

Original Article**Esophagus Associated Lung Diseases- A Retrospective Study**

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Abstract

Introduction: Structural diseases of oesophagus such as trache-oesophageal fistula, achalasia and esophageal diverticula are frequent causes of aspiration related respiratory morbidity. In this retrospective hospital data based study we looked for esophageal causes in patients admitted with respiratory symptoms in Pulmonary Medicine ward.

Materials and Methods: We conducted a retrospective analysis of records of all patient admitted in the Pulmonary Medicine ward of a tertiary care teaching hospital in Kerala for a period of one year from 01-01-2016 to 31-12-2016 to identify oesophageal abnormality as the cause for their respiratory symptoms and needed help from Gastroenterologist for diagnosis and management. Patient medical history, results of radiologic evaluations, endoscopic findings and course in the hospital were used to gain information about the diagnosis and treatment.

Result: Out of the 946 patients treated during this period there were 4 cases where structural diseases of esophagus were found to be the cause for the respiratory symptoms. These patients together illustrate the spectrum of respiratory symptoms and problems caused by esophageal abnormality. Since these patients reported to Pulmonary Medicine for respiratory symptoms there is a delay of 3-14 days before final diagnosis is made. This also causes delay in seeking definitive treatment.

Conclusion: This study illustrates the respiratory involvement and potential consequences of diseases of the esophagus, the frequent delay in diagnosis and referral, and the outcome of those patients.

Keywords: Tracheo-esophageal fistula, Achalasia cardia, Diverticulum, Aspiration Pneumonia.

Introduction

Chest physicians generally acknowledge a link between esophageal disorders and respiratory diseases. This relationship is however complex and may manifest in a variety of clinical entities.

Gastro-esophageal reflux disease (GERD) is a common disorder and its relationship to airways disorders such as asthma has been well studied. Lung diseases other than asthma have also been associated with GERD. But the nature and scope

of the relationship between other lung diseases and GERD has not been fully evaluated. Apart from the functional abnormality of reflux, there are few structural abnormalities of esophagus which lead on to recurrent aspirations and devastating respiratory problems. The most common among these are esophageal achalasia, esophageal diverticulum, esophageal obstruction, and tracheo-esophageal fistula (Congenital or acquired). It is important for the pulmonary physician to consider the diagnosis of esophageal abnormality in patients with anorexia, chest pain, dysphagia, regurgitation, weight loss or chronic cough especially after food intake. Often these symptoms are attributed to less serious pathology, leading to delay in diagnosis of structural diseases of esophagus. Delayed diagnosis can result in more severe and potentially life-threatening complications such as aspiration pneumonia, lung abscess and empyema.

Aim & Objective

- To study structural diseases of esophagus as the cause for respiratory symptoms in patients admitted to the Pulmonary Medicine ward of a tertiary teaching hospital in North Kerala.

Materials and Methods

We conducted a retrospective analysis of case records of all patients admitted in the department of Pulmonary Medicine of the hospital, which is a tertiary care teaching hospital in a tribal district of Kerala and identified those admitted with respiratory symptoms and on investigation found to be due to abnormality of esophagus during the period of one year from 01/01/2016 to 31/12/2016. Patient medical history, results of radiologic evaluations, and endoscopic findings were used to gain information about the diagnosis. Records of four patients met the inclusion criteria for this study. These patients course in the hospital, time taken for a definitive diagnosis and delay in referral to the concerned specialists are noted.

Results

Total admission in the Pulmonary Medicine ward during the study period was 946 of which 4 patients had structural diseases of esophagus causing respiratory disorders in the form of pneumonia, lung abscess, pleural disease and bronchospasm. There were 2 males and 2 females and their age ranged between 52 to 76 years. Out of this one patient had acquired trachea-esophageal fistula, two patients had esophageal diverticula and one had achalasia cardia. All cases were diagnosed with the help of gastroenterologist and referred to surgeon for definitive management.

Case-1

A 72 year old female patient was admitted in medical ward with cough and breathlessness of 1 month duration. She had two previous admissions during the past one month and was treated as COPD exacerbation. During the previous admission she was intubated and mechanically ventilated for 4 days. She also was diagnosed to have mild disturbance in renal and liver functions. During this admission she was diagnosed to have right sided pleural effusion and thoracocentesis done removing 50 ml of hemorrhagic fluid. Follow up X- Ray taken on the next day showed multiple fluid levels and her symptoms worsened (Fig-1). A thoracic CT scan was performed and she was shifted to MICU for management. She was an emaciated patient with history of respiratory symptoms for one month. She had difficulty in swallowing and loss of appetite. This was attributed to her drugs including inhalers. There was tachypnea and hypotension. Total WBC count was 13200cells/mm^3 with neutrophilic predominance. Hb is 10.1 gm%. Blood sugar was normal. Blood Urea elevated with normal creatinine. Liver enzymes are elevated. Albumin was 3 gm/100ml. She was on inotropic support. Her initial x-ray showed right sided pleural effusion. The post thoracocentesis X-ray showed multiple opacities with air fluid level on the right side, and chest CT exhibited pleural effusion with air fluid level (Fig-2).

Dilated and distended esophagus was seen suggesting distal obstruction or communication with airways (Fig-3). Based on her X-ray and CT findings, a diagnosis of dysphagic pneumonia with pleural complication was made. Upper GI endoscopy showed a fistulous communication. Edge of the fistula appeared smooth and there was no evidence of acute inflammation or ulceration. Fibreoptic bronchoscopy was done in the ICU. A fistulous communication detected on the posterior wall of trachea 4 cm proximal to carina. Since she was desaturating further evaluation or biopsy was not possible. A tentative diagnosis of Chronic trachea esophageal fistula (TEF) was made. The duration of hospital stay before being referred for definitive treatment was 14 days.



Fig-1: X-Ray Chest PA view showing opacity right side with multiple air fluid levels.



Fig-2: CT Thorax axial view showing pleural effusion on the right side with multiple air pockets and collapsed right lung

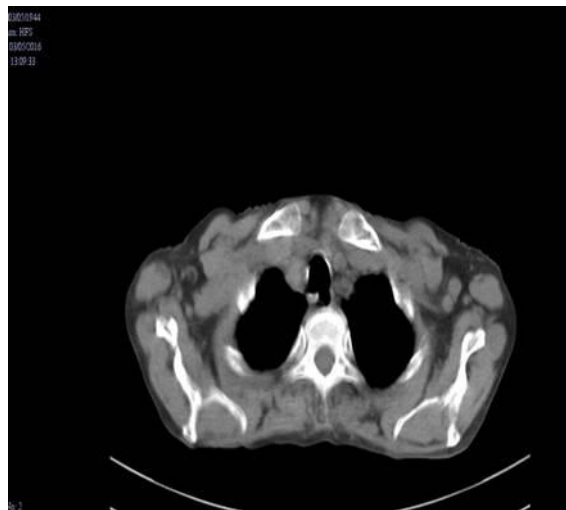


Fig-3: CT Thorax axial view showing trachea with fistulous communication to the esophagus

Case-2

63 year old female school teacher presenting with fever, body ache and cough for 2 days. Put on antibiotics as outpatient. No improvement on the second day. X-ray chest was ordered and case referred as Lung abscess. Clinically patient was febrile with profuse crackles on the right side. Her vital status was stable. Her history revealed a medical evaluation including upper GI endoscopy 2 years back. She was advised only periodic follow up. X ray chest of the patient on admission showed an opacity right lower zone with air fluid level suggestive of lung abscess (Fig-4). She was admitted as a case of aspiration pneumonia and lung abscess and put on antibiotics covering anaerobic organism. She was worked up for causes of aspiration. Routine blood examination was normal. Her random blood sugar was 184 mg% and Blood Urea 18mg%. Sputum culture was sterile. CT Thorax showed dilated and distended lower esophagus with filled up food particles (Fig-5) and parenchymal infiltrate right midzone and lower zone. Upper GI endoscopy revealed large diverticular sac (Fig-6). She stayed in the Pulmonary Medicine ward for 3 days before being referred to surgical gastroenterologist.



Fig-4: X- Ray Chest PA view showing opacity in right cardiophrenic angle with air fluid level.

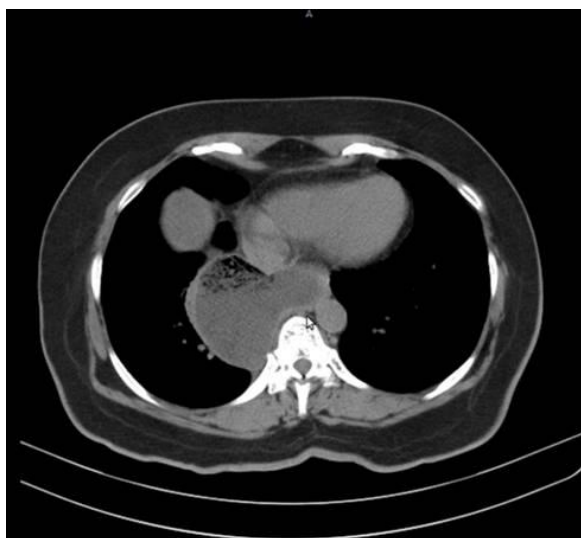


Fig-5: CT Thorax mediastinal window showing large diverticular sac of esophagus filled with food towards the right side.



Fig-6: Upper GI endoscopy showing large diverticulum with food material to the right side.

Case- 3

76 year old male patient was admitted with fever, cough and breathlessness of 5 days duration. He used to get recurrent respiratory symptoms for the last one year. Physical signs showed a febrile, tachypnoec patient with evidence of right lower lobe pneumonia. The white blood cell (WBC) count was $19,180/\text{mm}^3$ (neutrophil 80.0%, lymphocyte 18%, eosinophils 2%). X-Ray chest PA view showed non homogenous opacity right lower zone (Fig-7). Sputum gram stain did not show any organism and culture was sterile. He was put on empirical antibiotic with amoxicillin-clavulanic acid and supportive measures. Since his response to treatment was not satisfactory a CT thorax was taken which revealed dilated esophageal pouch at the lower end filled with food material (Fig-8). Endoscopy demonstrated a diverticular pouch. He was treated in Pulmonary Medicine ward for aspiration pneumonia for 10 days before being referred.



Fig-7: X Ray Chest PA view showing non homogenous opacity right lower zone suggestive of pneumonia

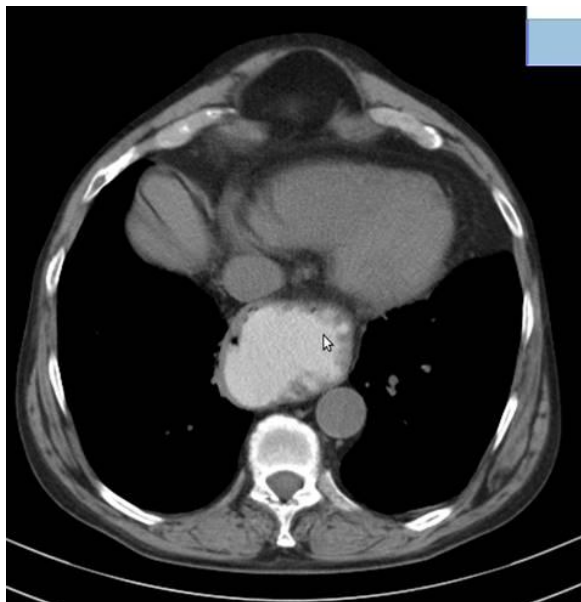


Fig-8: CT Thorax mediastinal window showing dilated esophagus with a diverticular pouch filled with food material

Case-4

A previously healthy 52-year-old male patient was admitted for cough and heartburn, which were aggravated at night. His symptoms had been ongoing for over 8 months. He also complained of breathlessness and wheeze. Physical findings showed an average built individual with bilateral polyphonic wheezes. His vital signs were stable and white blood cell (WBC) count was $14,440/\text{mm}^3$ (neutrophil 82.0%, lymphocyte 13.8%). A pulmonary function test (PFT) showed unremarkable findings (FEV1/FVC 80.7%, FEV1 2.26 L [70%], FVC 2.80 L). All other laboratory data were unremarkable. X-Ray chest showed right paracardiac shadow with air-fluid level. Shadow was extending to abdomen suggesting an esophageal origin (Fig-9). CT thorax revealed a dilated and distended esophagus filled with food material (Fig.10). Upper GI endoscopy revealed dilated esophagus with food stasis. Based on imaging studies and endoscopy findings a diagnosis of achalasia is made. He remained in the Pulmonary Medicine ward for 9 days and refused a referral to surgical gastroenterologist.



Fig-9: X Ray Chest PA showing right paracardiac opacity with air fluid level and extending to the abdomen.

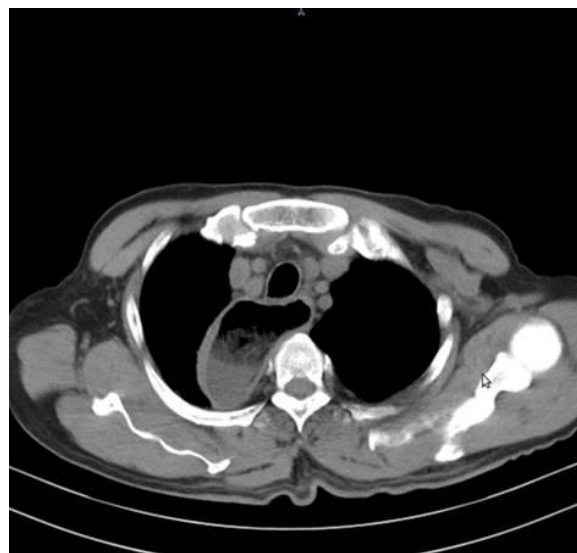


Fig-10: CT Thorax mediastinal window showing dilated esophagus with retained food material.

Discussion

Respiratory symptoms may be caused by diseases of another thoracic organ such as esophagus. In this study a series of esophageal diseases responsible for generating respiratory symptoms are evaluated. Diseases such as esophageal fistula, achalasia, esophageal obstruction, esophageal diverticula and gastro-esophageal reflux disease have been associated with respiratory problems, including aspiration, airway obstruction, asthma, bronchospasm, chronic cough, and laryngitis. These associations, which had been based on clinical observation, have recently been supported by upper GI endoscopy, contrast radiography and computerized tomogram.

The spectrums of symptoms caused by esophageal diseases, which mimic those caused by more common conditions, are illustrated by the case series in this study. Diverticula and achalasia may cause anorexia, chest pain, dysphagia, epigastric pain, halitosis, heartburn, nocturnal cough, odynophagia, regurgitation, or weight loss ^[1]. However, in as many as 40% of patients, the diverticulum will be asymptomatic ^[2].

Esophagogastroduodenoscopy is recommended for the detection of these pathology ^[3]. A delay in the diagnosis and treatment of trachea-esophageal fistula (TEF) and epiphrenic diverticula can lead to severe complications. Patients are at risk of regurgitation, nocturnal cough, gastrointestinal bleeding, and aspiration pneumonia ^[3]. Very severe, persistent aspiration can cause permanent damage to the bronchi leading to bronchiectasis. Patients with undiagnosed epiphrenic diverticula may also be at increased risk for cancer^{3}, which occurs at a frequency of 0.3% to 3% for patients with this condition ^[4].

Abnormal communication between trachea and esophagus can be either a late presentation of congenital tracheo-esophageal fistula or due to acquired causes such as post traumatic, post inflammatory or malignant diseases ^[5]. Tracheo-esophageal fistulas in adults are mostly due to malignancy. TEF due to benign causes are rare. Nonmalignant tracheo-esophageal fistula is caused by delayed presentation of congenital tracheoesophageal fistula ^[6] or presence of tracheoesophageal membrane which gets ruptured later on in life leading to tracheo-esophageal fistula ^[7]. It can be post traumatic due to foreign body ingestion, blunt or penetrating trauma, pressure changes during vomiting, endotracheal intubation or tracheostomy ^{[8][9]}. Post-operative causes of TEF are pulmonary resection and aortic aneurysm repair. Infectious diseases like tuberculosis ^[10], syphilis or histoplasmosis cause TEF either through infected lymph nodes or through empyema and lung abscess ^{[10][11]}. In AIDS patients, esophagitis is common, which may result in fistula formation ^{[10][12]}. The classical

clinical presentation of TEF is swallow-cough sequence (Ono's sign) ^[11].

Nocturnal aspiration is reported to cause recurrent aspiration pneumonitis in 10 % of all untreated patients ^[13]. Ellis, reporting on 269 patients treated for achalasia found evidence of aspiration pneumonia in 26 of them, one with a lung abscess ^[14]. Later, Rees et al. ^[15] described a history of single or repeated episodes of aspiration pneumonia in 14 of their 84 patients with achalasia. Effler^[16] reported pulmonary complications due to nocturnal aspirations of esophageal contents in 24 % of his subjects (n=100), 8 of them demonstrating radiologic evidence of pulmonary damage. Black et al. ^[17] found pulmonary symptoms in 46.3 % of their 108 patients. In most of these subjects symptom was productive cough. 8 patients (7.4 %) had choking attacks while 13 (12%) showed evidence of aspiration pneumonitis. Olsen^[18] in his case series of 601 subjects described acute and chronic pulmonary damage in 10 % of patients. Five of these patients had more chronic form of pulmonary infection caused by atypical mycobacteria. *Mycobacterium fortuitum* resistant to most antibiotics, may produce pulmonary infection by growing in a fatty supernatant fluid retained in the esophagus ^[19].

Among the acute situations which may occur secondary to achalasia, airway obstruction has been reported which required immediate intubation and myotomy ^[20]. Massive pulmonary aspiration remains one of the most catastrophic events that may occur during initiation of surgical treatment for achalasia patients. Allen and Clagett ^[21] reported that one of two deaths in their series resulted from aspiration during induction of anesthesia, obviously due to an incomplete preoperative esophageal toilet. Each patient must be carefully evaluated for the presence of retained food and liquid in the esophagus ^{[14][22]}

Conclusion

This study is an attempt to evaluate patients presenting with respiratory diseases due to primary pathology in the esophagus. This case series illustrates the breadth of symptoms and

potential consequences in respiratory system due to diseases of the esophagus. Often these symptoms are attributed to less serious pathology, leading to delay in diagnosis and result in more severe and potentially life-threatening conditions such as aspiration pneumonia and pleural complications. This also highlights the frequent delay in diagnosis and possible complications that can occur in the lungs. There is a delay of 3-14 days before final diagnosis is made with the help of in house gastroenterologist and hence a delay in seeking definitive treatment.

Conflict of interest

No financial disclosure and no conflict of interest

Acknowledgement

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