

## Adult Bronchoesophageal Fistula Diagnosed on Computed Tomography

David M. Chaky, M.D., Carlos Escamilla, M.D., Philip H. Sheridan, M.D., and David Deboer, M.D.

Tracheoesophageal and bronchoesophageal fistulas are usually diagnosed early in life after an infant presents with difficulty feeding or recurrent pneumonias. These conditions rarely presents in adulthood. We report a case of a 59-year-old woman who presented with cough and recurrent pneumonias. The workup revealed a bronchoesophageal fistula that was diagnosed on CT and confirmed with a barium esophagogram.

### Introduction

Tracheoesophageal fistulas that present in adulthood are usually due to malignancy or iatrogenic. The point of entry of the distal aspect of the fistula into the tracheobronchial tree can range from 2 cm above the carina to the center of either mainstem bronchus. There are several non-malignant causes of rare tracheoesophageal fistulas that present in adults. Common non-malignant causes include: foreign body ingestion, trauma,

and iatrogenic injuries. Certain infectious agents such as tuberculosis, syphilis, and histoplasmosis can affect mediastinal lymph nodes and cause erosion into the adjacent trachea, bronchi, or esophagus. Candida and mycobacterium infections of the esophagus, commonly seen in AIDS patients, can erode into the adjacent tracheobronchial tree and lead to fistulas [1].

The most common type of tracheoesophageal fistula consists of esophageal atresia with a distal tracheobronchial fistula [2]. The rare “H-type” of tracheoesophageal fistula is the only type that remains undetected until adulthood since both the trachea and esophagus are patent. The “H-type” of fistula is thought to account from 1 to 20% of all tracheoesophageal fistulas. Up to 23% of these fistulas can be associated with other anomalies, particularly cardiovascular. Common cardiac anomalies include VSD, ductus arteriosus, and a right aortic arch [3].

Congenital tracheoesophageal fistula without esophageal atresia is a rare condition in adults [4]. Common presenting symptoms include recurrent pneumonias, hemoptysis, and coughing episodes following eating.

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Abbreviations: CT, computed tomography

David M. Chaky, M.D. (Email: dmchaky@yahoo.com), and Carlos Escamilla, M.D., are in the Department of Radiology, St. Francis Hospital, Evanston, IL, 355 Ridge Ave., 847-316-4000, USA.

Philip H. Sheridan, M.D., and David Deboer, M.D., are in the Department of Surgery, St. Francis Hospital, Evanston, IL, 355 Ridge Ave., 847-316-4000, USA.

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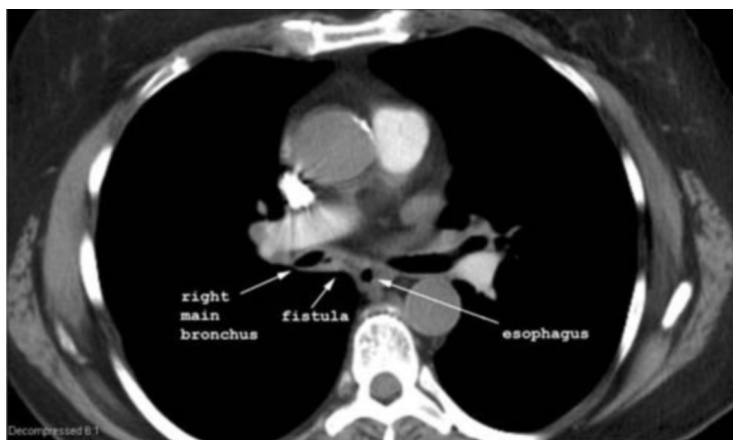


Figure 1. 59-year-old woman with congenital bronchoesophageal fistula. Noncontrast axial CT (mediastinal windows) through subcarinal region shows small air collection between the right mainstem bronchus and the esophagus.

Identification and treatment is required to prevent recurrent infections, chronic lung changes, inflammation, and even pulmonary sepsis [5].

### Case Report

A 59-year-old woman with a history of smoking, hypertension, and asthma presented with cough and recurrent pneumonias, particularly over the past three years. The patient denied any incidents of swallowed bones or chest trauma. She also reported occasional dysphagia, particularly while consuming milkshakes. The patient was chronically taking prednisone and Allegra for her bronchial asthma. On presentation to the hospital, the patient had finished a course of oral antibiotics for her cough. Despite this, she complained of increasing cough over the past three weeks but denied fever, nausea, or vomiting.

The physical exam was unremarkable except for inspiratory crackles and diminished breath sounds heard at the lung bases with mild expiratory wheezes.

Axial CT images of the chest both

with and without intravenous contrast were obtained. Bronchial wall thickening and segmental atelectasis of the posterior right middle lobe was unchanged compared to a chest CT performed a year earlier. These findings had the classical but nonspecific appearance of the “right middle lobe syndrome.” A small, linear, walled air collection was noted just medial to the bronchus intermedius tracking towards the esophagus, a finding suspicious for a bronchoesophageal fistula (Figures 1 and 2). A virtual endoluminal view of the data also nicely demonstrated the orifice of the fistula (Figure 3). Further evaluation with an esophagogram as well as endoscopy and bronchoscopy were recommended.

One day after the CT was performed a barium esophagogram revealed prompt filling of a thin fistula between the mid-esophagus and the right mainstem bronchus (Figure 4). The exam was terminated after the visualization of the fistula.

A bronchoscopy demonstrated only mild erythema and thickening near the proximal bronchus intermedius with no obstruction or fistula. Subsequent pulmonary function tests showed a moderate obstructive lung defect. That airway obstruction defect was confirmed by

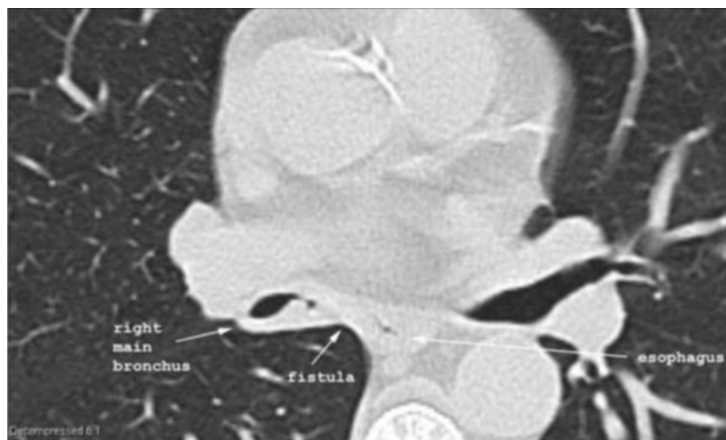


Figure 2. Noncontrast axial CT (lung windows) through subcarinal region shows small air collection between the right mainstem bronchus and the esophagus.

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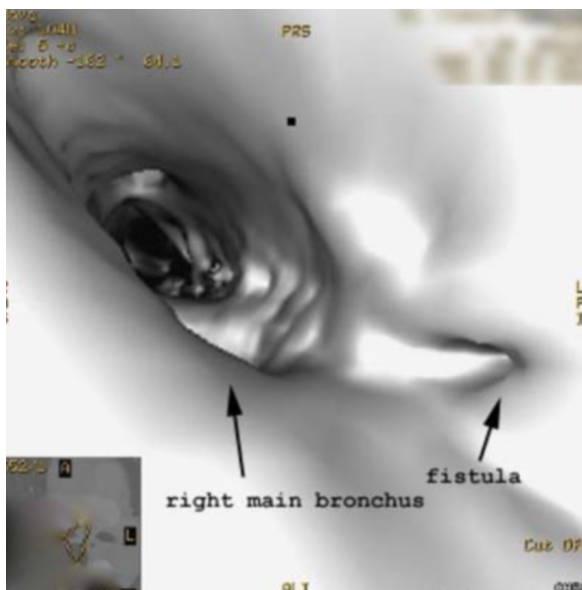


Figure 3. Endoluminal three dimensional CT image from the vantage point of the trachea, peering down towards the right main bronchus, demonstrates the orifice of the bronchoesophageal fistula.

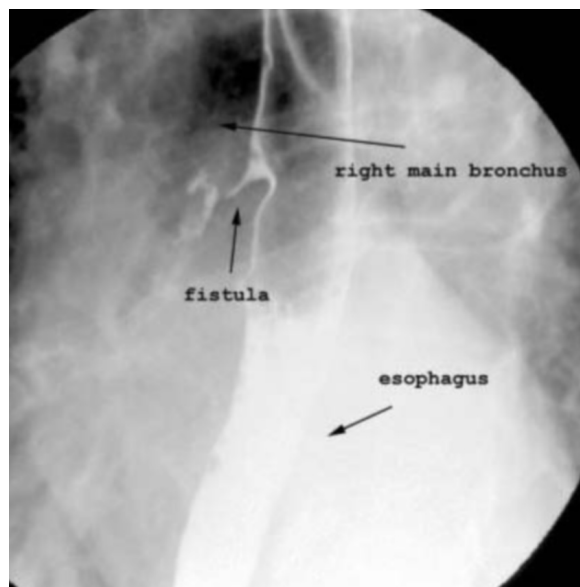


Figure 4. Barium esophagogram shows the fistula between the esophagus and the right mainstem bronchus.

the decrease in flow rate at peak flow and flow at 25%, 50%, and 75% of the flow volume curve.

The patient underwent a right posterolateral thoracotomy with ligation of the bronchoesophageal fistula using staples (Figure 5). Her postoperative course was uneventful. The patient returned to the clinic for follow up with no complaints of cough or wheezing. Her dysphagia with milkshakes had also resolved.

### Discussion

The barium esophagogram is an important study in the diagnosis of a tracheoesophageal fistula at any age. However, in adults, a high degree of suspicion is required to prompt the clinician to even consider this diagnosis, let alone this diagnostic study. Esophagoscopy and bronchoscopy can also be used to make this diagnosis and have even been used in conjunction with interventional techniques, such as stenting, to provide treatment [1]. Both of these studies require a high de-

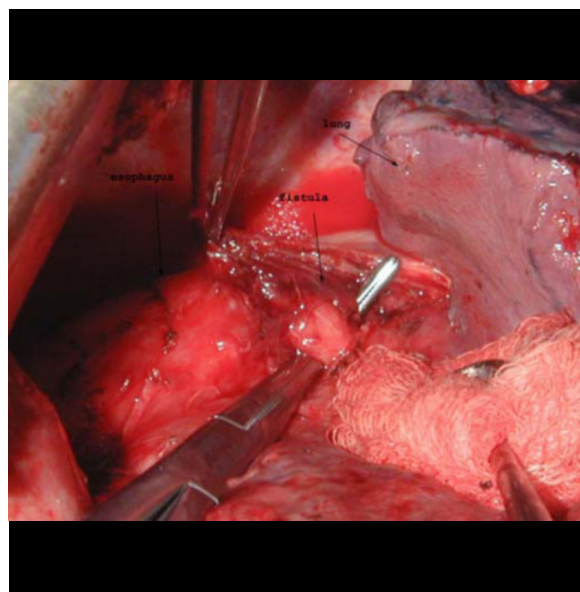


Figure 5. Intraoperative photo shows the bronchoesophageal fistula prior to ligation.

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gree of clinical suspicion. It should be noted that both of these studies may miss a tracheoesophageal fistula due to nonvisualization or the presence of a partial membrane shielding the opening of the fistula [4].

CT has been shown to have a diagnostic role in congenital esophageal atresia in neonates [6]. CT is a noninvasive study that can be useful in detecting unsuspected adult tracheoesophageal fistulas. A recent literature review revealed at least two cases of adult tracheoesophageal fistulas that were diagnosed on CT. One case involved an acquired tracheoesophageal fistula caused by an accidentally swallowed denture [7]. Malignant, iatrogenic and acquired tracheoesophageal fistulas are believed to be more common in adults than congenital tracheoesophageal fistulas. Common etiologies include esophageal cancer, surgical complications and caustic ingestion. Another reported case involved late manifestation of a congenital tracheoesophageal fistula which is similar to the case presented above [4]. The widespread adoption of 32- and 64-slice multidetector row CT, with multiplanar reformations, increased resolution, and decreased motion artifact, has the potential to be even more useful in the detection of adult tracheoesophageal fistulas of any etiology. This is critical since early diagnosis and treatment can prevent longterm sequelae such as dysphagia, recurrent pneumonia, obstructive and restrictive ventilatory defects, and airway hyperreactivity [5].

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