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Original Research Article

Unexpected Pathway - A Case of Tracheoesophageal Fistula in Middle Aged Female

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Abstract:
Tracheoesophageal fistula in adults is a rare condition that may be congenital or acquired. Congenital TEF, often an H-type, can present late with recurrent respiratory infections and aspiration due to chronic microaspiration. Understanding the distinctions between congenital and acquired TEF, along with prompt diagnosis and tailored treatment-including ATT in tubercular cases-is essential to improve outcomes and reduce morbidity in affected adults. We present a rare case of tubercular tracheoesophageal fistula in a 32-year-old female.
Keywords: Tubercular, Tracheoesophageal Fistula.

Introduction

TEF (Tracheoesophageal Fistula) is an abnormal connection between the trachea and oesophagus, typically characterized by the passage of air or gastrointestinal contents between these two structures. While congenital TEF is commonly diagnosed in neonates, acquired TEF is a rare but serious condition in adults, often resulting from malignancies, infections, or trauma. [1,2] Among these, malignancy-induced TEF is the most common, followed by benign causes such as tuberculosis and inflammatory diseases. [3,4]

In regions where TB (Tuberculosis) remains prevalent, tuberculous lymphadenopathy is a well-recognized cause of acquired TEF. TB-associated TEF results from the erosion of caseating lymph nodes into adjacent structures, leading to fistula formation. [5] Patients often present with dysphagia, cough during eating (Ono's sign), recurrent aspiration pneumonia, and significant weight loss. [6,7] Prompt diagnosis using imaging techniques like CECT (Contrast-Enhanced Computed Tomography) and endoscopic evaluation is essential for appropriate management. [8]

Bronchoscopy also plays a critical role in evaluating the extent of TEF and obtaining tissue samples for diagnosis. In TB-endemic regions, BAL (Broncho-Alveolar Lavage) and tissue biopsies are often necessary to confirm the diagnosis using microbiological studies such as AFB (Acid-Fast Bacillus) staining, GeneXpert, and culture. [9,10] Timely intervention using ATT (Antitubercular Therapy) and supportive care remains the cornerstone of management. In severe cases, surgical repair may be necessary to restore the integrity of the airway and esophagus.

This case report describes a 32-year-old female with acquired tracheoesophageal fistula secondary to tuberculous mediastinal lymphadenopathy, highlighting the diagnostic challenges and therapeutic approaches in managing this rare presentation.

Presentation of Case: A 32-year-old female presented with dull aching throat pain and difficulty in swallowing for 2 months. The symptoms were insidious in onset. The symptoms had progressively worsened with difficulty in swallowing more for solids than semi-solids and liquids. Patients also had a history of weight loss and reduced appetite.

There was no history of abdomen pain, abdominal distention, nausea/vomiting, retrosternal chest pain or altered bowel habits.

Her history was significant in that she had been diagnosed with pulmonary tuberculosis 2 months back. She also stated that her mother had a history of tuberculosis, for which she received anti tuberculous therapy. She had no previous surgical history.

On examination vitals were stable, she was afebrile. The only positive finding was the presence of bilateral pitting pedal oedema. Examination of the systems did not reveal any abnormalities. Local neck examination did not show any ulceration, visible veins or skin changes. There were no palpable lymph nodes.

Routine laboratory tests were within normal limits except for a raised ESR. Barium swallow showed tapering at lower oesophagus.

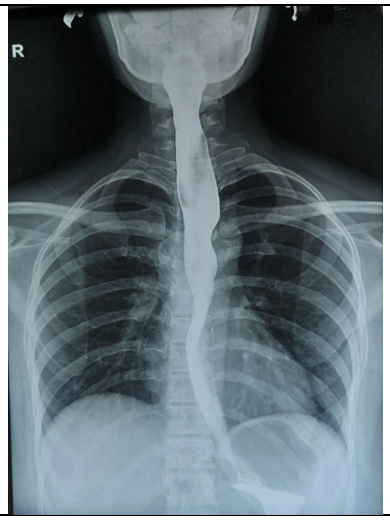
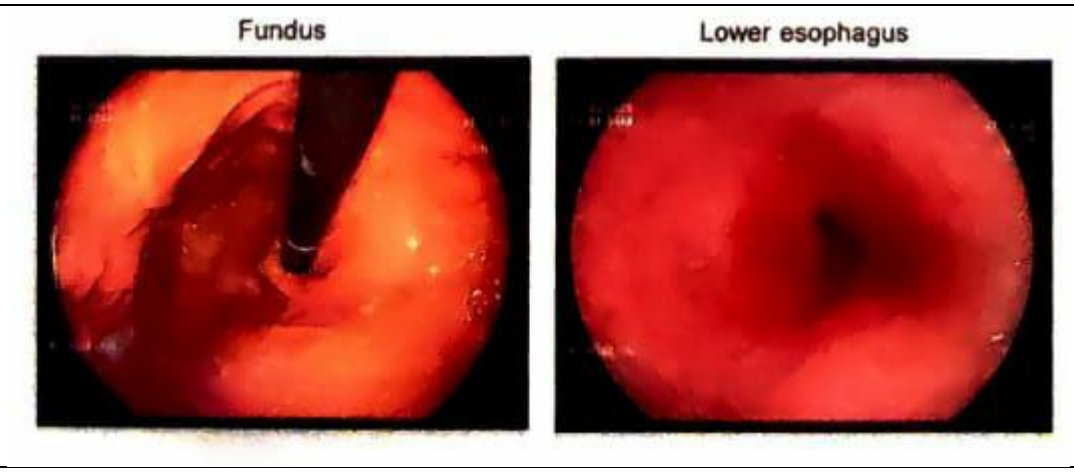


Figure 1: Barium swallow showed tapering at lower oesophagus

She subsequently underwent an upper oesophageal gastroscopy which revealed a fistulous opening at 22 cm from the incisor with minimal pus discharge. Stomach and duodenum were normal.



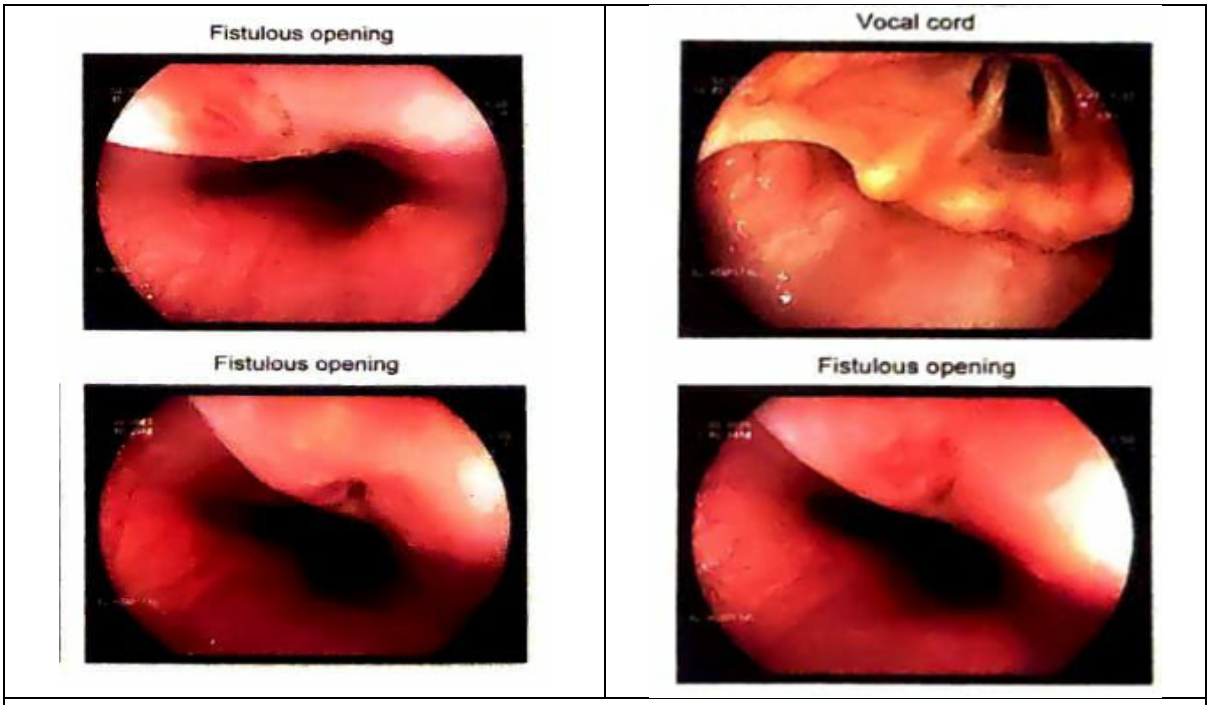


Figure 2

CT chest showed abnormal communication between trachea and oesophagus at T2/T3 level-suggestive of tracheoesophageal fistula. Multiple enlarged lymph nodes with few showing central necrosis were noted in pretracheal, paratracheal, subcarnial, right inferior jugular and right hilar regions, largest measuring 18x15 mm.

Bronchoscopy showed normal vocal cords and trachea. Mucosal secretions seen in segmental bronchi. Enlarged mediastinal lymph nodes with heterogeneous echogenicity were noted in subcarnial (level 7) region. BAL samples were obtained and sent for AFB smear, GENE-XPERT, cytology and fungal culture and cytology.

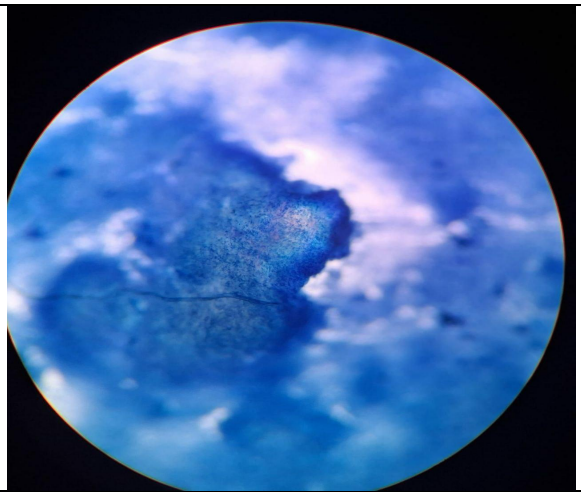


Figure 3: ROSE on BAL shows Granulomatous Lymphadenitis

Histopathology of the lymph nodes showed caseating granulomatous lymphadenitis favouring tuberculosis. However, no AFB was seen in the BAL fluid. KOH Mount for Fungal filaments and cultures were negative.

Considering the clinical features and diagnostic work up, a diagnosis of tracheoesophageal fistula secondary to tuberculous lymphadenopathy was arrived at. She was managed with anti-tubercular treatment and other supportive measures. She made sustained progress with abatement of her symptoms and was advised to close follow-up.

Discussion

TEF in adults is a rare but serious condition characterized by an abnormal connection between the trachea and esophagus. It can be congenital (often H-type) or acquired. When evaluating a patient with a TEF, especially secondary to

tuberculous lymphadenopathy, it is important to consider a broad range of differential diagnoses. Some common differentials include:

1. Malignancy
    - Esophageal carcinoma or tracheal carcinoma can directly invade and form a fistula.
    - Lung cancer or mediastinal tumors may also lead to TEF due to direct extension.
2. Infectious Causes
    - Tuberculosis: As seen in this case, tuberculosis can cause mediastinal lymphadenopathy, leading to fistula formation.
    - Fungal infections: Histoplasmosis or aspergillosis in immunocompromised patients.
    - Actinomycosis: Chronic infection that may involve the esophagus and trachea.
3. Traumatic and Iatrogenic Causes
    - Post-intubation injury: Prolonged mechanical ventilation with cuff-induced tracheal injury.
    - Esophageal perforation: Often secondary to endoscopic procedures, surgery, or foreign body ingestion.
4. Inflammatory and Autoimmune Disorders
    - Sarcoidosis: Can cause granulomatous inflammation leading to fistulization.
    - Granulomatosis with polyangiitis (Wegener's): Can present with airway involvement.
    - Radiation-induced injury: In patients with a history of thoracic radiotherapy.
5. Congenital Conditions
    - Congenital TEF: More common in neonates and infants but rarely diagnosed in adulthood if undetected.
    - H-type TEF: A specific congenital variant presenting later in life with recurrent respiratory infections.
6. Other Conditions
    - Esophageal diverticula (e.g., Zenker's diverticulum) with secondary erosion.
    - Aorto-esophageal fistula: Can mimic TEF, especially in cases of thoracic aortic aneurysm.
    - Foreign body ingestion: Leading to pressure necrosis and fistula formation.

Symptoms commonly include recurrent cough, aspiration, respiratory infections, dysphagia, and sometimes severe respiratory distress.

High suspicion is required in adults with odynophagia and unexplained chronic cough and recurrent pneumonia. Imaging modalities including contrast esophagography, CT (Computed Tomography) scan of neck and chest, bronchoscopy and esophagoscopymay be required to locate the fistula. Sometimes diagnosis occurs incidentally during surgery or investigation for respiratory symptoms.

Tuberculosis is a rare but documented cause of acquired TEF in adults. Unlike the more frequent etiologies-such as malignancy, prolonged intubation, and trauma-tubercular TEF results from granulomatous infection, often due to adjoining mediastinal lymphadenopathy with caseation that erodes into both the trachea and esophagus. Patients may present with chronic cough, dysphagia, constitutional symptoms, and recurrent aspiration or respiratory infections. The pathogenesis is thought to involve rupture of caseating mediastinal lymph nodes into adjacent structures, or, less commonly, direct extension from active tracheobronchial or esophageal TB. This emphasizes the need for high suspicion in endemic regions or immunocompromised patients presenting with compatible symptoms.

Diagnosis is established via imaging, endoscopy, and microbiological confirmation of Mycobacterium tuberculosis. [11,12]

Conservative management with antitubercular therapy has led to spontaneous closure of the fistula in several cases, though some patients require tube feeding or even surgical intervention if there is persistent fistula or life-threatening aspiration. [13] The prognosis for tubercular TEF is generally favorable with early detection and prompt initiation of anti-TB therapy. However, delayed treatment or severe systemic disease may increase morbidity. [14]

In patients with tubercular tracheoesophageal fistula (TEF), the duration of ATT (Anti-Tubercular Therapy) typically follows the standard regimen for extrapulmonary tuberculosis, often lasting 6 to 9 months. The initial Intensive phase includes 2 months of quadruple therapy with isoniazid, rifampicin, pyrazinamide, and ethambutol, followed by a continuation phase of 4 to 7 months with isoniazid and rifampicin. Extended treatment beyond 9 months is not required unless there is drug resistance or incomplete clinical response. [15]

Overall, early initiation and adherence to ATT with close follow-up are crucial for successful conservative management of tubercular TEF.

Conclusion

Tracheoesophageal fistula secondary to tuberculous lymphadenopathy remains a rare yet significant clinical challenge, particularly in regions with high tuberculosis prevalence. Early diagnosis through a combination of imaging, endoscopy, and microbiological investigations is crucial to prevent complications and ensure timely management.

While medical management with ATT remains the mainstay for tuberculosis-related TEF, multidisciplinary care involving pulmonologists, thoracic surgeons, and infectious disease specialists is often essential for optimal outcomes.

This report highlights the importance of maintaining a high index of suspicion for tuberculosis in patients presenting with respiratory symptoms, dysphagia, and recurrent aspiration pneumonia. Further research and case studies are needed to establish standardized management protocols for such rare presentations.

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