Bronchopulmonary Sequestration and Pulmonary Tuberculosis

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Bronchopulmonary sequestration was discovered in a 36-year-old man being treated for pulmonary tuberculosis. Although this anomaly is a frequent site for pyogenic infection, a review of the literature reveals only two other reports of bronchopulmonary sequestration associated with pulmonary tuberculosis.

Bronchopulmonary sequestration is a congenital anomaly in which a portion of pulmonary tissue is detached from the remainder of the normal lung and receives its blood supply from a systemic artery. Described since the 18th century by pathologists, it is through the use of angiographic technique that the diagnosis has become possible during life. Analysis of pathologic specimens obtained at autopsy and at thoracotomy, in apparently unselected series, reveals an incidence of this anomaly ranging from 0.4 percent to 1.8 percent.

The anomaly generally presents as a mass in one of the lower lobes of the lung, and is often cystic in nature. A history of recurrent pulmonary infection is a regular accompaniment of this abnormality.

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Discussion

The use of absorbable versus nonabsorbable suture material for pericostal closures in thoracotomy is a matter of personal preference among thoracic surgeons. The arguments against the use of nonabsorbable suture material parallel those that led to the near abandonment of "circular" and "banding" techniques commonly practiced among orthopedic surgeons. The use of steel or silver wires or band, particularly if left in place for a long time, is associated with a higher incidence of bony necrosis. These wires and bands are generally designed for subsequent removal when the bony fractures are healed. This is not true of nonabsorbable pericostal stay sutures.

In our case, the findings of a lytic lesion with frank fracture is thought to be due to pericostal necrosis under the sutures leading to gradual bony erosion and frank fracture probably resulting from the unusual stress placed upon the thoracic cage. The patient's lack of symptoms is attributed to gradual healing concomitant with the erosion of the ribs. Although organisms were not demonstrated in the granulomatous material, it is felt that braided silk used in thoracotomy closures must occasionally harbor bacteria which contribute to the formation of the granulation tissue. Due to the indefinite nature of the diagnosis and the possibility of a malignancy, this patient underwent secondary surgery which might possibly have been avoided had absorbable suture material been utilized in the original thoracotomy closure.

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Figure 1. Lateral bronchogram revealing an area of bronchial displacement.

Figure 3. Frank fracture has occurred (November, 1970).

Figure 2. Alveolar collapse of the left lung.
A 36-year-old white man was transferred to the Naval Hospital, St. Albans, New York, on October 11, 1970, because of a diagnosis of pulmonary tuberculosis. The patient first came to medical attention on September 9, 1970, at the Naval Hospital, Oakland, California, when he was hospitalized for elective resection of an anal fistula. A routine chest roentgenogram at that time revealed a soft tissue density in the posterior portion of the left lower lobe seen on the lateral chest film. Past history at that time was remarkable only in that the patient was a three pack-per-day smoker of 15 years' duration. Physical examination was unremarkable. Laboratory work-up included skin tests with a PPD-S of 0 mm induration, coccidnoidin of 0 mm, histoplasmin of 9 mm, and a second strength PPD of 20 mm induration. Sputum was smear positive for acid-fast bacilli. Bronchogram revealed the bronchial tree to be displaced around the left lower lobe mass, without any communication between the two (Fig 1).

On admission to the Naval Hospital, St. Albans, the patient related a 21-pound weight loss dating from June 1970. He denied fever, sweats, chills or hemoptysis. He admitted to a chronic cough of several years' duration, productive of yellow-green phlegm. He had been treated on several occasions for 'pleurisy,' characterized by fever and chest pain, but had never been hospitalized. Review of his health record revealed that in 1967 his intermediate PPD was 3 mm induration.

Results of physical examination were within normal limits. Laboratory data, including complete blood count, blood urea nitrogen, electrolytes, liver function tests, electrocardiogram, and VDRL were normal or negative. Skin testing revealed intermediate PPD-S of 11 mm, and a PPD-B of 0 mm. Chest roentgenogram and tomography of the left lower lobe confirmed the presence of a mass (Fig 2). Bronchoscopy was within normal limits. An aortogram was performed via a transfemoral catheterization (Fig 3) and revealed an accessory vessel originating from the abdominal aorta and coursing into the left lower lobe mass.

All sputum specimens, gastric aspirates, and urine cultures were negative for the growth of mycobacteria. On the basis of a positive sputum smear for acid-fast bacilli and the conversion of the PPD-S, the diagnosis of tuberculosis, pulmonary, minimal, active was established. The patient was begun on a two-year course of antituberculosis chemotherapy. Resection of the sequestration was considered.

Figure 2. Plain chest film and tomogram demonstrating the presence of a left lower lobe mass. A (left). Plain chest film, lateral view. B (right). Tomogram showing retrocardiac mass.

Figure 3. Aortogram demonstrating the anomalous vessel as it arises from the abdominal aorta.
but because of the patient's minimal symptoms and absence of documented pneumonia, it was decided to follow the patient medically. The patient was placed on a regimen of isoniazid, 300 mg, orally, daily and ethambutol, 1,500 mg, orally, daily; his course was uncomplicated. After four months of initial isolation, he was returned to duty with no physical limitations.

DISCUSSION

The association of pulmonary tuberculosis and bronchopulmonary sequestration is not a recent phenomenon. One theory contends that a sequestration is an acquired disease and that infection early in life initiates the development of this anomaly, which later in its formation captures an aberrant vessel; tuberculosis is postulated as being one such silent etiologic agent.

Frequent reference is made to this simultaneous occurrence. However, review of the literature discloses only two patients with the simultaneous occurrence of bronchopulmonary sequestration and tuberculosis.

Smith describes a young woman presenting with a left lower lobe infiltrate and positive sputum for acid-fast bacilli. She responded to anti-tuberculosis chemotherapy. However, a persistent shadow remained in the left lower lobe. One year after the detection of pulmonary tuberculosis, because of an inability to convert her sputum, the patient was subjected to resection of her left lower lobe. Histologic as well as gross examination revealed bronchopulmonary sequestration with a tuberculous lodged within it.

Tosatti and Gravel describe a 23-year-old man who presented with a 17-year history of "bronchitic attacks." A chest roentgenogram revealed a thin-walled calcified cyst in the right lower lobe. Lobectomy was performed and revealed a bronchopulmonary sequestration. Histologic examination revealed two minute tubercles in the posterior basal segment.

Our patient, unlike the young woman in the first case described, did not experience any difficulty in converting her sputum; unlike the man in the second case he did not have a history of intractable pyogenic infections. For these reasons it was felt that surgical intervention could be avoided.

The discovery of pulmonary tuberculosis in conjunction with a bronchopulmonary sequestration has rarely been reported. The benign course which tuberculosis adopts in the face of anti-tuberculosis chemotherapy may mask the necessity for investigating the incomplete resolution of an atypical pulmonary infiltrate. This case underscores the importance of ruling out underlying pulmonary disorders whenever pulmonary tuberculosis appears in atypical sites.

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Serial Cardiac Catheterizations in
Infundibular and Pulmonic Stenosis

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A 43-year-old man with infundibular and pulmonic stenosis underwent two cardiac catheterizations over a seven-year period. With passage of time a decrease in cardiac index and severity of the infundibular stenosis was observed. Little change was observed in the valvular stenosis gradient. Reduction in obstruction at the infundibular level can probably be ascribed to an increase in the right ventricular volume.

The natural history of isolated pulmonic stenosis is still largely unknown. This is mainly caused by relatively recent clinical awareness of the frequency of this condition as well as the effectiveness of cardiac surgery.

Four groups have performed serial cardiac catheterizations in children, and have concluded that the right ventricular pressure remains essentially unchanged. These studies suggest that the orifice of the stenotic pulmonic valve increases with growth of the patient with mild to moderate pulmonic valvular stenosis. The symptoms that develop in many patients during the second decade of life have therefore been ascribed to the development of right ventricular myocardial fibrosis and infundibular hypertrophy. Indeed, in studies of patients with pulmonic valvular stenosis, the severity of infundibular hypertrophy increases with each decade. This finding suggests that the infundibular stenosis may develop and lead to a secondary and, at times, a major site of ventricular outflow obstruction. This concept, however, has remained conjectural since no serial cardiac catheterization studies have been performed in such a patient. We report the serial cardiac catheterization results in an adult with infundibular and pulmonic stenosis.

CASE REPORT

A 43-year-old man was seen in the Fordham Hospital cardiac clinic because of progressive dyspnea of six months' duration.

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