

The incidence of tracheoesophageal fistulas and its major determinant factors

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Abstract: *The tracheoesophageal fistula which occurred during oro-tracheal intubation of a patient in intensive care unit is a true challenge both in diagnostic and in therapeutic approach. The best treatment is prevention, by identifying risk factors but especially is important which the mechanism in the occurrence of tracheoesophageal fistula was. The occurrence of this complication in the evolution of hospitalized patients in ICU is accompanied by significant increase in mortality, contributing to negative prognostic. We have started a large multicentric study in April 2016 regarding all patients who required intubation longer than 7 days. The study will finish at the end of 2020. We are looking for a definite conclusion, in this moment we do not have enough data for a conclusion.[1, 2]*

INTRODUCTION

The tracheoesophageal fistula is an abnormal communication between the esophagus and trachea. It can be congenital or acquired. Most of them are congenital with a frequency of 1 to 3500/ 6000 births. In this case usually are associated, or appear within, with other birth defects (trisomy 13, 18 or 21, tetralogy of Fallot, other digestive problems or muscle skeletal VACTERL Syndrome (Vertebral anomalies, Anal atresia, Cardiac defects, Tracheoesophageal fistula and/or Esophageal atresia, Renal & Radial anomalies and Limb defects.)). Then, there are the malignant ones which appear in the posterior infiltrating tracheal wall or the anterior wall of the esophagus. The last ones are those acquired, non-malignant [1, 3, 4].

They occur particularly after a prolonged period of intubation with or without mechanical ventilation. Fistula can result from incidents of intubation

maneuver, in the operating room but especially in ICU. The first fistula appeared after a prolonged period of intubation and was initially described in 1956 by d'Avignon [2, 4].

Several factors are involved in these serious complications during a prolonged period of intubation. The most important and most discussed about in recent years is represented by the cuff pressure of orotracheal tube. If the cuff is overinflated, it leads to compression on the rear wall membranous trachea, which in time leads to ischemia and necrosis, basically forming an abnormal communication between the trachea and esophagus. Other possible complication of a hyper-inflated cuff is tracheal stenosis or bleeding erosion of a significant blood vessel. Often, both situations can occur simultaneously. The

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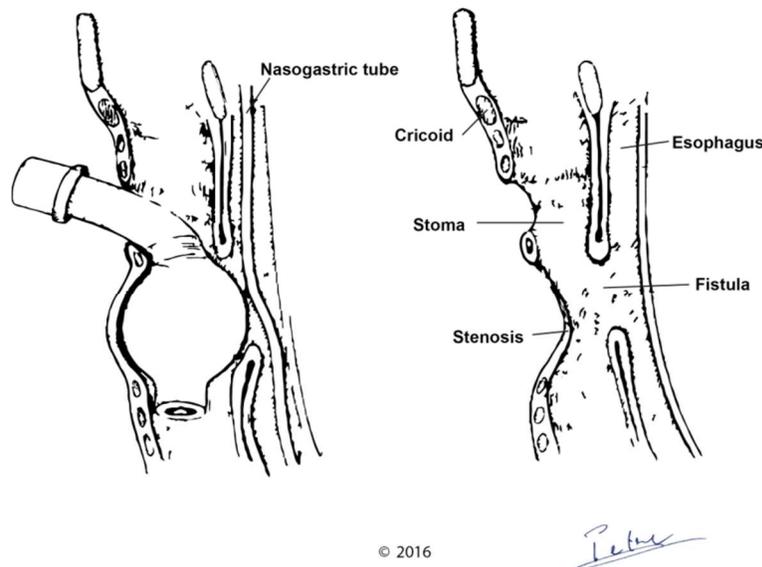
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tracheoesophageal fistulas were more common when the high cuff pressure tubes were used. Once with the use of tubes with high volume and low pressure cuff, the incidence of fistulas has dramatically dropped down. In the international literature the occurrence of these fistulae has a relatively low frequency, of approximately 1% [4, 5, 6].

The widely accepted indication is that the cuff pressure tube should not exceed 25 cm H₂O and the volume should ideally be of 6-8 ml air. More than 10

ml of air should raise the question about tracheal injury. There are data from multi-center studies which have shown dangerously high cuff pressure after patient mobilization. These recommendations are given after multiple multi-center, international researches, but the low pressure cuff has the same danger like the high-pressure ones. If the trachea is not fully secured, then the patient is prone to tracheobronchial aspiration, despite the good and high efficient nursing [7, 8].



The tracheostomy does not reduce the risk of tracheoesophageal fistula, the cuff of the cannula can injure the trachea in the same way. If the cannula's material is too rigid, the direct injury of tracheal wall may become possible through angulation [2].

The other factors involved in the occurrence of tracheoesophageal fistula are the presence of rigid nasogastric or orogastric tube, anemia, malnutrition, hypoxemia, anxiety, changing positions in bed, steroid treatment, advanced age, low perfusion from severe shocks [9, 10].

Tracheoesophageal fistula are located usually at the superior half of trachea, and in case of tracheostomy, 1-2 cm below the stoma [10].

The diagnosis of tracheoesophageal fistula is difficult. Suspicion of fistula is based on clinical signs: loss of air from breathing circuit, air on gastric tube, recurrent

pneumonia, etc. We can do clinical test by administering blue methylene on the tube, but the diagnostic choice remains the bronchoscopy, images of computed tomography and upper gastrointestinal endoscopy [8, 11].

Treatment is usually surgical; less invasive procedures can be performed particularly for smaller defects, consisting in placing endoscopic stents [12].

PATIENTS AND METHODS

We have started a large prospective multicenter study in two intensive care units, the Central Military Hospital and University Emergency Hospital, Bucharest, Romania. The study started in April 2016 and will finish in the end of 2020.

All patients admitted to the intensive care unit which required orotracheal intubation more than 7 days,

with or without mechanical ventilation, will be enrolled. Each observation paper will be attached in a special sheet and will include all the monitored parameters.

The parameters which will be monitored: counting days of orotracheal intubation, the pressure in the tube cuff, presence or absence of gastric tube, nutritional status of the patient, and hemoglobin during hospitalization, necessary of inotropic substances, presence or not of steroid treatment. Bronchoscopy will be performed regularly for early identification of changes of tracheal wall.

RESULTS

The occurrence of this complication in the intensive care unit of Military Central Hospital Bucharest during last five years was zero among the admitted patients (about 1500/year).

From 2,800 patients which were intubated, 1,100 needed tracheoesophageal intubation or tracheostomy more than 48 h. It is obvious that incidence of tracheoesophageal fistulas is inferior

compared to actual literature information. So, we are looking forward the results of this study, in this moment the data we have aren't enough for a conclusion.

DISCUSSION

Our study aim is to highlight exactly the incidence of tracheoesophageal fistulas among endotracheal intubated patients in the ICU and their determinant factors.

Early identification of these complications with direct impact on morbidity and mortality of patients is extremely important. Secondary occurrence of pulmonary fistula and subsequent contamination of the lung may results in severe suppurative complication. Prompt treatment, either conservative or surgical, should be immediately applied.

In conclusion, the occurrence of tracheoesophageal fistulas can be lowered by aggressive nursing measures and eliminating/correcting determinants, including days of orotracheal intubation.

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