following long term chemotherapy will be given.

16. Segmental Resection of Pulmonary Tuberculosis: An Analysis of 300 Cases Followed from One to Five Years.

J. MAXWELL CHAMBERLAIN, ROBERT KLOPSTOCK and CHARLES F. DANIELS
(*by invitation*), New York, N.Y.

In the surgical treatment of pulmonary tuberculosis, we have performed 300 segmental resections upon patients who have been followed from one to five years. The morbidity and mortality rates for the entire series is reported and special emphasis is directed at the complications which are divided into two types: minor and major.

The results from a bacteriological viewpoint are extremely encouraging and the complications have decreased as our experience increased. The indications for the operation are presented and, in the discussion, the postoperative management is reviewed.

17. Electrolyte Studies in Pericardial Resection.

WALTER B. CRANDELL, ANDREW YEOMANS (*by invitation*),
DAVID HOFFMAN (*by invitation*) and GEORGE H. STUECK, JR.
(*by invitation*), White River Junction, Vt.

Metabolic studies have been carried out on two cases of pericardial resection for constrictive pericarditis and a comparison is made between the two in regard to the immediate postoperative course which was benign in one and stormy in the other. An analysis of data obtained indicates that a regime of restriction of sodium intake can be carried so far as to be deleterious, and the following evidence is presented to support this view.

- 1) During the eight days of balance studies prior to operation, an accumulative deficit of nearly 1000 milliequivalents (23 gms.) of sodium occurred through withdrawal of pleural fluid and dietary limitations.
- (2) Total urinary sodium excretion for the 72 hours before operation was only 25 milliequivalents (normal is 100 meq/ day).
- (3) The blood pressure drop occurred while receiving blood and did not return to normal in spite of replacement of the estimated blood loss and with normal values for hematocrit, plasma volume, and blood volume.
- (4) Serum sodium levels became abnormally low and remained so after clinical improvement.
- (5) Hypotension and oliguria were overcome at about the time that the marked sodium deficit was corrected.
- (6) The clinical features and laboratory changes resembled the peripheral vascular collapse produced by salt depletion in experimental animals.

Saturday Afternoon, March 28, 1953

2:00 P.M. Executive Session.

3:00 P.M. Scientific Session.

Address of the President, Robert M. Janes, Toronto, Ont.

19. The Experimental Closure of Atrial Septal Defects.

HARRIS B. SHUMACKER, JR., and THOMAS C. MOORE (*by invitation*),
Indianapolis, Ind.

Efforts at experimental surgical closure of atrial septal defects have been directed along three general lines. The first involved various methods of direct closure of the defect by application of pericardial or auricular appendage grafts through the opened right atrium with the venous inflow to the heart temporarily occluded. The second was concerned with placement of grafts through a rubber-capped glass cylinder inserted into the base of the auricular appendix. The grafts could thus be introduced into the atrial chamber and fixed over the defect without stopping heart function and without blood loss. Both methods appeared to have definite promise but had intrinsic features which were not considered ideal for application to the problem in patients. The third method seems ideally suited to use in human patients and has been successfully used in one case. It can be carried out in dogs without mortality and with complete closure. It permits direct suture with good vision and palpation of the defect, without blood loss or danger of embolism or intracardiac thrombosis and without interfering with heart function. Autogenous tissue is used. The procedure consists of suture of a pocket of pericardium to a linear incision in the atrial wall, its inversion into the atrial chamber, and suture of one

wall of the pocket to the margins of the defect. Details of the various methods will be given and results presented.

20. Surgical Treatment of Mitral Insufficiency: An experimental Study.

MAX G. CARTER and JOHN M. GOULD (*by invitation*),
New Haven, Conn.

A series of experiments has been performed on mongrel dogs in an effort to develop a method of treatment for mitral valve insufficiency. A plastic ball, encased in a tubed pedicle of pericardium, has been placed behind the lateral leaflet of the mitral valve by insertion directly through the left ventricular wall. The procedure has been well tolerated by the experimental animals.

Anatomical reduction in the size of the left ventricular inflow tract has been obtained. Significant endocardial or myocardial damage has not been observed.

The operative technic, anatomic and physiologic observations will be presented.

21. Pulmonary Valvuloplasty Under Direct Vision: The Aid of a Mechanical Right Heart.

F. D. DODRILL, ROBERT A. GERISCH (*by invitation*), ARAN S. JOHNSON
(*by invitation*) and EDWARD HILL (*by invitation*), Detroit, Mich.

There is, at present, a blind operative procedure on the pulmonary valve in patients with congenital pulmonary stenosis. This is known as the Brock operation and is a good one. It has vastly improved numerous patients. There is some suggestion, however, that patients who have had the Brock operation may again develop a high right ventricular pressure, indicating that the stenosis has recurred. If improvements are to be made from this point on, it is probable that they must be made by exposing the pathological structure.

Patients with pulmonary valve stenosis, who do not show arterial oxygen unsaturation and who do not show simultaneous opacification of the aorta and pulmonary artery during angiocardiography, may have only the pulmonary valve defect. Such patients do not have polycythemia or other signs of anoxia. In such a patient, a temporary by-pass of the right heart is possible using the mechanical right heart. The lungs and left ventricle continue to perform their functions.

A mechanical right heart has been used to by-pass the right heart in such a patient. Blood is withdrawn from the right atrium, passes through the mechanical heart and back into the artery to the right lower lobe, the cannula pointing centrally. The suction on the cannula in the atrium tends to cause the atrial wall to occlude the tricuspid valve. If this is not an air tight closure, a light clamp may be applied across the conus proximal to the pulmonary valve. The main pulmonary artery is separated from the ascending aorta and a clamp is placed across it. This prevents backflow from the pulmonary circuit. The pulmonary valve is now completely isolated. An incision is made in the base of the pulmonary artery and the valve is readily exposed. A plastic valvuloplasty is done under direct vision.

A movie will be shown of the entire operation.

6:30 P.M. Cocktails and Dinner, Fairmont Hotel.

Attendance limited to Members of the Association and their wives, Invited Speakers and their wives. Dinner Dress.

Monday Morning, March 30, 1953

9:00 A.M. Scientific Session.

22. The Problem of the Hiatus Hernia of the Diaphragm.

CONRAD R. LAM and LEO J. KENNEDY (*by invitation*),
Detroit, Mich.

At the present time, patients with hiatus hernia of the diaphragm receive conflicting advice, even from thoracic surgeons. Many with small but symptomatic hernias are told that a change of diet and habits is all that is indicated. For others, crushing of the phrenic nerve is suggested. Surgical conversion of small hernias into large ones has been advocated by several surgeons. Among those who use the more conventional surgical methods, there are proponents of both the trans-abdominal and transthoracic approaches. Surgeons who prefer the latter route differ with regard to the technical details of obliteration of the sac, phrenic nerve interruption, and more importantly, with the manner of reducing the size of the esophageal hiatus.

In an early series of eighteen transthoracic repairs by the senior author, follow-up x-rays revealed some degree of recurrence in one-third of the cases. The technic of closure of the hiatus has been changed to give a more anatomically sound repair. An antero-posterior row of sutures is placed and the esophagus is moved to an anterior position. This modification is in agreement with the technic proposed by Merendino, Varco and Wangenstein, and by Allison of Leeds. No recurrences of hernias have been noted in this group of patients. Some anatomic and physiologic features of the esophageal hiatus as noted at operation and in autopsy material will be considered.

23. Muscle Wall Tumors of the Esophagus.

RICHARD H. SWEET and LAMAR SOUTTER, Boston, Mass.

Over a twenty-year period 22 cases of tumors of the muscular wall of the esophagus have been observed. Of these, 21 were smooth-muscle tumors which are properly classified as leiomyomata, one of which was a leiomyosarcoma. In one patient the tumor was a rhabdomyosarcoma.

Of these 22 examples, 9 were incidental findings, 5 at autopsy and 4 in surgical specimens removed at operation for resection of carcinoma of the esophagus. In one instance no operation other than an esophagoscopy biopsy was performed. In 12 patients a curative procedure was carried out. This consisted of local excision of the tumor in 9 and resection in 3. In the latter group the indication for resection was the enormous size of the tumor in two instances and the fact that the tumor was malignant in the third.

A detailed presentation of the clinical aspects, indications for operation, and technical problems encountered in the 12 patients who were treated by surgical extirpation of the tumor is given.

In view of the fact that tumors of this sort are infrequently encountered, it seemed worthwhile to report the series.

24. Reinforcement of Aortic Aneurysms by Wrapping - A Research Report.

J. KARL POPPE, Portland, Ore.

Polyethylene film was suggested by the author in 1946 as the most satisfactory material for reinforcing the walls of aortic aneurysms. Confusion arose from the comparison of the plastic film with cellophane and failure to recognize the presence of a contaminant, dicetyl phosphate, as the irritating substance. Inconsistent results have followed the use of pure polyethylene which either never contained dicetyl phosphate or lost it during sterilization.

It is the purpose of this paper to report the results of further research in selection and preparation of the most effective material for reinforcing aneurysms. Experimental work reported previously indicated that dicetyl phosphate produced a more extensive fibrosis than did any type of cellophane.

Since recognizing dicetyl phosphate as the active ingredient and polyethylene as only its supporting framework all of the polyethylene film used by the author is being especially prepared. The pure film is heavily impregnated on both sides with dicetyl phosphate by rubbing the powder into the polyethylene while it is softened by heating.

Attempts were made to substitute a temporary vehicle, such as gelfoam, to avoid the presence of a permanent foreign body, but the other material disintegrated too rapidly to hold the irritant in place. Other irritating substances, such as asbestos and talc, were tested and found to be less effective than dicetyl phosphate, although the asbestos was more irritating than the talc.

All forms of sterilization were slow to reduce the concentration of dicetyl phosphate on the polyethylene film, but the least damage was noted in the film soaked in 1:1000 aqueous zephirin at room temperature for 25 minutes.

25. Clinical and Cytologic Changes in Patients Receiving Aerosol Trypsin and Desoxyribonuclease.

SEYMOUR M. FARBER (*by invitation*), DAVID A. WOOD (*by invitation*),
R. DANIEL GORMAN (*by invitation*) and SAMUEL PHARR
(*by invitation*), San Francisco, Calif.

Twenty-four patients with pulmonary tuberculosis who had excessive cough and who were raising moderate to large amounts of sputum were given trypsin alone or in combination with desoxyribonuclease by aerosol inhalation. Trypsin alone was of little effect, but in combination with the desoxyribonuclease it reduced cough and sputum viscosity in a majority of instances. Results were not marked, however, except for three patients in which the decrease in cough was substantial. Almost three-fourths of the patients in the series had significant toxic reactions; in nine patients these were so severe as to require discontinuance of treatment. Sensitivity reactions of chills and fever or asthmatic attacks were encountered. Cytologic studies revealed marked alterations of epithelial cells consisting of metaplasia and dyskeratosis. The significance of the rapid cytologic changes in the epithelial components of the sputum is not understood, and further evaluation of the action of pancreatic enzymes of the tracheobronchial epithelium is strongly indicated. In some patients who have not received this trypsin aerosol for at least six months, metaplasia is still being produced.

26. Torsion Ballistocardiography in Cardiovascular Surgical Patients.

C. FREDERICK KITTLE (*by invitation*), KURT R. REISSMANN (*by invitation*),
E. GREY DIMOND (*by invitation*) and PAUL W. SHAFER,
Kansas City, Kansas

Pre- and postoperative ballistocardiograms were analyzed in approximately 100 patients with surgically amenable cardiovascular diseases. The objectives were to investigate alterations in the ballistocardiogram in relation to known surgical intervention.

A torsion ballistocardiograph was used in contrast to the conventional head-foot ballistocardiograph because of the following advantages: (1) Both longitudinal and transverse vectors could be measured; (2) The site of origin of the reactive forces could be estimated; (3) Abnormal patterns could be accentuated by positioning the patient relative to the center of rotation.

Of particular note were ballistocardiograms in patients with patent ductus arteriosus, mitral valve deformities, chronic constrictive pericarditis and coarctation of the aorta. The abnormal wave found in patients with patent ductus arteriosus disappeared following surgical correction. The marked changes toward a normal ballistocardiogram in patients with mitral stenosis following valvulotomy correlated well with improvement in other parameters of their cardiodynamics. In coarctation of the aorta the I:J ratio provided a reliable index of the pathological preponderance of the cephalad flow of blood during systole. Diagnostic patterns found in patients with chronic constrictive pericarditis reverted to normal following pericardiectomy.

Representative tracings will be shown and some basic problems of ballistocardiography discussed.

27. An Experimental Study of the Effect of Parasympathetic Denervation of the Lung on Pulmonary Artery Pressure.

VICTOR H. KAUNITZ (*by invitation*) and MURRAY N. ANDERSEN

(*by invitation*), Buffalo, N.Y.

Because of the dearth of knowledge of the mechanisms regulating the lesser circulation, it was thought useful to study changes in the pulmonary vascular bed following complete parasympathetic denervation of one and both lungs in the experimental animal. The parasympathetic innervation was chosen because of the availability of a measurement of complete denervation of parasympathetic supply to a lung.

This test consists of determining the presence or absence of the Hering-Breuer reflex during bronchspirometry. Following vagus section in the neck, or division of all vagus branches to the lung, the homo-lateral Hering-Breuer reflex is always abolished.

Ten dogs were studied, by means of the above ventilatory test and by cardiac catheterization, preoperatively and after parasympathetic denervation of each lung. This consisted of division of all vagus branches to the lung, below the recurrent laryngeal nerve, ten to thirteen being found. The Hering-Breuer reflex was absent after this procedure in all animals, indicating complete loss of parasympathetic innervation of the pulmonary vascular bed. Changes in pulmonary artery pressure as measured by cardiac catheterization, were thereby determined after complete parasympathetic denervation of both lungs. The significance of these changes will be discussed in relation to cor pulmon-ale, idiopathic pulmonary hypertension and other conditions involving hypertension of the lesser circulation.

Monday Afternoon, March 30, 1953

2:00 P.M. Scientific Session.

28. The Role of the Bronchial Artery Circulation in the Etiology of Pulmonary and Pericardial Suppuration: An Experimental Study.

RICHARD S. HAHN (*by invitation*) and EMILE HOLMAN,
San Francisco, Calif.

A series of experiments were designed to determine the functional role of the bronchial artery circulation in the production of lung abscess, pericarditis and suppurative lesions of the mediastinum and chest cavity.

The right posterior bronchial artery was cannulated via a standard thoracotomy approach. A suspension of staphylococcus aureus and clotted whole blood was injected in Group I animals. Group II animals received the organisms and blood clot mixed with an equal quantity of Bismuth oxychloride and Gum Acacia in solution. Extreme care was taken to avoid the slightest gross contamination of the surrounding tissue. No antibiotics were used.

Results: Of five animals in Group I, two died within two weeks. Both displayed massive mediastinitis and empyema. One animal was sacrificed after three weeks and no abnormal findings were noted. Two are living, one of which is obviously quite ill with empyema.

Of three dogs in Group II, all died within 24 hours. At autopsy each manifested a marked hemorrhagic, inflammatory reaction of all pleurae. Fluid was found in the free chest cavity, pericardium and mediastinum. The tracheobronchial tree and esophagus were edematous and hemorrhagic. Petechial hemorrhage of the myocardium and the fatty areolar tissue was seen. The dye medium was found to be dispersed in the arterial bed of all structures involved.

It would appear that the bronchial artery circulation has a degree of collateralization hitherto not appreciated. Virulent organisms when injected into this system have been capable of producing primary empyema, mediastinitis, pericarditis and myocarditis. Lung abscess has not been produced. This is contrasted with the results of Holman, et al, in which septic emboli of the pulmonary arterial system resulted uniformly in lung abscess and a notable lack of involvement of other structures.

It would thus appear that septic emboli or bacteremia disseminated by way of the bronchial artery circulation has little or no propensity for initiating lung suppuration. Indeed, its importance in primary

suppurative processes of the mediastinum, chest walls, pericardium and heart itself appears to be of greater significance. The clinical application of the findings bear evaluation.

29. The Production and Repair of Interatrial Septal Defects Under Direct Vision with the Assistance of an Extracorporeal Pump Oxygenator Circuit.

BERNARD J. MILLER (*by invitation*), VICTOR F. GRECO (*by invitation*),
BURGESS A. SMITH (*by invitation*) and JOHN H. GIBBON, JR.,
Philadelphia, Pa.

Despite recent reports of occasional successes in the closure of interatrial septal defects in human patients, it appears to us that the problem is far from being satisfactorily solved. We believe that the solution will probably lie in careful closure of these defects under direct vision. We would, therefore, like to report a series of 10 dogs in which interatrial defects were created and closed with pericardial grafts at the same operation.

The systemic venous return to the heart and cardiac venous blood were diverted from the right atrium through an extracorporeal pump oxygenator circuit. This blood was oxygenated, cleared of carbon dioxide, and continuously returned to the animal through a centrally directed cannula in the femoral artery. The atrium was then widely opened. An excellent view of the interatrial septum was obtained. Defects measuring between 0.8 cm. and 1.8 cm. were made in the atrial septum. Repair was effected by suturing pericardial grafts to the free edge of the defects. In three instances, the graft was separated from its pericardial attachment, while in the remaining seven, the graft remained attached to the pericardium. Three animals died. The remaining seven animals are all alive and in good condition without any clinical evidence of an interatrial defect. The animals will be sacrificed after several months, and the gross and microscopic appearance of the pericardial grafts will be reported.

A brief motion picture will be shown illustrating the technique of this repair of interatrial defects.

30. The Oxygenator Pump in Total By-Pass of Heart and Lungs: Laboratory Evaluation and Clinical Use.

JAMES A. HELMSWORTH, LELAND C. CLARK, JR., (*by invitation*),
SAM KAPLAN (*by invitation*), ROGER T. SHERMAN (*by invitation*) and
THOMAS LARGEN (*by invitation*), Cincinnati, Ohio

The oxygenator pump, developed by Dr. Leland C. Clark, Jr., has been used by the authors in more than 85 experiments. In each instance, the subject dog had complete by-pass of its heart and lungs for at least thirty minutes. In the most recent group of experiments, cardiotomy was performed during total by-pass, and observations were made on venous return to the so-called "bloodless" heart. Measurements of the volume of combined bronchial and coronary venous return will be given. Technical problems related to operative surgery on the cardiac septa will be mentioned.

A detailed report will also be given describing total by-pass of the heart and lungs in a child with a ventricular septal defect. The closure of a portion of the defect was successfully accomplished. However, sixteen hours later the patient succumbed to the delayed effects of hypotension. A possible explanation for this hypotension will be offered and the lessons learned from this initial experience will be summarized.

31. Experiences with Cardiopexy in the Treatment of Coronary Disease.

SAMUEL A. THOMPSON, New York, N.Y.

For the past 14 years, cardiopexy has been performed upon a group of patients most of whom were completely incapacitated, because of severe coronary disease and angina. The rationale of the operation is to change the ischemic myocardium of coronary disease to a myocardial hyperemia. This is accomplished by distributing magnesium silicate powder over the myocardium inside the pericardial sac. The powder produces a foreign body reaction and a granuloma which involve the superficial myocardium and pericardium; it stimulates the development of intercoronary anastomosis, and it produces adhesive pericarditis. The new collateral circulation to the myocardium is thus both intra-cardiac and extracardiac in origin.

Fifty patients have been followed from the time of operation up to 14 years, with the idea of determining the degree of relief and the length of life after operation. Ninety percent of the patients were more than 50

percent improved; 40 percent of the patients were more than 75 percent improved, while only 10 percent were less than 50 percent improved.

Thirty-three (66 percent) of the patients are still living and of the 17 who have died, their average life span after cardiopexy was five years.

A short description of the operation is given and other pertinent data such as the age and sex of the patients, initial symptoms, length of symptoms before operation, and a comparison of the life span of the operated patients with the average span of the non-operated ordinary coronary patients is shown.

Microscopic slides from autopsy specimens show the persistence of the granuloma for as long as 10 years.

32. Cardiac Surgery Under Hypothermia.

CHARLES P. BAILEY, BRIAN COOKSON (*by invitation*), WILLIAM LIKOFF (*by invitation*), H. E. BOLTON (*by invitation*), D. F. DOWNING (*by invitation*) and W. B. NEPTUNE (*by invitation*), Philadelphia, Pa.

The works of Temple Fay, of W. E. Bigelow and of W. C. McQuiston and W. Potts have clearly portended the trend toward the utilization of lowered bodily temperature (and metabolism) for the performance of both open and closed intracardiac surgery. Following their lead, and after the employment of this modality in a considerable series of animal experiments, the authors have become emboldened to apply the technique to human cardiac surgery. The first patient was operated upon on August 29, 1952, in an unsuccessful attempt to repair an interatrial septal defect.

Since that time and up to the time of submitting this abstract, seven additional patients have been operated upon under hypothermia, both by the open and closed technique. Undoubtedly, by the time of presentation of this material, additional cases can be reported.

The indications to date for the employment of this method have been: interatrial septal defect; pulmonic stenosis; tetralogy of Fallot; mitral regurgitation and complete transposition (congenital) of the great arteries.

The experiences and results achieved with this method of management in our hands have been, on the whole, encouraging. It is felt that while there are distinct limitations to the successful clinical application of hypothermia, it does permit surgical correction of certain lesions which are not presently amenable to any other operative approach.

33. The Management of the Dangerously Torn Auricle.

WILLIAM K. SWANN (*by invitation*), THOMAS L. LOMASNEY (*by invitation*) and JORGE RODRIGUES-ARROYO (*by invitation*), Knoxville, Tenn.

The utilization of the left auricular appendage as an avenue of approach to the diseased mitral valve has now been widely adopted for commissurotomy in mitral stenosis.

There are certain normal and pathological variations in the auricle and its appendage which may render the procedure extremely hazardous. The auricular appendage may be so small as to not permit introduction of the operative ringer after amputation or wide opening of the appendage. This may require a lower and more unsafe application of the clamp to the wall of the auricle itself. The usually friable auricular tissue may become even more surgically unacceptable in the presence of adhesive pericarditis. In the presence of a greatly enlarged auricle or an eccentric location of the mitral orifice, or both, manipulation by the operative finger may create exceptional pressure or torsion at the site of entrance into the auricle.

Any one or a combination of the above listed factors may result in a tear in the auricle and this tear may readily extend below the previously applied purse string.

There are several dangers that are inherent in attempting to control hemorrhage from the torn auricle. This report deals with the detailed anatomy in this region of the heart. The authors have had occasion to manage auricular tears in two of their patients. The successful outcome was realized only because of attention

to certain anatomic details. These are illustrated and a detailed report of the surgical management of one patient with a severely torn auricle is given.

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