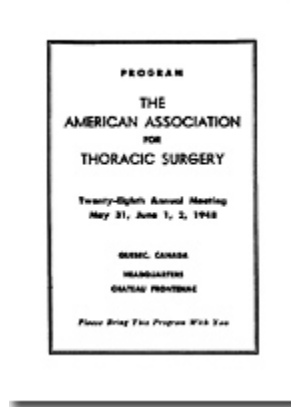# 1948 ANNUAL MEETING PROGRAM

Monday Morning, May 31, 1948

9:00 A.M. Business Meeting.

9:30 A.M. Scientific Session.

1. Streptomycin as an Adjunct in Surgical Treatment of Pulmonary Tuberculosis.
DANIEL A. MULVIHILL, LAURENCE MISCALL, and *(by invitation)*
ROBERT KLOPSTOCK, JOSEPH BITSACK, Jamaica, N. Y.

In our experience on the surgical service of Triboro Hospital as illustrated by the series of 85 cases presented herewith, streptomycin has been a most valuable adjunct in the surgical treatment of pulmonary tuberculosis, and has proven efficacious for the following indications:

1. Preoperatively and postoperatively for all pulmonary resections and intrapleural surgery on Tbc patients.
2. Preoperatively and postoperatively for all thoracoplasties considered substandard risks, or with complications such as contra-lateral pneumothorax, diabetes, etc.
3. For acute exudative postoperative spread, where streptomycin has not been used prophylactically.
4. Intrapleurally for pure tuberculous empyema without broncho-pleural fistula.
5. In combination with open Schede thoracoplasty for Tbc-mixed empyema with bronchopleural fistula.
6. In the infected chest wounds and sinuses.

2. The Role of Streptomycin in the Surgical Treatment of Pulmonary Tuberculosis.
P. T. CHAPMAN *(by invitation),* E. J. O'BRIEN and
PAUL V. O'ROURKE, Detroit, Mich.

The paper concerns the marked change in the surgical treatment of pulmonary tuberculosis since the advent of streptomycin. There is a very noticeable decrease in the number of pneumothorax treatments, phrenic nerve operations, etc., in the early stages of the disease, and a striking increase in more drastic procedures such as thoracoplasty and pulmonary resection in those patients with more advanced disease. Many patients with extensive soft disease that need these procedures, but were formerly denied them because the disease was "too hot" can now be "cooled off" with streptomycin and prepared for these extensive procedures early with comparative safety.

The paper deals also with the prevention of spreads and the clearing of them, if they occur, by the use of streptomycin. Many patients with endobronchial disease, blocked cavities, etc., are sufficiently unproved to warrant major surgical procedures. An increasing number of cavities is closed. The mere fact that bronchial ulceration cannot be seen through the bronchoscope does not exclude the possibility of endobronchial disease beyond the field of vision, and excellent results are sometimes obtained in these patients.

The paper also discusses extrapulmonary lesions such as enteritis, genito-urinary disease, lymphatic glands, etc., which often were a contraindication to major surgery. The results of the use of streptomycin in these conditions are evaluated.

3. Experimental and Clinical Studies of the Role of Streptomycin in the Pleural Cavity.

EDWARD J. BEATTIE, JR. *(by invitation),* BRIAN BLADES
and CHARLES HORTON *(by invitation),* Washington, D. G.

Observations have been made both in experimental animals and humans on the rate of absorption of streptomycin from the pleura. These studies indicate an extremely rapid absorption rate which might cause toxic effects from too high blood levels when both parental and intrapleural streptomycin are employed. The rate of absorption from scarred and unscarred pleuras seems to vary and has some clinical significance.

4. Results in Pulmonary Resection for Tuberculosis (100 Cases Without Streptomycin Contrasted With 100 Cases Operated With Streptomycin Therapy).

CHARLES P. BAILEY, and *(by invitation)* THOMAS O'NEILL
and ROBERT P. GLOVER, Philadelphia, Pa.

During the past seven years resections for pulmonary tuberculosis have been increasingly utilized at our clinics. While anesthetic methods and surgical technics have improved steadily during this period, the most important single element in the postoperative mortality and morbidity has been the use of streptomycin. The surgical indications for selection were liberalized during the same period so that progressively more complicated and desperate cases were chosen. Thus the effects of improved anesthesia and surgery were largely neutralized by selection of poorer risk cases. It is believed therefore that the sudden improvement in results appearing with the advent of streptomycin were largely due to its systemic and local inhibition of the tuberculous process.

In the nonstreptomycin treated cases there was an operative mortality of 25 per cent, contralateral spreads 15 per cent, homolateral spreads 3 per cent, bronchopleural fistulae 8 per cent, empyemas 11 per cent, sputum conversions were 62 per cent.

In the streptomycin treated cases the mortality was 14 per cent, contralateral spreads 1 per cent, homolateral spreads 0 per cent, bronchopleural fistulae 1 per cent, empyemas 2 per cent and sputum conversions in 94 per cent of living cases.

5. An Evaluation of Streptomycin as a Protective Agent in Pulmonary Resections for Tuberculosis.

J. A. MOORE, Asheville, N. C., J. D. MURPHY, Oteen, N. G.,
and *(by invitation)* P. D. ELROD, Oteen, N. C.

This is a review of 70 cases of pulmonary tuberculosis treated by resection in which streptomycin was used pre- and postoperatively. The mortality rate in the series was 7 percent, with 84 per cent negative sputum. There was an incidence of tuberculous spread of 3 per cent, of bronchopleural fistulae 3 per cent, of empyemata 2 percent with no tuberculous wound infections. The 10 per cent of patients with positive sputum all have bronchial ulcerations and are undergoing treatment for these lesions. It is expected that most of these will become negative when the ulcerations clear. These results are compared with a 50 per cent sputum conversion in most other series before the use of streptomycin. Our indications for pulmonary resection, pre- and postoperative care, and the operative technic employed in this series are given.

We have reviewed the results of pulmonary.resections for tuberculosis now in the literature and compared results before and after the use of streptomycin A brief history of pulmonary resection is given including an analysis of the advances responsible for the marked reduction in tuberculous spreads, fistulae and empyemata.

6. An Anatomic Approach to Segmental Resection.

J. GORDON SCANNELL, Boston, Mass, *(by invitation)*
to be introduced by EDWARD D. CHURCHILL, Boston, Mass.

In recent years the bronchopulmonary segment has assumed the role of the surgical unit of the lung predicted for it by Churchill in 1939. Lingulectomy and separate removal of the dorsal and basal segments of the lower lobes have become standard procedures. Specific segments of the upper and lower lobes have been removed.

Segmental resection as applied to the anterior segment of the upper lobe, and the medial basal segment of the right lower lobe is presented with illustrative > cases. The anatomic features of the bronchopulmonary segment are reviewed and the aforementioned cases, plus the general problem of segmental resection, discussed in the light of recent anatomic investigations in this field.

Monday Afternoon, May 31, 1948

2:00 P.M. Scientific Session.

7. Endobronchial Occlusion During Pulmonary Resection. Preliminary Report. Movie: An Endobronchial Balloon for Pulmonary Resection.
    JAMES D. MOODY, Durham, N. C.

The control of bronchial secretions during resection for suppurative pulmonary diseases still remains a problem in thoracic surgery. The many attempts at solution, including the subject of the present discussion, have been described in two previous reports (J. Thor. Surg. 16:258, 1947, and J. Thor. Surg. (in press).

In as much as our own instrumental approach to the problem appears to hold some hope of solution, a movie on the mechanics of the instrument will be presented followed by a short discussion of the results of its clinical application.

8. Medullary Pegging of Ribs in Thoracotomy Incisions.
    KARL P. KLASSEN, Columbus Ohio

In posterolateral thoracotomies the pleural space is entered through an incision carried through the periosteal bed of a resected rib or through the intercostal muscles with transection of the adjacent ribs. In both types of thoracotomies postoperative pain is common, the result of operative trauma, overlapping and nonunion of the cut rib ends and excessive callus formation. Depression deformities, thoracic instability and bulging of the anterior segments of the sectioned ribs have followed these types of incisions.

The prerequisite of a good thoracotomy, a pain-free and stable thorax permitting early ambulation, has been met in our experience by the use of an intercostal incision with autogenous medullary pegging of the transected ribs.

The posterolateral incision is carried through the skin and the extrathoracic muscle layers in the usual manner. The sacrospinalis muscle group adjacent to the planned intercostal incision is retracted medially down to the transverse processes. A 1 cm. area of the periosteum is stripped from the adjacent ribs 2 cm. distal to the transverse processes and the two ribs transected, without the removal of a segment. The intercostal nerves are exposed and crushed or injected with novocaine. The intercostal vessels are ligated with a transfixion suture and cut. Transection of two ribs usually gives excellent exposure, although more can be cut should wider exposure be desirable.

On completion of the intrathoracic operation a 4 cm. long, 4 mm. wide, diamond shaped section of the inferior border of the lateral portion of the rib above the intercostal incision is resected superiosteally. The periosteum of this area is closed with interrupted fine silk. The removed section of rib is cut diagonally into two 3 cm. long pointed cortical bone pegs which are inserted for a depth of 1.5 cm. into the medullary cavity of the proximal rib stumps. On approximating the anterior rib segment to the proximal stump, the sharp protruding peg will enter the medullary cavity, locking the rib in place. For additional stability the sacrospinalis muscles are sutured to the sectioned ribs. The intercostal muscles can now be sutured without tension and the extrathoracic muscles and skin are closed in the usual manner.

In a series of fifty posterolateral thoracotomies performed in the last six months using medullary pegging of the ribs, the patients postoperative pain has been minimal and X-ray studies have shown excellent position of the transected ribs.

9. Sputum in Cancer of the Lung: A Study of the Incidence and Causative Factors.
        J. R. MCDONALD (by invitation), STUART W. HARRINGTON
        and O. THERON CLAGETT, Rochester, Minn.

Several recent studies have shown that it is possible to recognize cancer cells in the sputum of approximately 80 per cent of patients who have cancer of the lung. The present study was stimulated by these investigations.

It was considered desirable to determine how many patients who have a primary cancer of the lung have sputum, and how early in the course of a cancer of the lung sputum develops. Furthermore, the mechanism by which sputum is produced in patients with cancer of the lung has been studied. The basis for this study is an analysis of data concerning 185 patients who underwent surgical resection of the lung for pulmonary neoplasms.

10. Cytology of Bronchial Secretions-An Aid to Early Diagnosis of Lung Cancer.
WILLIAM L. WATSON and *(by invitation)* HENRY CROMWELL,
LLOYD GRAVER and GEORGE N. PAPANICOLAOU, New York, N. Y.

An improved method of staining and studying microscopically speciments of bronchial secretion in order to arrive at a positive diagnosis in pulmonary neoplastic disease was first proposed and carried out in June 1945 by Dr. George N. Papanicolaou. Since then an experience covering a series of more than nine hundred cases has accumulated. The proposed paper deals with the clinical and statistical evaluation of this material.

The relative value of sputum specimens as compared with material obtained by bronchial washing and aspiration is discussed. The Papanicolaou classification into five groups and his technics of staining are briefly described. Several pitfalls and early mistakes in diagnosis are pointed out.

Pneumonectomy has been correctly carried out in five instances where the only positive preoperative information was a Class V bronchial cytology report.

A plea is made for the general adoption of the Papanicolaou method, as it sometimes proves to be the only means of making an early and positive diagnosis of lung cancer.

11. Malignant Nature of Bronchial Adenoma.
ALFRED GOLDMAN, Los Angeles, Calif.

In several previous reports series of patients with bronchial adenoma with no metastases nor great invasion- of surrounding tissue were observed. During the last two years, six additional cases have been operated upon and one observed at post mortem. Of these six, three exhibited mediastinal metastases, one exhibited unusual invasive qualities, and another had a complete "transformation" of its histology from that of adenoma to squamous cell anaplastic carcinoma with multiple numerous pleural, mediastinal and pulmonary metas-* tasis. Of this group of six hitherto unreported, surgically resected adenomas, all but one exhibited more than the usual invasive and metastastic manifestations. These experiences lead the author to conclude that pathologically, as well as clinically, bronchial adenoma should be considered as malignant. This malignancy is low grade and compatable with long life (20 years). These cases will be described in detail and the histology of the metastases demonstrated.

12. Adenoma of the Bronchus.
HAROLD NEUHOF and *(by invitation)*
COLEMAN B. RABIN, New York, N. Y.

Since the first report in 1932 of the features of a group of cases of bronchial adenoma (Wessler and Rabin) varying views concerning pathology and treatment have been entertained. In particular, divergent views concerning treatment have been based upon differences of opinion as to the pathology. In the original description occasional involvement of the tissues beyond the bronchial wall was described and evidence of "malignant transformation" was presented. Subsequently these features have been stressed by others to such an extent that the prevailing opinion amongst surgeons is (1) that the lesion is not completely removable bronchoscopically and (2) that surgical eradication by lobectomy or pneumonectomy should comprise the sole treatment. Some believe the lesion to be actually or potentially malignant, others that nothing but radical operative treatment is permissible because of a high incidence of malignant transformation.

The series studied by the group at the Mount Sanai Hospital now numbers more than 64 certified cases and the follow-up as well as further studies which have been made permit conclusions drawn from long

observation and experience. If one of the conclusions takes issue with the uniform application of radical surgery to the problem of bronchial adenoma, a counterargument may be that it is only of academic interest since no mortality and but little morbidity is to be anticipated following lobectomy or pneumonectomy for adenoma with the present-day development of thoracic surgery. In a sense, the argument against taking any chances with malignancy or potential malignancy is particularly strong because most of the subjects for the operation are young and otherwise healthy. However, it is just because the preponderance of patients with bronchial adenoma have many years of life before them that they should not be deprived unnecessarily of large areas of pulmonary tissue and therefore that certain conclusions to be drawn may be of practical import.

Analysis of the pathology of bronchial adenoma in our series (with the exclusion of cylindroma, a separate entity) establishes an incidence of malignant transformation which is less than 10 per cent. It is significant that certain features of malignant bronchial adenomata are unique: (1) the microscopic appearance of adenoma is almost invariably unchanged not only in the tumor but also in its metastases; (2) the latter usually are confined to contiguous lymph nodes; (3) metastases are known to persist essentially unchanged for many years. The term "malignant transformation" applied to adenoma is one of convenience rather than accuracy in view of these three points.

The essentially benign nature of bronchial adenoma is established. Acknowledging that the term "adenoma" is objectionable insofar as true gland formation usually is lacking, the lesion is a distinctive pathological entity. Its features are restated (slide). Formerly confused at times with carcinoma, there should now be no difficulty in its microscopic recognition with adequate material for examination. Features of mixed tumors are not found. Calcification and ossification, as noted in adenomas elsewhere, are seen rarely in bronchial adenoma. Cylindromas, which may be placed amongst mixed tumors, comprise a separate pathological and clinical entity not to be confused with adenoma.

The clinical course of uncomplicated bronchial adenoma is benign, in keeping with slight growth over many years. It remains essentially unaltered in the presence of malignant transformation (slide of case histories with particular reference to long life history of many). The clinical and other features of complicated adenoma such as infection, empyema, etc., will be discussed. Adenoma as a more or less accidental finding will be cited. Reference will be made to the clinical manifestations of adenoma with special reference to "clean" hemoptysis.

The following will be discussed: (1) Incidence of adenoma in main bronchi and in branch bronchi. (2) Incidence of adenoma which does not extend into and that which extends beyond the walls of bronchi. (3) Superficial adenoma which is more common in main bronchi. (4) Methods of recognition of superficial and invasive adenoma.

Noninvasive adenoma of main bronchi is a proven suitable field for bronchoscopic treatment. Repeated biopsy of the base of the tumor after endoscopic removal is essential to prove complete eradication. Report is made of follow-up of 15 cases which establishes the correctness of this statement and report of past errors in selection of cases for bronchoscopic treatment. Report will be made of past errors in performing pneumonectomy for an endoscopically removable tumor (slide).

The discussion will also include variations in appearance of adenoma in branch bronchi; limits of endobronchial visibility; extra-bronchial growth; growth into cavities; operation (lobectomy) the sole treatment for branch bronchus tumors; pneumonectomy indicated for invasive main bronchus tumors, for malignant transformation with metastatic nodes, or for irreversible infection of the lung; question of pneumonectomy under certain circumstances even with known persistence of tumor after opened pathway for drainage of infection; question of lobectomy or pneumonectomy in the aged or poor risk patient when symptoms are neither severe nor progressive (illustration by an operative and a nonoperative case).

Tuesday Morning, June 1, 1948

9:00 A.M. Scientific Session.

13. The Clinical Use of a Prosthesis to Prevent Overdistension of the Remaining Lung Following Pneumonectomy.

JULIAN JOHNSON and *(by invitation)*
CHARLES K. KIRBY, Philadelphia, Pa.

The experimental data of Cournand and his co-workers have suggested that pulmonary function is decreased by the overdistension of the remaining lung following a pneumonectomy. This tends to confirm the clinical impression of some surgeons that the patient does best who has had a thoracoplasty to prevent this "compensatory emphysema." It seemed desirable to be able to achieve this result by some means less radical than a thoracoplasty. Therefore, an effort has been made to obtain a prosthesis with which the pleural cavity may be filled at the time of pneumonectomy, thereby preventing overdistension of the remaining lung.

Experimental studies in dogs have indicated that lucite balls may be used for this purpose. The effect of these balls has been observed in dogs for over one year. The shift of the mediastinum is prevented and there is a minimum foreign body reaction. This procedure has now been used upon six patients subjected to pneumonectomy. The advantages and disadvantages of this type of prosthesis will be discussed.

14. An Evaluation of Extrapleural Pneumonolysis With Lucite Plombage.

JOSIAH C. TRENT *(by invitation),* JAMES D. MOODY
(by invitation), Durham, N. C., and JOSEPH S. HIATT, JR.
(by invitation), McCain, N. C.

1. Fifty-one cases operated from one year and four months to two years and seven months prior to this report have been presented in which extrapleural pneumonolysis with lucite plombage has been attempted or carried out. Nine cases (17.6 per cent) are improved, five (9.8 per cent) unimproved, eighteen (35.3 per cent) worse, fifteen (29.2 per cent) dead and four not followed.
2. Lucite plombage must be a definitive procedure for once the spheres are inserted they are extremely difficult to remove unless the surrounding tissue is liquified by infection.

15. Experimental and Clinical Study of Collapse Therapy Using Fiberglas Wool and Fabric.

THOMAS J. O'NEILL and *(by invitation)* HECTOR P. REDONDO
and ROBERT G. TROUT, Philadelphia, Pa.

Various types of collapse therapy procedures are discussed. It is felt that improvement over existing technics can be made. Two Fiberglas products are presented with this in mind, and their suitability as prosthetic agents examined.

The first product, Fiberglas wool, has been used as a "filler", in a series of experimental animals (dogs), to fill completely the tissue dead space resulting from extrapleural pneumonolyses. This was done by packing the extrapleural space with the wool and closing the wound in layers over the packing.

The second product, Fiberglas woven fabric has been used as a "container", in a series of experimental animals (dogs), to cover a lobe completely which had deliberately been subjected to atelectasis. This maintained the collapse by successfully resisting re-expansion. The "container", or bag was fashioned at the time of operation and sutured securely. The remaining lobe or lobes were allowed to re-expand immediately bringing about a selective collapse of the treated lobe.

The animals were followed by X-ray, and were sacrificed at selected intervals, and the condition of the fabric, pleura, parenchyma and vascular supply was investigated both grossly and microscopically. Photographs were made for comparative demonstrations.

A clinical review of nine patients was made. Seven had the wool used as extrapleural packing, and two, had the fabric used as a lobe container in deliberate selective collapse following pneumonolysis done by the open technic.

The results of these studies are regarded as very satisfactory and show promise of useful and more widespread applications.

16. Intrathoracic Meningocele.

FRANCIS S. BYRON, Los Angeles, Calif., and *(by invitation)*
EMERY E. ALLING, Battle Greek, Mich., and PAUL G. SAMSON, Oakland, Calif.

A review of the literature on intrathoracic meningocele reveals only three proven, and two probable cases of this anomaly. None of these reports appeared in the American Literature. While this lesion would appear to be extremely rare, it may be suspected to occur more often than is realized since each of the authors have encountered, and operated upon, a case within the past year.

From a diagnostic standpoint the anomaly may closely simulate intrathoracic neurofibromata and this, in fact, was the preoperative diagnosis in each instance. In the X-ray they are seen as smoothly outlined or lobulated posterior mediastinal masses. There may be enlargement of an intervertebral foramen, absorption of adjacent ribs and destruction of vertebrae. The further similarity of intra-thoracic meningocele to intrathoracic neurofibroma is the frequent association of neurofibromatosis. The only procedure that offers a good chance of differential diagnosis is intraspinal injection of a radio-opaque medium and positioning of the patient so as to demonstrate the meningeal communication. Inasmuch as excision of the meningocele is inadvisable in many instances, the differential diagnosis is essential.

17. Use of Pedicle Tube Flap in Carcinoma of Upper Esophagus.

EUGENE BRICKER *(by invitation)* and THOMAS H. BURFORD, St. Louis, Mo.

Experiences with carcinoma of the upper esophagus are presented. A rational plan of attack on these lesions is believed to have been worked out. Since the lymph drainage of the upper esophagus is, to a large degree, through the lower chain of cervical nodes bilaterally, a valid procedure for the treatment of cancer in this region must embody radical bilateral neck dissection. Procedures failing to take this into account are unsound from the standpoint of cancer surgery. A description is presented with illustrative slides and photographs of a procedure combining radical neck dissection with anterior thoracotomy. Satisfactory staged reconstruction of the upper esophagus is obtained by the use of a pedicle tube graft which is anastomosed directly to the thoracic esophagus in the superior mediastinum with reestablishment of normal deglutition.

18. Transthoracic Esophago-Jejunogastrostomy for High Stricture of the Esophagus.

ALBERT WILSON HARRISON, Galveston, Tex.

After complete stricture of the esophagus, gastrostomy feeding is a poor substitute for normal eating. Accumulations in the pharynx are a constant threat to the respiratory system in addition to the annoyance of frequent spitting.

Two boys, both aged three years, had complete cervical strictures from drinking lye and were subject to repeated attacks of pneumonitis. A segment of jejunum was substituted for the resected esophagus in each case. The procedure was successful in both but improvements in the second from experience in the first resulted in more satisfactory function. He now eats soft food more or less normally.

The operative procedure was divided into three stages. In the first, through an abdominal approach, the segment of jejunum was isolated, and the distal end anastomosed to the stomach. In the second, through the chest, the diaphragm was opened, and the proximal blind end of the loop was brought up along with the resected esophagus and out through the neck. In the third the cervical esophagus and jejunum were anastomosed in the neck.

Results so far indicate that the transthoracic route is preferable to the subcutaneous route. Further trial seems warranted.

19. Completing the Multiple-Stage Operation for Atresia of the Esophagus.

CONRAD R. LAM, Detroit, Mich.

In a series of 13 infants operated on for congenital atresia of the esophagus with tracheo-esophageal fistula, the preferred operation of direct anastomosis in the mediastinum was carried out ten times. In the remaining three babies, the multiple-stage method was utilized, once from choice and twice from necessity. One of these died immediately after the first stage which consisted of ligation of the fistula followed by a

futile attempt to connect the two segments of the esophagus in the mediastinum. The other two children have had the continuity of their alimentary tract established by the construction of an antethoracic esophagus by a method which differs slightly from any previously described.

This experience is presented with the hope that it may be of assistance to surgeons who may be responsible for children who are being fed by gastrostomy for prolonged periods while waiting for the final plastic procedures.

The plan is as follows: If anastomosis is impossible at the time of mediastinal exploration, the detached lower segment is ligated and allowed to retract, and the chest is closed. Two days later, if the condition of the infant warrants, the upper segment is exteriorized in the left clavicular region and is opened to permit sham swallowing. The third stage follows in a few days; it consists of mobilization of the cardiac end of the stomach and lower esophageal segment through an abdominal approach. The latter is exteriorized through a skin tunnel, the end being brought out as high as possible on the chest wall. Feedings through this esophagostomy are carried out during the following year by the intermittent insertion of a catheter. This arrangement presents several advantages over the use of a gastrostomy.

During the second year of life, the two esophagostomies are connected by a skin-lined tube constructed according to previously described methods. The antethoracic tubes in the two children herein reported were completed when they were approximately two years old.

The functional capacity of this type of esophageal reconstruction will be demonstrated by a short motion picture.

Tuesday Afternoon, June 1, 1948

2:00 P.M. Executive Session.

3:00 P.M. Scientific Session.

Address of the President-ALTON OCHSNER,
New Orleans, La.-factors Influencing Survival
Rate in Primary Pulmonary Malignancy.

20. Decortication in Pulmonary Tuberculosis Including Studies of Respiratory Physiology.
      JOSEPH GORDON, RAY BROOK, N. Y.
      EDWARD S. WELLES, Saranac Lake, N. Y.

The feasibility of decortication has been demonstrated in a number of instances. The application of this operation to the unexpandible lung which has been under therapeutic collapse for pulmonary tuberculosis poses a number of problems for consideration. The objectives are twofold: 1. The obliteration of the pleural space. 2. The regaining of functional lung. To this end the present study has been undertaken. Patients have been operated upon whose therapeutic pneumothorax has been present from several months to years. The complications present included frank pus containing tubercle bacilli subsequent to previous mixed infection and bronchopleural fistula. The plan of study for these patients included preliminary bronchoscopy and detailed respiratory function measurements before and after the operation.

At the outset it was recognized that because of variable extents of parenchymal disease for which the lungs were collapsed, re-expansion and improved function might not necessarily follow. It was, therefore, considered important to carefully review all previous films, especially those before collapse was instituted, to estimate the maximal extent of visible disease. This would then be a factor in the decision of the advisability of primary decortication or preliminary partial thoracoplasty followed by decortication.

Thus far the material studied indicates, among other things, that empyema is not a deterrent in performing the operations and obtaining primary wound healing. While re-expansion may be anticipated, there are suggestions that this may not be followed necessarily by improved lung functions, but on the contrary by some oxygen desaturation. It is, therefore, of some importance at this stage in our developmental knowledge to have as much detailed information as possible for evaluation of results.

21. Decortication of the Unexpanded Tuberculous Lung Following Pneumothorax.

JOSEPH A. WEINBERG and *(by invitation)*
J. DWIGHT DAVIS, Van Nuys, Calif.

This is a preliminary report on decortication of the unexpanded lung with fluid or empyema development following induced pneumothorax for the treatment of pulmonary tuberculosis. The lung had remained unexpanded and fluid had accumulated eight, nine, eleven and twenty-one months, respectively, prior to decortication in the four cases reported.

Prophylactic streptomycin therapy was given to all of the patients before surgery and was continued for several weeks following surgery.

Observations were carried out for a sufficient time preoperatively to prove that the lung would not re-expand. In one case of frank empyema a positive culture for tubercle bacilli was obtained. Cultures were negative in the three cases of fluid formation without suppuration.

All of the patients were operated upon through an intercostal incision without dividing or resecting a rib. The membrane over the parietal pleura was invariably thicker than the membrane over the visceral pleura. In no instance did the membrane follow the parietal pleura over the hilar region. Instead it was reflected onto the visceral surface at some distance from the hilum, binding the partially compressed lung firmly against the mediastinum.

Evidence of caseating tubercle formation was seen in both the parietal and visceral membranes in two cases. There was one instance with tubercle formation on the visceral surface only, while one case presented no visible evidence of tubercle formation.

Decortication was relatively simple in two cases but was difficult in the two cases showing evidence of more active tuberculous infection.

Excellent expansion of the lung occurred in all four cases following decortication.

The presentation will stress indications for decortication, pathologic changes found at operation and difficulties in technic which one may encounter.

22. Physiological Observations Concerning Decortication of the Lungs.

(By invitation) GEORGE W. WRIGHT, LESTER B. YEE, GILES F. FILLEY ALLAN
STRANAHAN, Sunmount and Saranac Lake, N. Y.

One case of chronic tuberculous empyema complicating an in expansible lung in the presence of a pneumothorax of four years' duration, and one case of pyogenic empyema of nine weeks' duration complicating a traumatic hemothorax (stab wound), were studied before and after evacuation of the pleural contents and removal of the visceral "peel." The following measurements were made: (1) Maximum Breathing Capacity. (2) Recumbent Lung Volume. (3) Lung Ventilation Efficiency. (4) Bronchospirometry. (5) Arterial Blood Gases at rest and during exercise. (6) Respiratory, Circulatory and Metabolic Responses to Grade Walking on the Motor Driven Treadmill.

In both cases, the collapsed lung was successfully re-expanded and the space obliterated. In the subject having an empyema of short duration, the operation was followed in four weeks by improvement of function, and at the end of seven months, by the restitution of virtually normal function. The postoperative studies of the tuberculous empyema show that at the end of eight months, there has been only a slight increase in the ventilation of the re-expanded lung and no measurable improvement of the respiratory reserves. Moreover, a significant veno-arterial shunt was created in the re-expanded but now poorly ventilated lung as is revealed by the postoperative development of incomplete arterial hemiglobin saturation.

Certain basic concepts of the surgical procedure of decortication as well as fundamental differences in the pathology of the two cases must be considered in explanation of their divergent end results.

23. Allergy of Tuberculosis, With Special Reference to Autotuberculinization.

A. R. JUDD, Hamburg, Pa.

This paper presents the problem of allergy or hypersensitivity to tuberculin. The relationship of this hypersensitivity to the sequence of events in a tuberculous infection is discussed. Five cases are presented all

of which showed typical symptoms and signs of auto-tuberculinization, including the state of suspended allergy (Mantoux-negative) and X-ray findings considered characteristic of this type of reaction. All of these cases were actually or essentially moribund yet all five cases recovered from their acute episode although one case later died as a result of complications of massive pulmonary hemorrhage. One case showed a dramatic response to the administration of an antihistaminic drug, but it is questioned if this drug (Benadryl) was actually beneficial in combating the allergic inflammatory changes associated with auto-tuberculinization.

7:00 P.M. Cocktail Party-Chateau Frontenac.

8:00 P.M. Banquet-Chateau Frontenac.

Wednesday Morning, June 2, 1948

9:00 A.M. Scientific Session.

24. Chronic Atelectasis and Pneumonitis of the Middle Lobe.
    DONALD L. PAULSON and ROBERT R. SHAW, Dallas, Tex.

Thirty-one patients having chronic atelectasis and pneumonitis of the right middle lobe for periods varying from five months to twenty years have been studied. Twenty-seven patients were subjected to right middle lobectomy. In all instances the middle lobe was either partially or completely atelectatic. A review of the symptomatology and the findings by roentgenogram, bronchoscopy and bronchography reveals a characteristic diagnostic pattern on the basis of which the diagnosis can be made preoperatively with a high degree of accuracy. The characteristic pattern of this type of middle lobe disease justifies its separation as a clinical entity and stimulated our making this report.

The bronchial obstruction producing the atelectasis was due to extrinsic pressure by enlarged lymph nodes in eleven patients and by calcified lymph nodes in seven patients. In two instances the obstruction was due to foreign body reaction in the bronchial wall. In seven patients the bronchial obstruction was apparently due to bronchial changes secondary to pneumonia. The pathogenesis of chronic atelectasis and pneumonitis of the middle lobe will be discussed.

25. Surgical Management of Pulmonary Coccidioidomycosis in Focalized Lesions.
    SAM J. GREER *(by invitation)*, JAMES H. FORSEE and HUGH W. MAHON *(by invitation)*,
    Fitzsimmons General Hospital, Denver, Colo.

Focalized lesions of pulmonary Coccidioidomycosis are circumscribed and may be solid or cavitary. They closely simulate tuberculosis and can be positively differentiated only by recognition or hyphae or spherules of c. immitis in tissue sections or by the isolation of c. immitis in cultures from lesions. The pathological discussion includes the pathology of the solid round lesions, the cavitary lesions, and the conglomerate nodose lesions simulating a round lesion in roentgenograms. The presence of hyphae in three of the cavitary lesions stimulates speculation as to possibility of person to person infection. In a group of 15 patients these lesions have been subjected to surgery. Nine were treated by lobectomy and six by wedge-shaped excision of the lesion. In cavitary lesions the absence of tubercle bacilli in the sputum and the history of residence in an area endemic for Coccidioidomycosis were the most important diagnostic aids. The frequent presence of daughter granulomata has made lobectomy a preferable procedure especially in the presence of cavitation. The indications for operation have included recurrent moderate hemoptysis, failure of closure of the cavity after many months' observation, spontaneous pneumothorax with failure of the lung to re-expand, and the exclusion of neoplastic disease. The operative technic and postoperative care have not differed from that employed in lobectomy for bronchiectasis. There has been no evidence of dissemination of the disease following the operation. In one instance re-expansion of the remaining lobes failed to fill the hemithorax entirely. No other operative complications were encountered. Recent follow-up data on the patients is presented.

26. Changes in Blood Volume and Available Fluid Volume During Thoracic Operations.

BERNARD J. MILLER *(by invitation),* JOHN H. GIBBON, JR., and FRANK F. ALLBRITTEN, JR., Philadelphia, Pa.

It is desirable to replace accurately, quantity for quantity, the blood which is lost during major operations. If this quantitative replacement can be achieved, there should be no disturbance in the circulatory balance of the patient and at the conclusion of the operation his blood volume should be the same as immediately before the operation. It has been our experience that it is fallacious to depend upon an increase in the pulse rate or a decrease in the blood pressure to indicate the need for transfusing additional blood. Counting the number of blood-stained sponges is also an extremely unreliable method of estimating the blood lost.

This report is based upon a series of 57 patients subjected to major thoracic operations. In all these patients, the plasma volume was determined both preoperatively and postoperatively by the dye method (T-1824). The blood volume was calculated from the hematocrit and the plasma volume. In 27 of the 57 cases, the blood lost during the operation was calculated from the increase in weight of dry gauze sponges used during the operation. In 31 of the 57 cases the available fluid volume was determined both preoperatively and postoperatively by the sodium thiocyanate method. The group of 57 operations comprised the following categories: 17 pneumo-nectomies, 12 lobectomies, 11 exploratory thoracotomies, 10 first stage thoracoplasties, and seven esophagectomies. The maximum, minimum and average blood loss in each of these categories will be reported. The correlation between the dye method and the sponge weight method will be presented. The changes in the available fluid volume, before and after operation, will be correlated with the duration of the operative procedure and the extensiveness of exposure of tissue in the operative field.

It is concluded that the method of weighing sponges during major thoracic operations is sufficiently accurate for clinical purposes and that it offers the only reliable method at present for the accurate quantitative replacement of blood lost during major thoracic operations.

27. Monaldi Suction in the Treatment of Bullous Emphysema and Large Pulmonary Cysts.

JEROME R. HEAD and *(by invitation),* EDWARD E. AVERY, Chicago, Ill.

Emphysematous blebs (bullous emphysema) may become so large as seriously to interfere with the respiratory function. The mechanism causing these blebs is similar to that producing tension pneumothorax. The air leaks into them more easily than it can find an exit and they tend to become gradually larger. They collapse the lung and in extreme cases can fill the larger portion of one or both pleural cavities.

Until recently, there has been no treatment for this condition. Many of the patients have been respiratory invalids and others have been bothered by severe dyspnea.

The present paper is a report of fifteen cases of large emphyse-matous blebs and two cases of bronchiogenic cysts which have been treated by interacavitary suction (Monaldi). The majority of these people have been greatly benefited. The indications, the technic and the results are discussed in detail.

28. A Review of Seven Years' Experience with Intracavitary (Monaldi) Drainage of Tuberculous Cavities.

WARRINER WOODRUFF, Saranac Lake, N. Y., WINFIELD O. KELLEY, Norwich, Conn., ALLAN STRANAHAN *(by invitation),* Albany, N. Y.

This review is based on 100 cavities in 90 patients who were accepted for Monaldi therapy between late fall, 1940, and December 31, 1947. Indications have fallen into two general groups: (1) As a palliative procedure for extensive bilateral cavernous disease. (2) As a preliminary to thoracoplasty in so-called tension cavities. In the vast majority of cases in which the catheter was successfully introduced, there has been marked symptomatic improvement, with closure of cavity in a large number, a rather early conversion of drainage and a decrease in the amount of sputum. Thirty-eight per cent of the cases in which the catheter had been introduced had had some further form of definitive therapy, such as thoracoplasty, before the time limit set in this paper. Several others have since had such interference.

Technic is discussed and statistics are presented regarding indications, methods of obliterating the pleural space, conversion of drainage and sputum, complications, length of time cavities have remained closed after removal of catheter, subsequent procedures and mortality.

Wednesday Afternoon, June 2, 1948

2:00 P.M. Scientific Session.

29. Coarctation of the Aorta.
>   H. BRODIE STEPHENS and ORVILLE F. GRIMES *(by invitation),* San Francisco, Calif.

Four patients, aged one, four and one-half, sixteen and thirty-four years, respectively, have undergone operation for coarctation of the aorta. One patient has survived and has been greatly benefited by the operation.

The two patients in the older age group expired from hemorrhage eleven and twenty-eight days following operation. End to end union was performed in one of these patients and end to side, subclavian to aorta in the other.

The child of one year of age succumbed immediately following the completion of the entire operation.

Necropsy examination was performed in the three fatal cases. The causes of death in these three patients are discussed and deductions outlined to establish better indications and contraindications for operation.

30. The Correction of Aortic Insufficiency in Dogs with an Artificial Aortic Valve-A Preliminary
>   Report.
>   J. MOORE CAMPBELL *(by invitation),* Oklahoma City, Okla.

A survey of the literature fails to reveal any successful attempt to relieve insufficiency of a cardiac valve by means of an artificial valve or any other prosthesis.

At present, several valve patterns are under study and improvement. The valve, studies of which form the basis of this report, is fabricated from methyl methacrylate. Within a polished tube of the plastic material, a moving valve is located that opens and closes with systole and distole. The tube is approximately the same diameter as the aorta, is placed in the aorta distal to the aortic leaflets.

Under Nembutal anesthesia, the aortic valve leaflets are lacerated and aortic regurgitation is produced as demonstrated by murmur and a kymographic recording of pulse pressure increase greater than 150 per .cent. Next, the artificial aortic valve is placed in the aorta distal to the destroyed leaflets with a kymagraphic recording of the corrective changes in the pulse pressure. In addition, stethocardio-graphic tracings of the regurgitant murmur and the sounds of the valve prosthesis are demonstrated.

When carefully polished methyl methacrylate is introduced into the aorta, clotting of blood about the moving valve has not occurred during the length of time the dogs have been observed.

There is some narrowing of the functioning lumen of the aorta due to the presence of the valve, but the obstruction has been minimal and serves partially to raise the mean pressure in the coronary arteries, which are proximal to the artificial valve and therefore do not benefit by correction of the regurgitation.

Valvular designs and physiologic effects from valvular insertions are to be discussed. Successful implantation of functioning aortic valves has been so recently achieved that to date only acute experiments have been done and ultimate survival time has not been established but is under study.

31. Experiences with the Anastomosis of the Left Subclavian Artery to Left Pulmonary Artery for
>   Pulmonary Stenosis.
>   EMILE HOLMAN, San Francisco, Calif.

Blalock has repeatedly expressed a preference for a right subclavian to right pulmonary artery anastomosis, but recognizes the superiority of the left subclavian artery when operating for pulmonary stenosis in young adults.

Because of its greater length, the left subclavian artery would seem to offer certain advantages in all cases. At the Stanford Clinic, the left subclavian artery has been deliberately chosen in preference to the right

subclavian in 23 cases. In four cases, because of interference with blood flow though the anastomosis due to sharp angulation of the subclavian artery at its emergence from the aortic arch following the completion of the end-to-side anastomosis, the left pulmonary artery has been deliberately divided proximal to the anastomosis, permitting relaxation and upward displacement of the anastomosis so that a good flow of blood through it occurred. No detrimental effect of such division was noted-on the contrary, all four patients were markedly improved following the operation, as were the other 19 patients in whom the left subclavian artery was employed.

Certain other modifications of the typical Blalock procedure will be presented.

32. Development of Anastomosis Between Coronary Vessels and Transplanted Internal Mammary Artery.
ARTHUR M. VINEBERG, Montreal, Canada

During the past twenty-five years many attempts have been made to increase impaired coronary circulation. In most of the previous attempts, fresh blood has been brought to the myocardium by means of suturing other tissues to the heart surface. Thus, new blood vessels reached the heart across a line of scar. Some workers have attempted to improve ventricular circulation by ligation of the vena magna cordis.

In man, arterial schlerosis of the coronary vessels usually involves the primary vessels on the surface and leaves the smaller vessels deep within the myocardium comparatively normal.

It is our opinion that a new blood supply brought to the myocardium should be arterial in type and should also be brought to the secondary vessels. We have attempted to do so by implanting the left internal mammary artery after it has been freed from the chest wall directly into the myocardium.

In our experimental work anastomosis occurred between the transplanted internal mammary artery and the vessels of the myocardium. This has been proven by (1) injection of radio-opaque substances, (2) serial section, (3) plastic casts of the arterial tree. It has been shown that the part of the internal mammary artery lying within the heart, develops branches which anastomose with the smaller coronary vessels. The frequency of anastomosis is dependent upon many factors, such as angulation of the vessel, thrombosis, etc. In one series of sixteen dogs anastomoses were proven in four and suspected in two of nine surviving animals. Over one hundred animals have been operated upon. (Colored slides will be shown.)

33. Bilobectomy-Surgical and Anatomical Considerations in Resection of Right, Middle and Lower Lobes Through the Intermediate Bronchus.
G. E. LINDSKOG, and *(by invitation)* A. A. LIEBOW,
M. R. HALES, New Haven, Conn.

A technic for resection of the right middle and lower lobes as a surgical unit through the intermediate bronchus has been described.

Vascular variations based on 25 injection studies are presented.

Results in six clinical trials are briefly presented.

The arguments for and against this procedure as compared to individual lobectomies performed seriatim are discussed.

34. An Experimental Study in Bronchial Anastomosis.
TRUXTON L. JACKSON, PHILIP LEFKIN, FOSTER HAMPTON *(by invitation)* and WILLIAM TUTTLE, Detroit, Mich.

The purpose of the experiment was two-fold: 1. To resect portions of the major bronchi and re-anastomose the ends. 2. To create strictures in the major bronchi, resect them, and re-anastomose the ends.

A total of thirty-two dogs of nonspecific breeds was used for the two parts of the experiment.

In twenty dogs, one-eighth to one-fourth inch cylinders were removed from one of the main bronchi, or one of their first divisions. The proximal end of the bronchus was then plugged with a rubber balloon and

bronchial suture completed. Two methods of bronchial suturing were used: 1. Interrupted through and through sutures of 00000 silk. 2. Interrupted, horizontal everting mattress sutures which turned up a cuff.

Both methods presented acceptable end results, but the "cuff" method led to a smoother postoperative course and, in general, to a superior anatomical union. The dogs were followed for varying periods up to eight months and were sacrificed for study. It was found that the use of any type of clamp on the bronchus to prevent leaking during surgery resulted in high grade stenosis at the suture line, pulmonary suppuration and bronchiectasis. In six dogs, clamps were used on the bronchus at the time of surgery. Four of these subsequently developed a high-grade stenosis with suppuration of the lung and severe bronchiectasis. In two there was breakdown of the suture line with development of local empyema. In the remainder of the dogs, the anatomical result was acceptable. The suture line was observed at regular intervals by bronchoscopy.

For the second part of the experiment, strictures were created in either of the main bronchi of twelve dogs. The dogs were followed clinically; the strictures were later resected; and reanastomosis was accomplished. These dogs were followed for varying periods up to six months, sacrificed and studied. The results were anatomically acceptable.

35. Mesothelial Mediastinal Cysts.
    EVERETT C. DRASH, Charlottesville, Va.

This is a discussion of five of our own cases with an embryological study of the origin of these tumors. In 1940, Lambert in his presidential address before the American Thoracic Surgical Association reported on two patients who had been operated upon by other surgeons and called these cysts pericardial coelomic cysts. In a study of the embryo we have come to the conclusion that these cysts are only incidentally related to the pericardium and that their true origin is from the mesothelium.

This paper reports the five new cases with a discussion of the microscopic and gross pathology of these cysts and in addition, the paper presents what we think is the more logical study of the origin. There is also a brief review of the literature on these tumors.

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