

A Novel Technique for Bedside Diagnosis of Tracheoesophageal Fistula in Mechanically Ventilated Patients

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ABSTRACT

Introduction: Pathological connections between the esophagus and the trachea or major bronchi are termed tracheoesophageal fistula (TEF) and broncho esophageal fistula (BEF), respectively. Most TEFs in adults are acquired.

Case report: A 36-year-old female patient with history of difficulty swallowing for 1 month diagnosed with Ca Esophagus (squamous cell carcinoma) was admitted to the Intensive Care Unit because of respiratory distress, with type 1 respiratory failure, and had tracheoesophageal fistula, diagnosed with nasogastric tube bedside.

Conclusion: Bedside diagnosis in a mechanically ventilated patient can be done with nasogastric tube and NGT bag. Both radiological and endoscopic procedures are complementary in diagnosis of TEF. Definitive diagnosis has been achieved using esophagoscopy or bronchoscopy, which provides accurate information about the size and the site of the TEF.

Keywords: Novel Technique, Diagnosis of Tracheoesophageal Fistula, Mechanically Ventilated Patients

INTRODUCTION

Pathological connections between the esophagus and the trachea or major bronchi are termed tracheoesophageal fistula (TEF) and broncho esophageal fistula (BEF), respectively. Most TEFs in adults are acquired as a result of malignancy (typically esophageal or lung), trauma, cuff induced tracheal necrosis from prolonged mechanical ventilation, traumatic endotracheal intubation, foreign body ingestion, prolonged presence of rigid nasogastric tube, and surgical complication.¹

TEF should be suspected in patients with a known risk factor who present with frequent coughing following solid and liquid intake, recurrent purulent bronchitis or pneumonia, recurrent aspiration, or unexplained malnutrition. Patients receiving mechanical ventilation may present with acute respiratory distress, worsening oxygenation, loss of tidal volume during ventilation, and gastric distension. Symptoms may develop over days to weeks (eg, those due to malignancy) while symptoms may be acute i.e. over hours in those due to intubation. The onset may also depend upon the location and size of the fistula in that large proximal TEFs may present earlier than smaller distal TEFs.²

Since the condition is uncommon and the symptoms are nonspecific, the diagnosis is often delayed.

CASE REPORT

A 36 year old female patient with history of difficulty swallowing for 1 month diagnosed with Ca Esophagus

(squamous cell carcinoma) was admitted to the Intensive Care Unit because of respiratory distress. The arterial PO₂ was 40.1 mm Hg and the PCO₂ was 32.1 mm Hg with a pH of 7.454. Due to severe respiratory distress and Type 1 respiratory failure she was intubated and put on mechanical ventilator support on SIMV mode. On chest auscultation, bilateral crepts were heard.

On hospital day 2, gastric distension was noted and gurgling sounds were heard from the mouth. Because TOF was suspected, a bedside fibreoptic bronchoscopy was done but did not reveal any abnormalities. A nasogastric tube was inserted and air bubbles were detected via an underwater seal through the nasogastric tube.

DISCUSSION

The early diagnosis and the treatment prevent long-term debilitating respiratory symptoms associated with the fistula. An esophagram and endoscopy should be performed in patients with suspected TEF.

In patients who cannot swallow (eg, mechanically ventilated patients), contrast studies may not be feasible such that chest computed tomography (CT) is an alternative. In most cases, bronchoscopy and/or endoscopy should be performed to confirm imaging findings and localize the fistula. However, recognition of smaller fistulas can be challenging especially if the mucosa is red and swollen. Orally administered methylene blue before bronchoscopy with observation of bubbles leaking into the airway has been described as helpful in identifying small fistulas.³

Bedside diagnosis in a mechanically ventilated patient can be done with nasogastric tube and NGT bag. Fitzpatrick et al. detected an air leak from a nasogastric tube via an underwater seal, during the inspiratory phase in a patient on assisted ventilation.⁴ Dakaraju et al. reported that polythene NGB ballooned out each time the lungs were mechanically inflated.⁵ Later, Rampaul et al. described this phasic inflation

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and deflation of the NGB with each respiratory cycle as the 'breathing bag' sign.⁶

Ortega-Carnicer et al described that over inflation of NGB associated with high O₂ concentration can be used to diagnose TEF.⁷

CONCLUSION

Both radiological and endoscopic procedures are complementary in diagnosis of TEF. Definitive diagnosis has been achieved using esophagoscopy or bronchoscopy, which provides accurate information about the size and the site of the TEF.

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