Tracheobronchial Tumor Cast Formation and Pneumothorax

Raymond A. Dieter, Jr., MD, FCCP; George B. Kuzycz, MD; Jeff Hund, MD, FCCP; and Lenora Su, MD

A 34-year-old white man was admitted to the hospital for progressive respiratory difficulty, recurrent left pneumothorax, and a diagnosis of aplastic left lung. Further evaluation, including bronchoscopy and CT scan, demonstrated a cast-forming tracheobronchial obstructing tumor. Surgical resection of the tumor through the left chest with left lower lobectomy resolved his symptomatology. Improved ventilation with an open airway led to expansion of the left upper lobe. The pathologic diagnosis remained controversial as to a definite designation and was primarily descriptive: spindle cell proliferation with myxoid and collagenized stromal benign tumor. However, the extent of this rubbery tumor cast and the ability to remove it intact illustrate the tenacity of the structure and the very unusual nature of a cast of the entire tracheobronchial system on the left side. (CHEST 2001; 120:1741–1742)

Key words: tracheal tumor resection; tracheobronchial cast; tracheobronchial tumor; tracheobronchial tumor and pneumothorax

Primary tracheobronchial tumors are uncommon in the community practice of thoracic and cardiovascular surgery. The most common tracheobronchial tumors are bronchogenic carcinomas of the lung with involvement of the bronchus and occasional extension into the carina or the trachea. Infrequently, a patient will have a benign primary endobronchial carcinoid or hamartoma. Infrequent primary tracheal tumors include the tracheal carcinoid, the adenoid cystic carcinomas, and the squamous cell carcinomas.

On rare occasions, patients present with cast formation of the trachea or the bronchi. The casts so formed may involve the bronchus, a portion of the bronchus, the trachea, or the tracheobronchial tree. Casts may develop as a result of inspissated mucus and, in particular, are seen in individuals with tracheostomies as benign processes. Occasionally, however, we will see a patient with a tumor cast of the trachea or bronchus. These may either be coughed up spontaneously or removed at bronchoscopy. More recently, we saw a very rare situation in which a patient developed a tumor cast of the trachea and the entire left bronchus, total atelectasis of his left lung, and left pneumothorax. Following consultation and bronchoscopy, this gentleman underwent resection of a large tumor cast that formed branching radicals filling each of the bronchi and subsegmental bronchi of the left lung.

Case Report

This 34-year-old white man was admitted to the hospital on December 28, 1999, with recurrent, left-sided pneumothorax and bronchospasm. The discharge diagnoses were left pneumothorax and congenital aplastic (agenesis) left lung. A two-pack-per-day smoker, he was discharged receiving bronchodilators and antibiotic therapy. On February 4, 2000, he was readmitted to the hospital complaining of periodic bronchospasm, fever, chills, purulent sputum, increasing dyspnea, and wheezing. He had a soft right lower lobe infiltrate shown on radiography, purulent sputum, a temperature of 39°C, absence of a left lung shadow, and a left pneumothorax. CT scan of the chest demonstrated either a polypoid tracheal mass or secretions.

Bronchoscopy demonstrated a mass nearly totally obstructing the distal trachea with only a moon-shaped, slit-like airway. Purulent secretions were aspirated. Following consultation, the patient was taken to surgery for definition and treatment of his condition. On February 12, 2000, rigid bronchoscopy was performed after right femoral artery cannulation for cardiopulmonary bypass standby. The rigid 7 × 40 bronchoscope was passed beyond the obstructing lesion with secretion aspiration and clearing of the right mainstem bronchus. The patient’s oxygen saturation immediately improved. Flexible bronchoscopy with endotracheal intubation of the right bronchus was carried out. Under general anesthesia, the patient was turned on his right side for a left thoracotomy. The bilobar left lung was totally atelectatic, and the left mainstem bronchus appeared to be filled with a rubbery lesion. Through a left mainstem bronchotomy, en bloc removal of the tracheobronchial tumor was accomplished. The tumor filling the distal one third of the trachea, the left mainstem bronchus, the left upper lobe bronchus, and each of the subsegmental bronchial orifices were removed. The mass seemed to be densely affixed in the left lower lobe bronchus. Therefore, a left lower lobectomy was performed in continuity within the tracheobronchial mass (Figure 1). Following the interrupted 3-0 bronchial suture closure, the left upper lobe ventilated and expanded well. An intercostal muscle flap was placed over the bronchotomy and the bronchial stump. Subsequent to chest closure, flexible bronchoscopy was performed through the endotracheal tube and again after extubation with no residual tumor noted. Following

Figure 1. Entire branching tracheobronchial cast en bloc with the left lower lobe.
surgery, a pulmonary embolus developed to the right lung, from which the patient slowly improved. Additional outside pathologic consultation revealed a benign endobronchial tumor cast.

**DISCUSSION**

A 34-year-old white man with progressive difficulty breathing had radiographic findings of opacification of the left chest and recurrent left apical pneumothorax. The previous tentative diagnosis was that of asthma in association with agenesis of the left lung. With progression of symptomatology, endoscopic examination demonstrated a near total occlusion of the trachea. Therefore, a left thoracotomy with resection of the tumor mass was performed. The pathologic description was that of a spindle cell proliferation with myxoid and collagenized stroma forming a tumor cast of the distal one third of the trachea and the left bronchial tree. The left lower lobe demonstrated severe atelectasis. The pathologists believed that this tumor represented a myxoid soft-tissue tumor with overlying atrophic bronchial mucosa. Frequent mast cells with no increase in mitotic figures were present. Lymph nodes resected from the left posterior hilum and peribronchial area demonstrated no evidence of tumor. Outside consultation from the Mayo Clinic (Mayo Medical Laboratories; Rochester, MN) confirmed that this was a benign tumor with the exact definition not apparent. The patient is doing well and back to work at hard labor.

Primary tracheobronchial tumors are very uncommon. Their surgical treatment has been difficult and fraught with great concern for postresection uncomplicated survival. Numerous articles have been written defining surgical techniques for these patients and their problems. The symptomatology experienced by the patient may include wheezing, shortness of breath, unusual expectoration, and hemoptysis in association with abnormal findings on radiography.1,2

Tracheal or bronchial casts have been equally uncommon and usually involve the more central, larger bronchi or trachea. The causes of bronchial casts may include bacterial pneumonia, diffusely infiltrative in nature, as well as noduloplastic plastic bronchitis, mucoid impaction of bronchi, asthma, allergic bronchopulmonary aspergillosis, pulmonary hemorrhage, or mucoviscidosis. Tumor causes of bronchial casts may include the lymphangiomatosis group of patients, bronchial carcinoids, and bronchogenic carcinoma.3,4 Removal of these casts may be particularly difficult because of the airway considerations. Our patient was having marked respiratory distress and oxygen desaturation, despite high oxygen flow rates by mask. Therefore, he underwent urgent surgery and removal of the cast and lower lobe. Many patients may be relieved by endoscopic cast removal or by withdrawal of the tumor cast through a tracheostomy. As we were unable to define the characteristics of the lesion or its source, our patient had a left thoracotomy. Mucus plugs, a lesser situation in the trachea, may be relieved more commonly with aggressive nasotracheal suction, as well as bronchoscopic examination.5,6 Surgical treatment for tumors of the trachea and bronchi may require multiple procedures and techniques. Depending on the specific situation, wedge excision of tracheal lesions, tracheal sleeve excision, bronchial sleeve excision, sleeve lobectomy, pulmonary bilobectomy, and pneumonectomy have all been performed.7 Some lesions are unable to be resected. Grillo has championed surgery for these tracheal tumors.8 Defining the possible resectability and the surgical technique and survivability in these patients remains a challenge.

**REFERENCES**

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**Rupture of the Chordae of the Tricuspid Valve After Knotting of the Pulmonary Artery Catheter**

Samir Arnaout, MD; Karim Diab, MD; Aghiad Al-Katounbi, MD; Ghassan Jameelidine, MD, FCCP

A case is presented in which the insertion of a pulmonary artery catheter was complicated by the formation of a knot around the chordae tendineae of the tricuspid valve. The catheter was pulled out under fluoroscopic guidance using a guidewire inserted through the femoral vein.

(CHEST 2001; 120:1742–1744)

Key words: pulmonary artery catheter; Swan-Ganz catheter; tricuspid valve regurgitation

Since Swan and colleagues in 1970 initially described it, the pulmonary artery catheter has been widely used as a valuable tool for monitoring patients and guiding therapy.

*From the Departments of Internal Medicine (Drs. Arnaout, Diab, and Jameelidine) and Radiology (Dr. Al-Katounbi), American University of Beirut-Medical Center, Beirut, Lebanon. Manuscript received January 2, 2001; revision accepted April 5, 2001.

Correspondence to: Ghassan Jameelidine, MD, FCCP, Associate Professor of Clinical Medicine, American University of Beirut-Medical Center, Department of Internal Medicine, PO Box 113-6044, Beirut, Lebanon; e-mail: ghassanj@aub.edu.lb*