

ABSTRACTS

This section of THORAX is published in collaboration with the two abstracting journals, Abstracts of World Medicine, and Abstracts of World Surgery, Obstetrics and Gynaecology, published by the British Medical Association. In this Journal some of the more important articles on subjects of interest to chest physicians and surgeons are selected for abstract, and these are classified into five sections: experimental; tuberculosis; neoplasm; asthma; thoracic surgery. Each section is not necessarily represented in any one issue.

Experimental

The Prophylaxis and Treatment of Acute Respiratory Diseases with Antihistaminic Drugs. I. Prophylactic Treatment in Navy Male Recruits. II. Prophylactic Treatment with Therapeutic Dosage in Navy Male Recruits. III. Treatment of Minor Acute Respiratory Infection in Navy WAVE Recruits. UNITED STATES NAVAL MEDICAL RESEARCH UNIT, No. 4. (1950). *J. Lab. clin. Med.*, 36, 555. Bibliography.

An attempt was made to determine the effect of prophylactic administration of an antihistaminic drug ("thonzylamine hydrochloride") upon the incidence of acute minor respiratory diseases among U.S. naval personnel. The dose given was 100 mg. daily. Great care was taken to minimize error and to ensure uniformity of classification of the various types of respiratory disease by examining physicians. Thus, whereas the subjects appeared to be divided into a "treated" and an "untreated" group, in reality one-half of the "treated" group were given a placebo so that only one-third of those observed were given the drug, their identity being concealed from the observers. Administration of treatment was supervised and the assessment of its effect was not dependent alone upon the patient's estimate. The occurrence of an influenza epidemic somewhat complicated the investigation, but the findings were clear enough to show that the drug had no effect upon the incidence or course of the common acute respiratory diseases.

A second study was undertaken after the influenza epidemic was over to determine whether the prophylactic administration of antihistaminic drugs in doses within the therapeutic range had any deterring effect upon development of the common cold. Thonzylamine hydrochloride was given in a daily dosage of 225 mg. to one group, and "trimeton" (90 mg. daily) to another, while a third group

received the placebo. There was no evidence that either drug prevented the development of colds or had any effect on their symptomatology or duration.

Finally, the therapeutic effect of thonzylamine in minor acute respiratory disorders was studied and compared with that of atropine and a placebo in 159 women auxiliaries of the U.S. Navy. The three groups showed no appreciable difference in respect of the symptomatology or duration of respiratory diseases occurring during the 14 weeks of the trial. An atropine-like effect of the antihistaminic was observed on the nasal mucosa, but this could not be regarded as a "cure" in view of the continuance of other characteristic signs and symptoms.

Richard D. Tonkin.

Experiments on Segmental Resection of the Lung. ROSSELLO, G. (1950). *Chir. torac.*, 3, 541.

Writing from the University of Padua the author describes an ingenious method of outlining the pulmonary segment corresponding to a given secondary bronchus. An alkaline, soapy solution and a weak acid solution coloured with gentian violet were successively injected into the lumen of a secondary bronchus of a dog. These two solutions, neutralizing each other, formed a dense coloured foam which uniformly distended the corresponding pulmonary segment, giving it a firm, plastic consistency. This method enabled the surgeon to identify the intersegmental vein of Overholt and to differentiate a pulmonary segment, outlined as described above, from the remainder of the lung.

[For details of the technique, which is described clearly and is beautifully illustrated by diagrams and photographs, those interested should consult the original paper.] *N. Alders.*

Tuberculosis

Review of Seven Years' Experience with Intra-cavitary (Monaldi) Drainage of Tuberculous Cavities. WOODRUFF, W., KELLEY, W. O., and STRANAHAN, A. (1949). *J. thorac. Surg.*, **18**, 777.

This review deals with the drainage of 100 cavities in 90 patients operated upon between 1940 and 1947. The method was used in far-advanced cases for relief of symptoms, for preparing otherwise unsuitable cases for surgery, for reducing the size of very large cavities before thoracoplasty, and in certain cases where a poor respiratory reserve ruled out other forms of surgical treatment. The more technical contraindications to drainage were a history of profuse haemorrhage, presence of a free pleural space, inadequate size of cavity, and multiple cavitation.

Pleurodesis was required in 85 instances, the method favoured consisting of resecting small segments of ribs over the site for drainage, sprinkling the parietal pleura with sulphonamide crystals, and then leaving a gauze pack in the depths of the wound for 5 days. Drainage was instituted about 2 to 3 weeks later, but in 18 cases it was not performed, because of marked improvement after rib resection (7 cases), failure to introduce the catheter (9 cases), or deterioration in the patient's condition (2 cases).

Complications during catheter insertion occurred in 33 cases; in 23 there was bleeding, but only in one case was this fatal; there was a non-fatal case of air embolism; and in 9 cases pneumothorax pockets were produced with one subsequent fatality.

Constant suction was employed after a lapse of 24 hours unless there was bleeding. Later complications occurred in 51 instances; in 37 there was haemorrhage through the catheter and in 2 of these it was severe enough to justify removal of the tube. Chest-wall infection around the tube occurred in 13 cases, but an empyema in one only.

The majority of cases showed an immediate marked clinical improvement, with lessening of the cough and sputum. In the majority the cavities were reduced in size as a result of drainage and in 40 instances the cavity closed. In only 7 instances did the cavity remain closed with the tube out, while in 11 others it reopened at a later date. (In the "palliative" group the catheter was left in place indefinitely.) In 30 cases further surgical treatment, such as thoracoplasty (25 cases) with removal of the catheter after completion of the surgery, was carried out.

The late results show that 19 patients are apparently well and the condition healed; in many others it is either approaching arrest or symptoms are markedly ameliorated. There were 31 deaths in all, but in only 2 instances was this directly referable to the catheter drainage.

W. P. Cleland.

Hydraulic Dissection of Pleural Adhesions.

BOGUSH, L. K. (1949). *Probl. Tuberk.*, No. 5, 29.

The author describes the method of hydraulic dissection of pleural adhesions in cases of artificial pneumothorax. Endopleural analgesia with 20 to 200 ml. of 0.5% procaine was used in all cases, the parietal pleura, overlying fascia, and muscle being infiltrated. The dissection of the adhesions was then carried out extrapleurally under thoracoscopic guidance, a "cap" of parietal pleura being left over the adherent area of the lung.

The following indications for hydraulic dissection of adhesions are mentioned: (1) large adhesions where there is a danger of injuring lung parenchyma or blood vessels; (2) short adhesions containing large blood vessels. The method is contraindicated if there is a thick parietal pleura overlying the adhesions (danger of severe haemorrhage), if thick mediastinal adhesions extend to the hilum, or if there are adhesions near a costochondral junction.

The author discusses the results of 800 adhesion-sections performed during the past 2½ years. There were 5 groups of cases: (1) thoracoscopy, 64 cases; (2) partial adhesion-section, 86 cases; (3) complete adhesion-section, 284 cases (Jacobaeus); (4) partial hydraulic adhesion-section, 110 cases; (5) complete hydraulic adhesion-section, 256 cases. Severe haemorrhage occurred post-operatively in 8 cases, and on 5 occasions a thoracotomy had to be performed; in 4 cases an intercostal artery had been severed and in one the subclavian vein. Moderate haemorrhage occurred in 29 cases. In every case the blood was aspirated completely within 2 to 3 days; several blood transfusions had to be given before the haemorrhage stopped. One patient died of an ensuing empyema. An empyema formed in 23 cases. Aspirations and administration of antibiotics cured the empyema in 8 cases; in 6 cases an oleothorax maintained an effective collapse, in 4 cases the lung re-expanded, in 3 cases thoracoplasty had to be performed. A pneumothorax, effective clinically and radiologically, was achieved in 510 cases; a clinically, but not radiologically, effective pneumothorax resulted in 120 cases. The pneumothorax remained ineffective in 170 cases. Of

this series, in 242 cases pneumothorax would have had to be abandoned if hydraulic dissection of adhesions had not been used. *N. Chatelain.*

A Series of 385 Extrapleural Pneumothorax Operations Carried out in a Sanatorium.
JOLY, H. (1951). *Sem. Hôp. Paris*, **27**, 291.

Extrapleural pneumothorax was carried out on many patients in whom other treatment was hardly possible in a recent series of 385 cases. From this experience it is concluded that extrapleural pneumothorax is indicated in recent lesions with retractable cavities, in bilateral lesions, in patients with cavities difficult to obliterate by thoracoplasty because of their position, and in patients in poor general condition, unable to withstand repeated surgery. Thoracoplasty remains the method of choice in adults with old and organized lesions and with emphysema. General anaesthesia, with intratracheal intubation and a closed circuit, is superior to local analgesia, abandoned by the author many years ago. Blood replacement and antibiotics changed the prognosis of many patients. The posterior approach is used with resection of the fourth or fifth costal arch and forcible retraction of the adjacent ribs. The pleura is stripped by painstaking blunt dissection under direct vision, and haemostasis is achieved by coagulation.

The post-operative complications are many, such as bleeding, formation of clots in the extrapleural pocket, surgical emphysema, cardio-respiratory failure, secondary perforation of the cavity, serous and purulent effusions, flare-up of contralateral lesions, and dissemination: these call for treatment.

[This article should be read in the original by those interested in thoracic surgery. The technique is described in detail, the complications and their treatment discussed, and statistical data presented.]
Z. W. Skomoroch.

Decortication of the Unexpandable Pneumothorax Lung. WATERMAN, D. H., and DOMM, S. E. (1951). *Dis. Chest*, **19**, 1.

The authors discuss their indications for decortication of the inexpandable lung, stating that, when any lung fails to re-expand at the end of artificial pneumothorax treatment, fluid empyema or gross mediastinal shift may develop. These are undesirable and can be prevented by operation. Endobronchial disease or gross fibrosis of the underlying lung may contraindicate the procedure, as it is unlikely to be helpful in patients in whom these conditions are present.

The technique is described in detail and few complications have been noted in the 6 cases subjected to the operation. In all, the results, from a functional point of view, have been good. In all save one complete re-expansion has been obtained. There have been no late complications.
J. R. Belcher.

Lobectomy and Pneumonectomy in the Treatment of Pulmonary Tuberculosis. A Ten-Year Survey. HIMMELSTEIN, A., BERRY, F. B., and READ, C. T. (1950). *J. thorac. Surg.*, **20**, 866.

A report up to 1950 is made upon 75 cases of resection performed at the Bellevue Hospital, New York, from 1939 to 1948. There were 42 lobectomies and 31 pneumonectomies. In the former group, 28 upper lobes and 14 lower lobes, the patients were considered separately as cases of (1) primary resection, of which there were 18 operations with 4 deaths; (2) resection following failed thoracoplasty, 14 patients and 1 death; and (3) combined lobectomy with thoracoplasty, 10 operations and 1 death. Out of this total of 6 deaths, 5 occurred before the availability of streptomycin: since 1947 there has been only one death.

There is difficulty in selecting patients for resection, but the main indications in this series were the presence of lower-lobe cavities or stenosing endobronchial disease, and thoracoplasty failure.

From the operative findings it would appear that only the major disease focus is removed and, since residual disease is present, all patients require treatment with streptomycin combined with some means of preventing overdistension, such as an upper-stage thoracoplasty, or a phrenic crush for lower-lobe resections in the early post-operative period. The best results in this group were obtained by the combination of lobectomy and thoracoplasty under cover of streptomycin.

Pneumonectomy was performed 17 times on the right side and 14 times on the left; thoracoplasty followed as a routine. The indications for this operation were endobronchial disease (9), extensive unilateral disease (10), thoracoplasty failure (3), pre-operative diagnosis of tumour (3), and miscellaneous (4). Of this group, 19 patients are clinically well and sputum-negative, 2 have questionable signs of activity, and the state of 1 is unknown. There were 9 surgical deaths, a figure not considered high in view of the advanced disease for which the operation was performed.
C. A. Jackson

Report of Series of Single-stage Thoracoplasties.

LAIRD, R. C., and LINDENFIELD, C. E. (1950).
J. thorac. Surg., **20**, 835.

Thoracoplasty was an extensive and formidable procedure in its early period of evolution, often associated with grave sequelae. As a result, a staging of the process became the practice. With improved technique the authors consider it justifiable to return to the single operation in treating localized apical lesions in otherwise well-controlled patients.

They report 72 such cases. The ages of the patients ranged between 16 and 65 years, and in 55% there had been no previous collapse therapy. All patients were in good general condition with disease confined to the upper zones, although 60% had bilateral disease. Streptomycin and *p*-aminosalicylic acid were used in preparation for surgery when indicated, and in certain cases to prevent post-operative spread. Under endotracheal cyclopropane-ether anaesthesia the whole of the first rib and sufficient portions of the upper six or seven ribs and their transverse processes were removed. Blood was used to replace the routine saline transfusion only when maximum resection was performed. No padding, but tight adhesive dressings were applied, sedatives given as required, and the patient spent the first post-operative 48 hours in an oxygen tent. Tribute is made to the efficient but light anaesthesia with consequent minimal shock observed in this series. In a 16-month follow-up, sputum conversion was obtained in 50 cases, further streptomycin converted 4 more, and 1 patient required a revision thoracoplasty. *C. A. Jackson.*

The Prevention of Spread during Pulmonary Resection by the Use of a Double-lumen Catheter. BJÖRK, V. O., and CARLENS, E. (1950). *J. thorac. Surg.*, **20**, 151.

Chemotherapy and postural drainage are effective in reducing the volume of sputum before operation in the majority of patients with suppurative pulmonary disease, but a proportion of cases remains in which it is not possible to eliminate sputum entirely, and in which there is danger of an unexpected flooding of the bronchial tree with secretion during intrathoracic manipulations. These secretions are dangerous and may give rise to serious infection in the remaining lung tissue. Three methods of preventing such contamination are available: (1) repeated tracheo-bronchial aspiration; (2) the use of endobronchial tubes placed in the sound lung; and (3) the use of bronchial occlusion on the affected side. These methods

have various advantages and disadvantages, and none is really satisfactory.

In 1949 one of the authors developed a double-lumen catheter for bronchospirometric work. This consists of a double-lumen tube with a small rubber hook which engages the carina and maintains the tube in position. Two inflatable rubber cuffs effectively secure separate ventilation of the two lungs. This tube has been employed in 20 pulmonary resections with very satisfactory results. The method has the advantages that the affected lung can be ventilated or collapsed at will, and that its secretions can readily be aspirated and are always prevented from reaching the opposite lung. A possible criticism of the procedure is that difficulty might be encountered in introducing the tube, although the authors have so far encountered no such trouble. Moreover, it will not protect a lower lobe from contamination with secretions from the adjacent upper lobe and vice versa; this can only be done effectively by intrabronchial occlusion.

W. P. Cleland.

Neoplasm**Chronic Non-specific Pneumonia and Bronchogenic Carcinoma (Radio-bronchographic and Histological Comparisons).** VAJL, S. S. (1950). *Klin. Med., Mosk.*, **28**, No. 7, 42.

The author believes that pathological changes in the bronchi caused by chronic non-specific pneumonia are often the basis of bronchial carcinoma. The neoplastic degeneration is preceded by proliferation and metaplasia of the bronchial epithelium.

The study of lesions of the bronchial tree is facilitated by post-mortem bronchography carried out before the removal of the lungs from the thorax. For this bronchography the author uses a 40% aqueous suspension of barium sulphate. This examination often results in the discovery of foci of chronic pneumonia and pneumosclerosis.

The chronic inflammatory lesions consist of endobronchitis, mesobronchitis, and panbronchitis, sometimes also bronchiectasis and mucous polypi with metaplasia of the cylindrical epithelium into stratified or even keratinized epithelium. The bronchial lesions keep up a chronic inflammatory process in the parenchyma, resulting in pneumosclerosis.

In cases of pulmonary metastases of extrapulmonary tumours there are no such inflammatory changes in the parenchyma and bronchi.

A. Orley.

A Clinical and Radiologic Study of Metastatic Pulmonary Neoplasms. MINOR, G. R. (1950). *J. thorac. Surg.*, 20, 34.

From the records of the University of Michigan Hospital for the 5-year period 1937-42 the author selected 314 cases of secondary pulmonary neoplasm, in all of which the primary lesion had been identified histologically (except for a few cases of primary renal tumour, in which a typical deformity on pyelography was accepted as diagnostic); for each primary site the total number of cases occurring during this period was also determined, amounting in all to 5,727, but owing to the inclusion of a number of cases incompletely investigated or followed up no definite conclusions can be drawn from these figures as to the comparative frequency of pulmonary metastasis from the various primary sites. Of the 314 cases, involvement of the pleura occurred in 60, and of mediastinal lymph nodes in 53. Of the 77 cases in which the primary growth was a carcinoma of the breast, the metastasis involved the pleura in 26, and the mediastinal lymph nodes in 18, the proportions being significantly higher than with any other primary site. In 294 cases information was available as to symptoms resulting from the pulmonary lesions, which were as variable as those of primary bronchogenic carcinoma.

In 69 (21.9%) of the 314 cases resection of the pulmonary lesion or lesions appeared possible on radiological examination alone, but when other factors such as recurrence of the primary after excision or the presence of extrapulmonary metastases were taken into consideration, only in 4 cases, or 1.2% of the total, did it appear possible to resect the pulmonary growth with any hope of permanent cure of the disease. Two of these patients were in fact operated upon and remained free from recurrence 7 and 4 years respectively after operation. The author therefore makes a plea for the excision of secondary neoplasms of the lung in all cases in which the primary growth has been controlled, there is no evidence of extrapulmonary secondaries, and the amount of tissue requiring excision is no more than the volume of one lung. [Such cases must be few, as is adequately shown by the author's figures.]

G. F. Chin.

Oesophageal Tumors. Pathology, Diagnosis and Surgical Treatment. IRELAND, P. E., and BRYCE, D. P. (1950). *Arch. Otolaryng.*, Chicago, 52, 1.

Benign tumours of the oesophagus are relatively rare, 44 being found in 7,400 necropsies

reported by Moersch and Harrington, while their clinical incidence is even lower, as many do not cause symptoms. They are more common in the lower two-thirds of the oesophagus and in men, and seldom become malignant. They are of two types: (1) the submucosal, which is often pedunculated, includes cysts, haemangiomas, neurofibromas, and polyps, while one case of osteochondroma has been reported; (2) the mural is the commoner type and is most often found in the lower part of the oesophagus, usually being a myoma arising in smooth muscle; as mural tumours tend to grow outwards they seldom obstruct the lumen, but may press on the surrounding structures. Signs and symptoms vary according to size, position, and type. A large pedunculated tumour may cause obstruction, while a history of a fleshy mass regurgitated into the mouth and swallowed again is "almost diagnostic." Such tumours may sometimes be removable through the oesophagoscope by snaring or fulguration. Many need no treatment, while others require oesophagotomy or, in some cases, even resection and anastomosis.

Malignant tumours of the oesophagus are nearly always squamous-celled and of histological types II or III. Adenocarcinoma occurring at the lower end of the oesophagus may have arisen from the mucosa of the cardia and spread into the oesophagus. Occasional basal-celled and mixed carcinomas have been reported. They constitute 5 to 7% of all cancer cases in the male, the incidence in the whole population being about 2 cases per 100,000. Except for postcricoid carcinoma, which is seldom found in men, carcinoma of the oesophagus is rare in women. Recent observations have shown that the old belief that oesophageal carcinoma grows slowly is untenable; in spite of the adequate lymphatic drainage and early spread into the lymph nodes, death usually occurs before metastases become obvious. The symptoms are late in appearance and often atypical (in nearly 20% of cases there is no obstruction of the lumen), and the pathological changes which produce the most marked symptoms are those which make the disease inoperable. When suspicion of oesophageal carcinoma arises there should be no delay in investigation, radiological examination being checked by endoscopy and biopsy, repeated if need be.

Radiotherapy should be reserved for advanced inoperable growths and for some tumours in the upper third of the oesophagus. Upper-third tumours can, however, be treated by resection with plastic reconstruction of the pharynx, with or without laryngectomy. In the treatment of

middle-third tumours there has been a real advance in recent years; the authors favour transthoracic resection of the growth with immediate intrathoracic oesophago-gastric anastomosis. The operative mortality varies from 13 to 24%; the higher the anastomosis, the greater the danger. Lower-third growths are treated in the same way as those of the middle third. The mortality is lower, and 39% of patients with resectable tumours survive 3 years after operation. *F. W. Watkin-Thomas.*

Rhabdomyosarcoma of the Esophagus. THOREK, P., and NEIMAN, B. H. (1950). *J. thorac. Surg.*, 20, 77. Bibliography.

In a study of the literature the authors were able to find only 58 published cases of sarcoma of the oesophagus, in 3 of which the growth was a rhabdomyosarcoma. They report a fourth case of rhabdomyosarcoma of the oesophagus.

They state that sarcoma occurs more frequently in men, the age incidence being from 4 to 70 years. The sites of origin are similar to those of carcinoma.

The patient, a man of 43, reported with 2 months' history of dysphagia and vomiting. The tumour was situated just below the aortic arch. A partial oesophagectomy with supra-aortic oesophago-gastrostomy was performed, and the patient was well one year later.

J. R. Belcher.

Benign Tumors of the Esophagus. Report of a Case of Neurofibroma. ENGELKING, C. F., KNIGHT, M. D., BRAUNS, W. H., and HERSHBERGER, L. R. (1950). *Arch. Otolaryng.*, Chicago, 52, 150.

This is the fifth reported case of oesophageal neurofibroma. Of the other four, one caused no symptoms in life and was discovered at a routine necropsy, two were intramural and extramucosal and were successfully enucleated, and one involved lung and oesophagus and was probably extraoesophageal; in this case the patient did not survive operation.

In the case reported here a woman of 39 had had nausea, occasional vomiting, and a sensation of dysphagia for 3 years. A skiagram showed obstruction at the junction of the upper and middle thirds of the oesophagus, and a diagnosis of posterior mediastinal tumour was made. Endoscopy revealed a semi-hard, bilobed mass 26 cm. from the upper incisors, nearly completely blocking the lumen. The mucosa was intact and the rest of the oesophagus was normal.

Thoracotomy revealed a tumour in the posterior oesophageal wall below the arch of the vena azygos. The tumour was easily enucleated from its site between the muscle and mucosal layers, and the patient made a complete recovery.

The tumour was ovoid and encapsulated, measured 5×3.5×3 cm., and contained a central cyst. Histological examination revealed a neurofibroma. *F. W. Watkin-Thomas.*

Thoracic Surgery

A Study of Pulmonary Hemodynamics during Pulmonary Resection. MENDELSON, H. J., ZIMMERMAN, H. A., and ADELMAN, A. (1950). *J. thorac. Surg.*, 20, 366.

By means of cardiac catheterization the pulmonary arterial pressure and cardiac output were measured before, during, and after operation in 11 patients undergoing thoracotomy, of whom 7 underwent pneumonectomy, 2 lobectomy, 1 dissection lobectomy, and 1 was found to be inoperable. Induction of anaesthesia was found to increase the systolic pressure by 36% and diastolic by 70% (all pressures referred to are those in the pulmonary artery). On ligation of one pulmonary artery the average rise in systolic pressure was 40%. Changes in diastolic pressure on ligation of the artery followed no consistent pattern and in some instances the pressure fell. These changes were all temporary, and the pressure fell to normal before the end of the operation. There was one exception, a patient with cor pulmonale whose pre-operative readings were double the normal. After lobectomy his systolic pressure remained high and he ultimately died of congestive heart failure.

It might be thought that removal of half of the capillary bed of the pulmonary artery would cause a great increase in blood pressure. That this is not so is an indication of the great adaptive qualities of the pulmonary capillary bed. Should this be diseased, however, removal of part of it would greatly increase the work of the heart and tend to cause failure, as in the one case described. The authors suggest that pre-operative pulmonary arterial catheterization may help in detecting this type of bad-risk patient with an abnormally high pulmonary arterial pressure.

A. G. Parks.

Pulmonary Prosthesis after Pneumonectomy. BRANTIGAN, O. C., and RIGDON, H. L. (1950). *J. thorac. Surg.*, 20, 109.

Although nothing is definitely known, most thoracic surgeons believe that overdistension

of the remaining lung after pneumonectomy definitely enhances the flare-up of tuberculous pulmonary lesions. If the surgeon waits until a flare-up occurs, he has waited too long. It is much better to perform thoracoplasty before the disease has become active than to attempt to cure the disease by thoracoplasty after flare-up has occurred. Once pneumonectomy is over, however, the risks of contemplated prophylactic operative procedures may be greater than the danger of future disease. Although thoracoplasty carries only slight risks, there is an associated deformity. "Lucite"-ball prosthesis, however, is simple, easy, and non-deforming. The immediate risks are negligible. Its effects over a period of years are yet to be determined.

Because of the difficulty in assessing the number of balls to be inserted at the time of pneumonectomy, and in order to allow the mediastinum to assume a normal position, the balls were placed in the mediastinum several weeks after pneumonectomy had been carried out by the authors in a series of cases. Although it was believed that fibrothorax would develop after operation, this had not occurred in any case even after 10 weeks. The authors therefore adopted the "position of the mediastinum" and not "time" as the indicator of when to operate. Even so, the mediastinal pleura did not always thicken after pneumonectomy, nor was such thickening easy to detect.

As the patient "may desperately need the motion of the diaphragm" in the immediate post-operative period, permanent phrenic paralysis was delayed until 3 weeks after operation.

The chest was opened by resection of 1 to 1½ in. (2.5 to 3.75 cm.) of the left 3rd or 4th rib in the anterior axillary line, fluid was aspirated, a pleural biopsy specimen taken, and enough lucite balls inserted to fill the pleural cavity. From 19 to 65 were used. The balls were sterilized in 1 in 1,000 aqueous "zephiran" solution for 18 to 24 hours, rinsed in sterile saline, and placed in "azochloramide" (1 in 3,300, in sodium tetradecyl sulphate, 1 in 500).

A series of 23 patients were treated. Although it was not unusual for post-operative temperature to rise to 102° F. (38.9° C.) for several days, infection developed only in 2 cases. Both patients had had intrapleural infection before operation and had been treated by chemotherapy.

From this experience the authors conclude that when the pleural cavity is accidentally grossly contaminated or when a tuberculous empyema is present at the time of pneumonec-

tomy, thoracoplasty rather than lucite-ball prosthesis should be performed to prevent overdistension of the remaining lung.

John Borrie.

Conservative Management of Empyema following Total Pneumonectomy. KENT, E. M. (1950). *J. thorac. Surg.*, 20, 374.

Although bronchopleural fistula and empyema, as complications following pneumonectomy, are now decreasing in frequency, they still occur sufficiently often to present problems of management. In the past, the usual practice has been to obliterate the residual pleural space by performing a thoracoplasty, but in the author's experience this is now unnecessary. Cases of bronchopleural fistula fall into two categories: (1) those occurring early, where primary healing of the bronchus has presumably not occurred and the empyema can be considered secondary to the fistula; and (2) those usually occurring later, where the residual pleural space becomes infected after adequate healing of the bronchus and a secondary fistula is formed by rupture of the latter.

The author records his experience in 19 cases of post-pneumonectomy empyema encountered during a period of 64 months, in 13 of which there was an associated bronchopleural fistula. Treatment consisted of simple pleural drainage which, in the majority of cases of fistula, was followed by rapid healing of the bronchus. [This is contrary to general experience in Great Britain, which is that fistulae are very slow to heal following drainage.] When the fistula had healed, penicillin in doses of 200,000 units, combined with 0.5 g. of streptomycin, was instilled daily into the pleural cavity through the drainage tube. When the pus draining from the tube was reduced in volume and less purulent in character and the organisms grown from it showed a predominance of contaminants, the tube was removed and daily instillations of chemotherapeutic agents into the pleural cavity carried out with a needle. Of the 13 patients with an associated fistula, 11 were cured by this means; one required a thoracoplasty for closure, and one still has a drainage tube *in situ* following a recurrence of the empyema. In those cases without a fistula, chemotherapy was started immediately after drainage. Five patients in this group healed satisfactorily, but one had two subsequent recurrences.

It is suggested that these results indicate that it is not always necessary to obliterate the pleural space in order to cure an empyema following total pneumonectomy, provided closure of any

bronchopleural fistula be first obtained, which in the author's experience occurs readily with surgical drainage. *W. P. Cleland.*

The Utilization of Streptokinase-Streptodornase in a Patient with Hemopneumothorax and a Patient with Postpneumectomy Sanguineous Coagulum. READ, C. T., and BERRY, F. B. (1950). *J. thorac. Surg.*, 20, 384.

Concentrated filtrates derived from broth cultures of haemolytic streptococci cause rapid lysis of blood clots (fibrin) and purulent coagula (nucleoprotein) owing to the action of two enzymes, streptokinase (SK) and streptodornase (SD) respectively. The action of the former is self-terminating as the "activatable fibrin-lysing system" pre-existing in serum is used up in the reaction. Details of a case of spontaneous clotted haemopneumothorax and of one of infected postpneumectomy haemothorax, in which complete aspiration was successfully performed after the instillation of streptokinase-streptodornase concentrates, are given. In the first case 250,000 units of SK and 3,000 of SD were injected simultaneously at 3 sites and 2,700 ml. of fluid subsequently aspirated in 48 hours; this was repeated 4 days later with complete evacuation. In the second case 150,000 SK and 60,000 SD were injected at 2 sites and the procedure repeated on 3 occasions with similar success. *Geoffrey Flavell.*

The Use of Streptokinase-Streptodornase in the Treatment of Hemothorax. SHERRY, S., TILLET, W. S., and READ, C. T. (1950). *J. thorac. Surg.*, 20, 393.

The use of the enzymes streptokinase (SK) and streptodornase (SD) in liquefying and thereby facilitating the aspirations of ultrapleural blood-clot in 27 cases of haemothorax is described. Dosage ranged from 80,000 to 450,000 units of SK per injection, but less than 100,000 units was found to be ineffective, the maximum effect occurring at titres of 100 to 500 units of SK per ml. of chest fluid. The standard dose adopted was 200,000 units in 20 ml. of sterile normal saline. A SK inhibitor exists, significant only in highly concentrated solutions, maximum speed of lysis occurring with a 1/32 dilution. The presence of an "activatable fibrin-lysing system" in the serum is also essential to SK action. A laboratory method of determining this factor is detailed. Injection is followed in 60 to 70% of cases by a febrile reaction controllable with amidopyrine; and aspiration is best performed after 24 hours, all exudate possible being

removed. The injection may then be repeated if required at 48-hour intervals.

Of 14 cases of sterile post-pneumectomy haemothorax, a single injection sufficed in 9, all the blood eventually being evacuated; 4 cases of infected postpneumectomy haemothorax required longer treatment, but all were similarly cleared and sterilized eventually. Of 13 cases of traumatic haemothorax (lung *in situ*), 11 yielded to treatment, including 2 which were infected. It is considered that the use of SK 48 hours after bleeding has ceased entails no risk of causing its recurrence. *Geoffrey Flavell.*

A Physiologic Evaluation of Vagus Section for Bronchial Asthma. KLASSEN, K. P., MORTON, D. R., and CURTIS, G. M. (1950). *J. thorac. Surg.*, 20, 552.

The authors review the literature on the physiology of the bronchial musculature and its nerve supply. Essentially, vagus stimulation causes contraction and sympathetic stimulation causes relaxation of the muscle. The pathway of the impulses, however, is variable and uncertain. The normal bronchial movements on inspiration are passive, due to change in intrapleural pressure. It is also noted that vagal stimulation increases secretion and sympathetic impulses have the opposite effect.

After discussion of the history of surgical attempts to relieve asthma, the authors conclude that bilateral vagal denervation should be the operation of choice. They have performed this operation in 3 cases: one patient "says she is cured"; one died on the 16th day after the second operation; and one is slightly, but definitely, improved. *J. R. Belcher.*

Therapeutic Status of Pulmonary Autonomic Nerve Surgery. ABBOTT, O. A., HOPKINS, W. A., and GUILFOIL, P. H. (1950). *J. thorac. Surg.*, 20, 571.

The authors discuss the history of the surgery of asthma and report their experience in 72 patients in whom various forms of autonomic surgery, with or without pulmonary resection, were carried out. In many cases in the series the "asthma" was associated with other disease, such as carcinoma, bronchiectasis, and tension cysts. Many types of operation were carried out, varying from vagotomy to sympathectomy, often accompanying resection of frankly diseased lung tissue. The use of "autonomic surgery" in spontaneous pneumothorax and idiopathic bronchorrhoea is referred to. It is difficult to draw any conclusions about the treatment of the great variety of pathological lesions described in this paper. *J. R. Belcher.*