Contralateral Pneumothorax: A Complication of Pneumonectomy*

Report of a Case

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Contralateral pneumothorax is a serious complication of pneumonectomy which may terminate in a fatal issue if not recognized immediately and treated aggressively. Because of the grave implications of this rare complication, a report of our recent experience with a patient who developed contralateral pneumothorax during pneumonectomy seems warranted.

Pneumothorax occasionally accompanies extrathoracic surgical procedures and is anticipated in selected operations. However, contralateral pneumothorax occurring as a complication of operations within or upon the thorax may be a serious threat to the patient. This complication has been observed following thoracoplasty, drainage of empyema, lobectomy, pleurectomy and pneumonectomy.1 The majority of patients reported as having contralateral pneumothorax after pneumonectomy did not survive. Of the 15 cases recorded, only four patients were treated successfully. An analysis of five fatal cases reveals that the pneumothorax was unrecognized in three patients.1-4 Another patient died immediately as the diagnosis was suspected and aspiration was made.4 Finally, one patient died of coronary artery occlusion six days after pneumonectomy and five days after continuous aspiration of a contralateral pneumothorax was instituted.5 In these fatal cases, the pneumothorax apparently developed either during surgery or within 36 hours. One of the surviving patients developed a minimal pneumothorax 60 days after pneumonectomy.6 Another patient was found to have pneumothorax the fifth day after operation which required a single aspiration.7 Contralateral pneumothorax was recognized in one patient 11 hours after pneumonectomy and successfully managed by continuous aspiration and tracheostomy.8 Finally, pneumothorax was diagnosed in the fourth surviving patient three hours after surgery and treated by continuous aspiration.9

CASE REPORT

A 41-year-old Caucasian woman was referred for admission to this hospital January 17, 1961. She was apparently well until about six weeks prior to admission when she developed right upper lobe pneumonia. Her course was one of recurrent symptoms which prompted a bronchoscopic examination with disclosur of an intraluminal mass obstructing the right bronchus. In addition to the acute illness, she gave a life-long history of intermittent episodes of wheezing and dyspnea. Physical examination was abnormal with dullness and decreased breath sounds over the entire right lung field and scattered wheezes over the left lung field.

A chest roentgenogram revealed deviation of the trachea to the right with atelectasis and infiltration of all but the lower segments of the right lung. Bronchoscopy confirmed the previously described presence of an obstructive, yellow-grey intraluminal tumor mass of the right bronchus. A biopsy diagnosis of anaplastic carcinoma was established. Pulmonary function evaluation suggested severe obstructive insufficiency. The vital capacity was 1.2 liters and the maximum breathing capacity 32.4 liters/min. It was felt that the pulmonary insufficiency was largely contributed to by nonfunction of the right lung; therefore, surgical exploration was advised.

On January 22, 1961 right pneumonectomy was carried out. The tumor mass encircled the right main bronchus. There were multiple, small, soft lymph nodes within the mediastinum which were removed with the lung by concomitant lymphadenectomy. All grossly detectable tumor was removed. After closure of the wound and

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returning the patient to a supine position, the endotracheal tube was removed. Although she was waking satisfactorily from anesthesia, spontaneous respiration appeared difficult and inadequate without support. Breath sounds over the left lung suggested a prolonged expiratory phase. Administration of intravenous aminophylline did not relieve the respiratory distress of which she was obviously complaining. Tracheal intubation was then accomplished to obtain better respiratory control. Exploratory needle aspiration of the left pleural space revealed the presence of tension pneumothorax. At this time she developed a rapidly progressing subcutaneous emphysema; therefore, rapid, closed catheter intubation of both pleural spaces was made for decompression. Portable chest roentgenograms were obtained and the endotracheal tube manipulated to several positions in an attempt to define the source of the pneumothorax. These studies were not productive of a precise diagnosis; therefore, the right chest was reopened to inspect the transected bronchus which was found securely closed. The surgery was concluded by tracheostomy. Mechanically assisted ventilation was instituted and the patient removed to the recovery area.

The first ten postoperative days were difficult for the patient. Bronchospasm was counteracted by administration of aminophylline, ephedrine and isoproterenol. Mechanically assisted ventilation was required for five days. Pleural space decompression was necessary for six days and on one occasion, reinsertion of an intercostal catheter was required. She experienced a serious episode of apparent cerebral anoxia on the seventh postoperative day when she became irrational and uncooperative. This subsided over a period of hours without specific therapy other than continued administration of oxygen mist. The surgical wounds healed without complication. The tracheostomy was finally removed 14 days after operation. From that time until discharge from the hospital, she regained her strength and increased her respiratory capacity to the point of satisfactory ambulation. Presently, ten months following operation, she is doing well. Postoperative pulmonary function has not as yet been evaluated.

**DISCUSSION**

Contralateral pneumothorax is a rare complication of pneumonectomy. It occurs most frequently in the period immediately following surgery. Recognition of pneumothorax in the pneumonectomized patient may be obscure because of the catastrophic seriousness of the event. The urgency of the situation does not permit elaborate diagnostic study; therefore, exploratory thoracentesis should be done if pneumothorax is suspected. This may serve as a temporary method of pleural space decompression until intercostal catheter drainage can be established.

A foreknowledge of respiratory conditions which might predispose to the postoperative development of pneumothorax should be helpful. A history of previous pneumothorax is of great significance; contralateral pneumothorax complicating surgical treatment of recurrent pneumothorax has been observed frequently. Emphysema may predispose the patient to this complication as may other bronchospastic conditions. Blebs or bullae observed in the resected lung may serve as a warning as to the potential possibility.

Treatment of this complication is decompression of the pneumothorax and assurance of adequate ventilation of the remaining lung. The most reliable method of pleural space decompression is continuous water seal drainage through a large bore intercostal catheter. Vigorous treatment is dictated by the serious threat to survival of the patient following pneumonectomy. The assurance of adequate ventilation is also a prime consideration. Mechanically assisted ventilation is indicated in those individuals with borderline pulmonary function. A few patients may be able to breathe spontaneously in spite of the discomfort associated with the presence of a draining catheter on one side and a thoracotomy incision on the other. However, this aspect of management must be individualized.

**REFERENCES**


CONTRALATERAL PNEUMOTHORAX


CLINICAL ASPECTS OF AURICULAR FLUTTER

At the Instituto Nacional de Cardiología, 230 cases of atrial flutter were found among 60,000 charts of these, 54,000 were cases of true heart disease and the remainder had no demonstrable cardiac disease. In the first group, the incidence of flutter was 0.4 per cent and in the second, one per thousand. Flutter was more common in men.

In cardiac patients, the most common etiologic factor was rheumatic fever (68.7 per cent). One hundred ninety-eight cases had cardiomegaly. The duration of flutter could be established in 97 cases. In 37, it was under two weeks and in 16, it was permanent. Of 23 cases with a necropsy record, 68 per cent had thrombosis and/or parietal endocarditis. Of nine cases treated with digitalis, 2 per cent were refractory to the treatment; 61 per cent were changed to auricular fibrillation and 37 per cent to sinus rhythm. Fifteen per cent of the cases treated with quinidine did not respond to therapy. In cases treated with digitalis and quinidine, 18.7 per cent were refractory to treatment. Cardenas, M. and Amecua, F. J.: "Aspectos Clinicos del Flutter Auricular," Arch. Inst. Cardiol. Mexico, 32:281, 1962.

PLASMA NOR-EPINEPHRINE RESPONSE

Increased activity of the sympathetic nervous system has been considered a major determinant of the circulatory response to muscular exercise. This study was undertaken in an effort to compare the activity of this system, as reflected by the concentration of nor-epinephrine in arterial blood in normal subjects and in patients with cardiac disease. In five normal subjects, moderate muscular exercise was associated with a slight elevation of arterial nor-epinephrine from an average level of 0.28 to 0.46 mcg. per liter. With more strenuous exercise, the level averaged 0.62 mcg. per liter. In seven patients with congestive heart failure, moderate exercise elevated the arterial nor-epinephrine from an average of 0.63 to 1.73 mcg. per liter. In three patients with heart disease without failure, the resting and exercise levels were similar to those noted in the normal subjects. It is concluded that the excessive augmentation of the plasma nor-epinephrine during exercise in these patients with congestive heart failure reflects an increased response of the sympathetic nervous system and that this response may have an important supportive role in such patients. Chidsey, C. A., Harrison, D. C. and Braunwald, E.: "Augmentation of the Plasma Nor-epinephrine Response to Exercise in Patients with Congestive Heart Failure," New Eng. J. Med., 267:630, 1962.

EXPERIENCES WITH CORONARY ENDARTERECTOMY

Over a three and one-half year period, endarterectomy of the coronary artery was performed on five patients. In two, restoration of arterial continuity was successful, One of these segments closed immediately, the other after a six-month period, and the patient's previous symptoms of angina then returned. Two of the other three patients died in connection with the operation. Warren, R.: "Experiences with Coronary Endarterectomy," J. Cardiovas. Surg., 3:281, 1962.