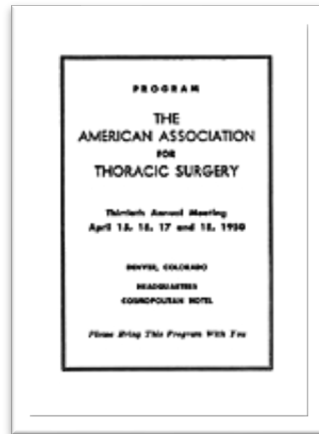


1950 ANNUAL MEETING PROGRAM



Saturday Morning, April 15, 1950

9:00 A.M. Business Meeting.

9:30 A.M. Scientific Session.

1. Intrathoracic Neurogenic Tumors.

J. T. GODWIN, M.D. (*by invitation*), W. L. WATSON, M.D.; J. POOL, M.D., and W. CAHAN (*by invitation*) New York, N. Y.

Twenty-one cases of intrathoracic tumors of nerve origin are presented from the Memorial Hospital. The pathology is organized in terms of a simple classification consonant with recent terminology and present knowledge of the life history of these tumors. Special emphasis is laid on clues to malignancy.

The clinical features are presented to emphasize differential diagnosis and characteristic radiographic signs. The special features of operative treatment are discussed.

2. Tumors of the Thymus.

W. D. SEYBOLD, M.D., JOHN R. MCDONALD, M.D., O. T. CLAGETT, M.D., and G. A. GOOD, M.D. (*by invitation*) Rochester, Minn.

Tumors of the thymus have been the object of much attention from pathologists, clinicians and surgeons since Weigert in 1901 described a case of myasthenia gravis in which a thymic tumor was found at autopsy. This association of myasthenia gravis with tumor of the thymus has been confirmed subsequently by many observers. However, the relationship between them is no more clear now than it was at the time of Weigert's report. Furthermore, there are other features of thymic tumors that are of uncommon interest. Only a small number of patients with myasthenia gravis have thymic tumors. Removal of the tumor has no uniformly beneficial effect on the course of the disease. The rarity of the tumors and the lymphoid character of the thymus have made differentiation of tumors arising from it and other tumors of the anterior mediastinum most difficult. Many tumors arising in the anterior mediastinum have been classified, probably erroneously, as thymic in origin. While the histologic distinction between a thymic tumor and a lymphosarcoma of the anterior mediastinum may be difficult or impossible, the response of each to exposure to deep roentgen rays is usually quite different. Not all tumors of thymic origin are associated with myasthenia gravis. While thymomas in patients with myasthenia gravis fall into a distinct histologic pattern, this same pattern has been seen in a number of thymomas in patients who had no evidence of myasthenia. Most thymomas are encapsulated and can be shelled out readily from their bed in the mediastinum, but many are found at operation or necropsy to have invaded the pleura, pericardium and great vessels. Constant histologic differences between the

encapsulated and invasive varieties have not been found to exist. Whereas deposits of calcium are extremely rare in malignant tumors generally with the exception of those which arise from bone, they are common in thymomas, in both the encapsulated and unencapsulated varieties. Thymomas that have been found to have invaded adjacent vital structures and to be ineradicable are compatible with long survival and freedom from disabling symptoms.

Forty-five cases in which the diagnosis of thymic tumor was verified by tissue removed at operation or at necropsy form the basis of this report on the clinical, pathologic and surgical aspects of the lesion.

3. Treatment of Carcinoma of the Lung Associated with Malignant Tumors Primary in Other Sites: Report of Eight Cases.

WILLIAM G. CAHAN, M.D. (*by invitation*), FRANK S. BUTLER, M.D. (*by invitation*),
WILLIAM L. WATSON, M.D. and JOHN L. POOL, M.D., New York, N. Y.

Within the past year at the Memorial Hospital there have been eight cases with a proved malignant tumor primary in a site other than the lung and associated with bronchogenic carcinoma. Six of these separate primaries were capable of metastasizing. In these cases, the appearance of a solitary lung density was found by routine chest roentgenogram. Exploratory thoracotomy showed them to be carcinoma primary in the lung and in a favorable location for resection.

The anatomical sites that were associated with the lung neoplasms include the hard palate, intrinsic, larynx, buccal mucosa, breast, colon and breast (triple primary) and rectum. Two other cases were basal cell skin cancers.

In a study of 1,500 cases of lung carcinoma, there were 25 other primary malignant tumors associated with a primary malignant lung tumor.

4. The Surgical Management of Carcinoma of the Lung.

E. D. CHURCHILL, M.D., R. H. SWEET, M.D., L. SOUTTER, M.D. and J. G. SCANNELL, M.D.,
Boston, Mass.

A parallel study of the results achieved by pneumonectomy and lobectomy for primary carcinoma of the lung at the Massachusetts General Hospital over the period 1934 to 1948 is presented. The value of resection is evaluated in terms of survival of the patient, operative mortality and immediate or long-term morbidity. Since lobectomy was performed by choice in a significant proportion of the resected cases, a basis for comparison of the efficacy of the two procedures is provided.

5. A Study of Pulmonary Hemodynamics During Pneumonectomy.

HARVEY J. MENDELSON, M.D., HENRY A. ZIMMERMAN, M.D. and ARTHUR
ADELMAN, M.D. (*by invitation*), Cleveland, Ohio

Pulmonary hemodynamics have been studied before and after pulmonary resection in humans but, to our knowledge, these are the first observations of changes occurring during the actual operative procedure. To date eight patients have been studied, six patients undergoing pneumonectomies, one undergoing lobectomy and one during an exploratory thoracotomy. One hour preoperatively, a Courmand catheter was introduced into an anticubital vein and under fluoro-scopic control placed in the pulmonary artery opposite to the one to be ligated. Basal cardiac outputs were determined by the Fick principle and initial pressures were recorded. The electrocardiogram, phase of respiration and femoral or brachial arterial pressures were recorded simultaneously, on a six channel direct writing oscillograph. Subsequent observations were made at 15-minute intervals throughout the entire procedure, including the immediate period of ligation and after the closure of the chest. In two patients, whose lesions were not resectable, the pulmonary arterial pressure measurements were obtained after temporary ligation of one pulmonary artery.

In one additional patient left auricular pressures were determined by inserting a catheter into the left auricle through a tributary of the superior pulmonary vein of the lung to be resected. In another patient left intraventricular electrocardiograms were taken by this same method.

The following changes were observed: There was a rise during the induction of anesthesia of both systolic and diastolic pulmonary artery pressures, averaging as high as 70% in the diastolic and 36% in the systolic pressures. The increase in systolic pressure during ligation ranged from 18% to 70%, the average being 40%. In three cases a decrease in diastolic pressure was observed and in the rest a moderate increase was observed.

There was a slightly greater change in pressure, as a rule, when the right pulmonary artery was ligated. Pressures returned to pre-ligation levels in most cases by the end of the procedure.

One patient who had a high pulmonary artery pressure developed congestive heart failure and an increase in his pulmonary artery pressure after left upper lobectomy. It was thought that determination of pulmonary arterial pressures preoperatively might help to detect unsuitable risks for pulmonary resection, particularly in those patients with initially high pulmonary artery pressures.

Studies are continuing and further information will be available as the studies go on.

Saturday Afternoon, April 15, 1950

2:00 P.M. Scientific Session.

6. Conservative Management of Empyema Following Total Pneumonectomy.

EDWARD M. KENT, M.D., Pittsburgh, Pa.

During the past five years there have been eleven patients who have developed an open bronchus following total pneumonectomy, an incidence of about four percent. In addition, there have been five patients who have developed thoracic empyema following total pneumonectomy without bronchial fistula. In the first group mixed infection was encountered in each instance while in the second group the pure infection was present in all cases. In both groups surgical drainage of the empyema was established.

In those patients in whom bronchial fistula had occurred healing of the fistula took place in every instance after surgical drainage. Following this a program of instillation of antibiotics into the pleural space was pursued. Subsequently, the drainage tubes were removed and the antibiotics were continued by local instillation for an arbitrary period of time. In eight patients, the empyema was cured by this technique without radical surgery. In one of these patients a recurrence was encountered three and one-half months later which was treated in the same fashion, following which recovery became complete and has remained so for sixteen and one-half months. In the three remaining patients, recurrence was encountered in two and in both instances the patients have refused a second trial of therapy and radical surgery, and are wearing their thoracotomy tubes up until the present. In the third instance, the response to antibiotic therapy was inadequate and the program was abandoned after which a thoraco-plasty was performed with a cure.

In the second group in which no bronchial fistula occurred, a similar program of antibiotic therapy was employed immediately after the institution of surgical drainage. As before, the drainage tubes were removed when certain criteria were met and the antibiotic therapy continued by injection through the chest wall into the pleural space. In four patients, the primary recovery of the empyema was obtained.

In the fifth patient a recurrence was encountered four months after therapy and the same program was observed again with satisfactory initial results, however, a second recurrence was encountered three months later at which time a thoracoplasty was performed with cure of the empyema.

It is interesting to note that the onset of the empyema in some instances was late, in one patient, nineteen months after pneumonectomy; in another patient, ten months after pneumonectomy; and in several instances, a few months after operation.

7. The Utilization of Streptokinase-Streptodornase in: (1) A Patient with Hemopneumothorax and (2) A Patient with Postpneumonectomy Sanguineous Coagulum.

C. THOMAS READ, M.D. (*by invitation*) and FRANK B. BERRY, M.D., New York, N. Y.

The rapid lysis of blood clot and related coagula takes place, as has been shown by Tillett and Sherry, when concentrated and partially purified preparations derived from broth cultures of hemolytic streptococci are instilled into them. These products, Streptokinase and Desoxyribonuclease (Streptodornase), acting as enzymes lyse fibrin and nucleoprotein respectively.

This report relates our experience with the enzymes (essentially Streptokinase) in the successful management of a case of hemopneumothorax and one of sanguineous coagulum following pneumonectomy wherein it was desirable to evacuate the thorax before thoracoplasty.

From the striking results obtained in these cases, the further application of the enzymes to thoracic surgical problems appears indicated.

8. Pulmonary Paraffinoma (Lipoid Pneumonia), A Critical Study.

THOMAS H. BURFORD, M.D. and RALPH BERG, M.D. (*by invitation*) St. Louis, Mo.

The authors desire to establish more precisely the clinical and radiographic picture of pulmonary paraffinoma. The study is based on an extensive review of the literature and personal experience with cases in which the lesion was resected. The importance of associated habits, pathologic processes and anatomical and functional changes is stressed. The relation of the lesion to the clinical presence of chronic sinusitis, esophageal and hypopharyngeal diverticula, cardiospasm, paralysis agitans and habitual use of mineral oil is reiterated. Radiographic features and methods of establishing a clinicopathologic diagnosis are pointed out. Emphasis is placed on differentiation of the lesion from carcinoma, either primary or metastatic, both clinically and at the operating table. A discussion of the relation of paraffinoma to carcinoma and its possible role as an etiologic agent in certain pulmonary carcinoma is made.

9. Surgery in Pulmonary Coccidioidomycosis-Preliminary Report of 25 Cases.

BERT H. COTTON, M.D. and J. W. BIRSNER, M.D. (*by invitation*) Beverly Hills, Calif.

1. A series of 25 cases of pulmonary coccidioidomycosis treated by surgical methods is presented.
2. Surgical treatment in pulmonary coccidioidomycosis can be used to prevent death and is effective in arresting the disease process.
3. Surgical treatment in pulmonary coccidioidomycosis does not cause dissemination of the disease to the skeletal or nervous system, but may even prevent dissemination.
4. Surgical treatment is definitely indicated in pulmonary coccidioidomycosis in the following conditions: 1. Specific types of cavities (a) giant cavity; (b) secondarily infected cavity; (c) blocked cavity. 2. Rupture of cavity (a) spontaneous pneumothorax; (b) empyema. 3. Non-expansile lung. 4. Hemoptysis (a) continued; (b) severe. 5. Coccidioma expanding lesion. 6. Failure of medical treatment (collapse therapy, etc.).
5. Coccidioma, which is usually single but may be multiple, must be differentiated from a tuberculoma, hamartoma, and both primary and metastatic carcinomatous lesions.
6. Lung complications resulting from the pulmonary coccidioidomycosis should be evaluated surgically from the standpoint of pathologic lesions without regard to the fungus origin or activity of the disease.
7. Surgical treatment in selected cases of pulmonary coccidioidomycosis results in rapid rehabilitation of the patient as contrasted to long term and frequently ineffective medical care.
8. The combination of pulmonary cavities due to tuberculosis and coccidioidomycosis does not constitute a contraindication to surgical management.

10. Pectus Excavatum-Management of a Case With Severe Cardiopulmonary Disability With Pre- and Postoperative Angiocardiographic Studies.

RALPH A. DORNER, M.D., PHILIP G. KEIL, M.D. (*by invitation*) and DONALD J. SCHISSEL, M.D. (*by invitation*), Des Moines, Iowa

The literature regarding surgical correction of funnel breast is briefly reviewed. A case with marked deformity in a twenty-eight year old male is presented. Severe cardiac dysrhythmia and bilateral lower lobe bronchiectasis coexisted. This case is of particular interest since detailed preoperative and postoperative studies of the circulation, including repeated angiocardiograms, have been made. Relief of distressing cardiopulmonary symptoms has been dramatic. The changes in the angiocardiograms and other studies over a six months' postoperative period have been correlated with this improvement.

7:00 P.M. Cocktail Party-Hotel Cosmopolitan.

8:00 P.M. Banquet-Hotel Cosmopolitan. Dancing

Monday Morning, April 17, 1950

9:00 A.M. Scientific Session.

11. Studies with Arteriovenous Fistulas. I. Response of the Normally Innervated and Denervated Heart to Occlusion of the Fistula.

H. B. SHUMACKER, JR., M.D., L. W. FREEMAN, M.D. (*by invitation*) and LEO RADIGAN, M.D. (*by invitation*), Indianapolis, Ind.

Characteristically profound changes occur with occlusion of an arteriovenous fistula: slowing of pulse, rise in blood pressure and fall in cardiac output. Not only are these changes of considerable interest because of their magnitude, but they are of interest also because they occur with the very first stroke of the heart after occlusion. The immediacy of the response might make one wonder whether the response is mediated by some reflex mechanism. In the present investigation dogs with large femoral fistulas were studied with regard to alterations in blood pressure, pulse and cardiac output upon digital occlusion of the fistula. The same studies were made upon dogs with normal cardiac innervation, in dogs with sympathetically denervated hearts and, finally, in dogs with hearts deprived of both sympathetic and vagal innervation. It was a remarkable observation that blood pressure and cardiac output changes occurred in animals with denervated hearts just as in animals with normally innervated hearts. These studies may be of significance, not only in understanding the problem of the circulatory changes in arteriovenous fistulas, but also with regard to the response of the heart in general to stress and alterations of circulatory dynamics.

12. Experimental Attempts at the Surgical Relief of Aortic Stenosis.

CHARLES P. BAILEY, M.D., ROBERT P. GLOVER, M.D., THOMAS J. E. O'NEILL, M.D. (*by invitation*) and HECTOR P. REDONDO RAMIREZ, M.D. (*by invitation*), Philadelphia, Pa.

A study has been carried out on dogs in an effort to explore various methods designed to overcome the physiological derangements of aortic stenosis. This investigation has taken three forms:

(1) An appraisal of the technical difficulties of punch resection of portions of the aortic valve utilizing both the innominate artery and the left ventricle as approaches.

(2) An approach through the left ventricle and utilizing instruments similar to those devised by Dr. Brock in stenosis of the pulmonary valves.

(3) Efforts were directed toward by-passing the aortic valve in dogs by utilizing grafts of aorta from donor animals. These grafts included the donor aortic valve. In all instances the distal end of the graft was anastomosed to the descending aorta of the recipient dog just below the left subclavian artery, using an end-to-side technic. In half of the dogs the proximal end was introduced through the left auricular appendage and mitral valve and, second, in the chamber of the left ventricle. Polythene tubing was incorporated in such a way in this proximal segment so as to facilitate maintaining patency. In the remaining half of the dogs the proximal segment was introduced directly through the wall of the left ventricle.

A summary of these experiences is presented together with illustrative lantern slides.

13. The Experimental Creation and Closure of Auricular Septal Defects.

HENRY SWAN, M.D. and (*by invitation*) GEORGE MARESH, M.D., MARVIN E. JOHNSON, M.D. and GEORGE WARNER, M.D., Denver, Colo.

The problem of creating experimentally in dogs a lasting auricular communication which simulates anatomically the clinical defect is discussed. A method employing excision of the major portion of the auricular septum under direct vision with the auricle open is described. Despite the wide excision there is a strong tendency for the defect to close spontaneously.

A method for the closure of these experimental defects, which does not interfere with blood flow at any time and which leaves exposed to the intra-auricular blood stream only endothelialized surfaces, is described. This is accomplished by inversion of the auricular appendages through the septal defect. Cardiac catheterization and autopsy studies reveal this to be an effective method of closure of such defects in the experimental animal.

14. A Physiological Evaluation of Vagus Section for Bronchial Asthma.

KARL P. KLASSEN, M.D., DOUGLAS R. MORTON, M.D. (*by invitation*) and GEORGE M. CURTIS, M.D., Columbus, Ohio

Various surgical procedures have been performed on the extrinsic pulmonary nerves in patients with intractable asthma. Of these, unilateral cervical vagotomy, unilateral cervical sympathectomy, stellate ganglionectomy, bilateral cervical sympathectomy and bilateral resection of the posterior pulmonary plexus have been performed more frequently. Unfortunately the results from these various procedures have been more or less equivocal. This fact has stimulated our clinical study, in order to evaluate further the neurophysiology of the bronchi.

In a series of patients with bronchogenic carcinoma, found to be inoperable at exploratory thoracotomy, the homolateral vagus trunk was transected immediately below the recurrent laryngeal nerve. Postoperative studies revealed that:

- (1) The cough reflex arising from the homolateral bronchial tree was abolished in all instances.
- (2) In the majority of cases pain of bronchial origin was abolished on the homolateral side.
- (3) No effect on the physiological respiratory change in bronchial caliber was noted, nor was any effect observed on bronchial motility.
- (4) On bronchoscopic observation no subsequent changes were noted in the amount nor in the consistency of bronchial secretion; likewise, postbronchography roentgenograms revealed no impairment of lipiodol clearance of the tracheobronchial tree.

These studies were performed on individuals in whom bronchospasm was not a factor, and no evidence of postoperative paralytic dilatation of bronchi was noted. However, inasmuch as the majority of authorities consider the vagus nerve to be the main "bronchomotor" nerve, and since individuals with bronchial asthma exhibit a variable degree of bronchospasm, it was postulated that bilateral vagotomy just below the origin of the recurrent nerves *might* prove of some value.

Three cases of bilateral parasympathectomy of the bronchi for intractable asthma are presented. Postoperative studies reveal the bronchospasm to be persistent. This is confirmatory evidence of our previous work performed on patients with inoperable bronchogenic carcinoma, in that vagotomy or parasympathectomy of the bronchial tree does not influence the caliber or motility of the bronchi.

15. Therapeutic Status of Pulmonary Autonomic Nerve Surgery.

OSLER A. ABBOTT, M.D. and (*by invitation*) WILLIAM A. HOPKINS, M.D. and PAUL H. GUILFOIL, M.D., Emory University, Ga.

This study consists of an evaluation of the results of various types of surgery of the autonomic nerves in patients with different pulmonary diseases. The authors present comparative series of patients with intractable bronchial asthma treated by (a) pulmonary plexectomy, (b) upper dorsal post-ganglionic sympathectomy and (c) either (a) or (b) plus segmental resection for "trigger" areas of chronic destructive infection. An attempt is made to determine the causes of failure in this therapeutic approach to bronchial asthma. The value of autonomic nerve surgery in conjunction with pulmonary resection in bronchiectasis is also considered, in view of comparable patients treated before and after the addition of autonomic nerve surgery to the operations for this disease. A discussion of experiences with surgery of the autonomic nerves in the surgical treatment of pulmonary emphysema is presented. Other lesions considered include (a) recurrent spontaneous pneumothorax, (b) recurrent pulmonary thrombosis, (c) palliative measures in bronchogenic carcinoma, (d) intractable bronchorrhoea.

An attempt has been made to evaluate the effect of these procedures by pre- and postoperative respiratory physiological studies. The prognostic value of such studies carried out, with and without various bronchial dilators, is discussed. It is felt, that from experience with over 150 cases of pulmonary autonomic nerve surgery, we are allowed to make certain preliminary conclusions: (1) that this can be a valuable adjunct to thoracic surgery but, (2) further clinical studies, with particular stress on objective pulmonary functional tests, are required.

16. The Surgical Treatment of Intractable Asthma.

BRIAN BLADES, M.D., EDWARD J. BEATTIE, JR., M.D. and (*by invitation*) WILLIAM S. ELIAS, M.D., Washington, D. C.

An analysis of thirty-seven cases of intractable asthma subjected to surgical intervention will be presented.

Follow-up reports and immediate and late mortality rates will be reviewed.

Various ramifications of the investigation, which may be more important than the original problem, will be presented. These include residual air studies, effects on electrocardiograms and pulmonary artery pressure readings.

Monday Afternoon, April 17, 1950

2:00 P.M. Executive Session.

3:00 P.M. Scientific Session.

Address of the President-EDWARD J. O'BRIEN, M.D., Detroit, Mich.

17. The Experimental Use of Homogenous Tracheal Transplants.

TRUXTON D. JACKSON, M.D. (*by invitation*), EDWARD J. O'BRIEN, M.D., WILLIAM TUTTLE, M.D. and JOHN MEYER, M.D. (*by invitation*), Detroit, Mich.

The experiments consisted of transplanting homogenous tracheal sections, using mature dogs as the experimental animals. Varying sized tracheal and bronchial defects were created surgically and these were covered with homogenous transplants. Entire cylinders of the trachea up to four centimeters in length were removed and the defects successfully bridged with transplants.

After the transplants were obtained, they were either inserted immediately or preserved and used at any time up to two weeks thereafter.

The transplants were studied after sacrifice of the animals. Autopsies were performed from two and one-half weeks to eleven months after surgery.

A surgical technic for securing the transplants in place is described.

18. Resection of the Trachea and Bronchi-an Experimental Study.

MAX G. CARTER, M.D., (*by invitation*), New Haven, Conn. and JOHN W. STRIEDER, M.D., Brookline, Mass.

The problems involved in the repair of defects in the trachea and bronchi are stated and the criteria for a physiologically satisfactory reconstruction are catalogued. Previous efforts for the repair of tracheo-bronchial defects following radical resection of segments are briefly reviewed.

A series of 20 animal experiments have been performed to develop a method of radical bronchial resection and repair. A method was developed for the insertion of an inlying endotracheal tube at operation to maintain an airway to the remaining pulmonary tissue and to facilitate the leisurely repair of tracheal and bronchial defects.

Autografts with segments of bronchus from resected lobes or lungs proved to possess the correct characteristics for a satisfactory postoperative recovery and healed without developing fibrous stenosis.

Homografts of complete tracheal segments from donor animals functioned well through the immediate postoperative period but resulted in gradual resorption and the late development of fibrous stenosis at the site of repair.

The operative technics are pictorially described.

19. Further Experiences with Dermal Grafts for Healed Tuberculous Stenosis of the Bronchi and Trachea.

PAUL W. GEBAUER, M.D., Honolulu, Hawaii

Of 136 patients with tuberculous tracheobronchitis 20 died, 27 are still receiving sanatorium treatment, and 26 have been discharged as healed. The remaining 63 (46%) have received surgical treatment. Of these, 13 patients had successful thoracoplasties. In 22 patients severe main bronchial stenosis plus distal lung destruction required pneumonectomy, three of these having had previous thoracoplasties. In five patients the bronchial lesion healed without the production of significant stenosis, but pneumonectomy was done for extensive lung disease unsuitable for collapse. Ten patients developed stenoses that required lobectomy, bilobectomy or segmental resection. In two patients pneumonectomy was avoided by reconstruction, with dermal grafts, of severely stenosed main bronchi, the parenchymal disease having healed. Pneumonectomy was avoided in eight patients by the substitution of lobectomy and dermal graft to the main bronchial stenosis. Three patients died from surgical attempts to correct severe, co-existent but separate, stenoses of both the trachea and the right main bronchus. These are the only deaths in the surgical series.

This experience supports the obvious facts that excisional surgery usually is indicated in bronchial stenosis, and that successful collapse occasionally can be applied despite some bronchial deformity. On the other hand, it shows that there are a significant number of patients in whom a direct surgical attack on the bronchial lesion itself is indicated. Wire-enforced dermal grafts provide a good surgical method of lessening the extent of necessary resection or avoiding it entirely when the parenchymal disease is minimal or healed. The clinical and surgical criteria and indications for their use are illustrated by case reports.

Tuesday Afternoon, April 18, 1950

2:00 P.M. Scientific Session

20. Pulmonary Function Before and After Extrapleural Pneumothorax.

EDWARD A. GAENSLER, M.D. (*by invitation*), Boston, Mass, and JOHN W. STRIEDER, M.D., Brookline, Mass.

The loss of pulmonary function after most types of collapse procedures has been intensively studied during the past twenty years. Extrapleural pneumothorax has been neglected from this standpoint beyond the finding that patients with small pulmonary reserve usually tolerate this procedure very well.

Sixteen patients with extrapleural pneumothorax and one with extrapleural lucite sphere plombage were studied immediately prior to operation, 14 days after operation and two months to one year after surgery. Studies included maximum breathing capacity, vital capacity and subdivisions, residual air and lung volume, walking ventilation, simple spirometry and differential bronchspirometry.

An average maximum breathing capacity of 76.4 liters before operation was increased to 77.3 liters per minute two weeks after surgery, an increase of one percent. There was no further increase or decrease two to 12 months later.

The average vital capacity of 2,227 cc. before operation was reduced to 1,960 cc. after operation, a loss of 12 percent. There was a small improvement during the following two to 12 months. The mean lung volume was decreased by about 25 percent. Extrapleural pneumothorax thus appeared to be created chiefly at the expense of residual air.

Accidental opening of the pleura in two cases with admission of air into the intrapleural space resulted, 14 days after operation in a 50 percent loss of maximum breathing capacity and a 60 percent loss of vital capacity in spite of assiduous aspiration of air and fluid post-operatively. This compares most unfavorably with a loss of 12 percent of vital capacity and no loss of maximum breathing capacity in 15 patients where the pleura was not opened, or, if opened, was found to be adherent to the visceral pleura in that region.

Differential bronchspirometry showed a one percent loss of oxygen uptake, an eight percent loss of ventilation and a six percent loss of maximum breathing capacity of the collapsed lung. The ventilatory equivalent for these lungs was thus reduced and ventilation became more efficient.

Compared to other collapse procedures the loss of pulmonary function after extrapleural pneumothorax was very small indeed. The loss was very much smaller than that following an unselected group of patients after pneumonectomy, lobectomy, thoracoplasty and intrapleural pneumothorax. It was somewhat smaller than the functional loss after phrenemphraxis and smaller in most cases than the loss occurring after pneumoperitoneum.

In the patients presented there was a contralateral pneumothorax or unexpandable pneumothorax lung present in eight cases, a contra-lateral four-rib and ten-rib thoracoplasty respectively in two cases, a surgically decorticated lung in one case and a previous pneumonectomy had been performed in one case. The loss of function here could, therefore, not be truly compared to pulmonary disability caused by a variety of other collapse measures. Extrapleural pneumothorax was carried out in most cases on lungs which performed the major portion and in three cases all of the total respiratory function. The mean oxygen uptake was 56.8 percent of the total as determined by differential bronchspirometry. The mean oxygen uptake of 48 patients prior to thoracoplasty was 22 percent of the total on the side to be operated upon while the mean oxygen uptake of 21 lungs to be resected was 12 percent of the total prior to operation.

The extrapleural pneumonolysis, in the cases presented, was invariably carried down to the hilus of the lung and the resulting air spaces were usually very large, particularly 14 days after operation.

The astonishing lack of loss of function not only some months after operation, but even two weeks after surgery, was felt to be due to the fact that all of the usual causes for loss of function, other than collapse of diseased tissue, were absent after this operation. These factors not present after extrapleural pneumothorax are felt to be: (1) paradoxical motion of the chest wall, the diaphragm and the mediastinum, (2) permanent partial destruction of the thoracic cage, (3) paralysis of the hemidiaphragm, (4) postoperative pain and (5) interference with the intrapleural pressure mechanism.

Data obtained in the physiology laboratory were supported by postoperative clinical findings. No patient was dyspneic at any time after operation except where the pleura was opened. Dyspnea could not even be detected when extrapleural pneumothorax was carried out in the absence of a contralateral lung or in the face of a contralateral 10-rib thoracoplasty.

Without entering the controversy concerning the indications for the extrapleural pneumothorax operation, the data presented suggest that this operation can be carried out with the certain knowledge that the resulting loss of pulmonary function will be very small or nonexistent. The operation can, therefore, be offered to a number of patients whose pulmonary reserve would not permit any other type of collapse therapy.

21. Summary of Pulmonary Tuberculomas, Pathogenesis, Diagnosis and Management.

GORDON J. CULVER, M.D. (*by invitation*), JOSEPH P. CONCANNON, M.D. (*by invitation*) and JOSEPH E. MACMANUS, M.D., Buffalo, N. Y.

The use of the term tuberculoma is defined, and limitations are established in the use of this term. The pathogenesis of tuberculomas is described as arising from (1) the encapsulation of a giant primary focus, (2) the encapsulation of a restricted reinfection focus, and (3) by means of the occlusion of a stem bronchus to a cavity. A case is presented demonstrating the evolution of a cystic lesion to an almost solid tumor by means of bronchial occlusion.

The roentgenographic history of tuberculomas is discussed. The differential diagnosis of round circumscribed lesions is described at some length, particularly the differentiation between peripheral bronchiogenic carcinoma and tuberculoma.

Tuberculomas are classified into two major types with sub-types. This is of importance because the treatment will be predicated on the type of tuberculoma. The question is brought up whether all tuberculomas in the lung fields should be removed. It is felt that conservative, well managed observation may be the treatment of choice in well calcified tuberculomas without breakdown. Tuberculomas without calcification, or with areas of breakdown, certainly should be removed.

Ten cases are presented to illustrate various types of pulmonary tuberculomas and their management. Two cases of mediastinal tuberculomas are included to complete the study of tuberculomas within the thorax.

22. One Stage Thoracoplasty for Pulmonary Tuberculosis.

R. C. LAIRD, M.D. and C. E. LINDENFIELD, M.D. (*by invitation*) Toronto, Canada

It has been felt for some time that with modern knowledge and control of shock, it might be possible to do many thoracoplasties in one stage, rather than in two or three stages. It is felt that this would give a much better collapse, it would shorten the period of postoperative hospitalization and would partly eliminate the distress of second and third operations.

Accordingly, we are now reporting seventy-five one stage thoracoplasties, and comparing them with seventy-five two or three stage thoracoplasties done under the same conditions and for approximately the same type of disease. We have noted the postoperative date of conversion of the sputum, the hospital morbidity, the mortality, if any, and the present occupation of the patients. Our conclusions have been that the collapse achieved is more adequate, the time in hospital is considerably decreased and the patient's comfort considerably increased.

23. Further Experiences with Segmental Resection in Pulmonary Tuberculosis.

J. MAXWELL CHAMBERLAIN, M.D. and ROBERT KLOPSTOCK, M.D. (*by invitation*), New York, N. Y.

Seventy-five consecutive cases of segmental resection in the treatment of cavitary tuberculosis are reviewed. Though the procedure is still a therapeutic uncertainty, it has greater merit than was originally anticipated.

Its natural evolution was based upon the desire to remove the diseased components with maximum preservation of lung function. Though the function in the residual segments may not be great, it is reasoned that as a "space-filler", overdistention and anatomical distortion of residual parenchyma can be minimized.

Developmental hurdles to overcome were (1) the philosophy of removing only the "main offending lesion" and (2) the possible transgression of tuberculous disease during the operation. The clinical picture and serial X-rays were helpful in estimating the degree of stability in the various segments, but the actual location and full appreciation of the problem was realized only by the use of tomography, and especially lateral tomography.

The indications, as we know them, improvements in technic, pathological observations, complications and deaths (three) are statistically analyzed. The longest follow-up is only two and one-half years, but early results are encouraging. Until sufficient time has passed, no conclusions are drawn.

24. Resection in the Treatment of Pulmonary Tuberculosis.

WILLIAM M. TUTTLE, M.D., E. J. O'BRIEN, M.D. and J. CLAUDE DAY, M.D., Detroit, Mich., and (*by invitation*) FOSTER HAMPTON, JR., M.D., Chattanooga, Tenn., and TRUXTON L. JACKSON, M.D., Detroit, Mich.

Increasing enthusiasm for resection of tuberculous pulmonary lesions has paralleled improved surgical technic, refinements of anesthesia, better preoperative and postoperative care and streptomycin protection. Although marked improvement in fatality and complication rates has occurred in recent years, the results still fall considerably short of desirable goals. It is likely that an irreducible minimum as regards mortality and morbidity is being approached, beyond which further improvement is not attainable. In view of well-known factors inherent in the disease, the uniformly good results to be anticipated in resection for non-tuberculous disease may never be equalled.

Our experience with resection in pulmonary tuberculosis, which consists of approximately 170 operations, is presented to supplement the large experience already recorded. It is our purpose to attempt an evaluation of the role of resection in the management of pulmonary tuberculosis and to further define its limitations.

The indications and contraindications are discussed, the complications are analyzed, and the causes of death are listed. The role of streptomycin is discussed in relation to its known protective function as well as in relation to the potential hazards inherent in its ill-advised use.

25. Pulmonary Resection in Pulmonary Tuberculosis.

A. HIMMELSTEIN, M.D., FRANK B. BERRY, M.D. and (*by invitation*) C. T. READ, M.D., New York, N. Y.

In the period from 1939 to December 1948 seventy resections for tuberculosis were done—forty lobectomies and thirty pneumonectomies. An attempt was made to follow for at least one year all cases of this study. This report deals with the results at the present time in these seventy patients.

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