

## CASO CLÍNICO

# Anaesthetic Challenges Raised by a Tracheal Prosthesis and an Airway Fistula

## *Desafios Anestésicos Colocados por uma Prótese Traqueal e uma Fístula na Via Aérea*

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### **Palavras-chave**

Anestesia Geral; Fístula do Sistema Respiratório; Fístula Traqueo-Esofágicas; Stents

### **Keywords**

*Anesthesia, General; Esophageal Neoplasms; Respiratory Tract Fistula; Stents; Tracheoesophageal Fistula*

## **ABSTRACT**

Esophageal neoplasm is the seventh cause of death from cancer in the world.

Malignant tracheoesophageal or bronchoesophageal or, less commonly, esophageal-lung parenchyma fistulas are late developments of advanced cancer of the esophagus, lung or mediastinum. The occurrence of an esophago-respiratory malignant fistula is a devastating complication. The presence of a respiratory prosthesis increases the risk. Its displacement can lead to several complications including total airway obstruction.

There are multiple anaesthetic problems presented by patients with respiratory fistulas.

We describe the anaesthetic management of a 56-year-old male patient with a metastatic esophageal cancer diagnosed with a malignant broncho-esophageal fistula and a tracheal prosthesis proposed to emergent laparotomy.

The anaesthetic management of a patient with an esophago-respiratory malignant fistula is a serious challenge. The presence of a tracheal prosthesis increases the risk of life-threatening problems during the anesthetic management. Multiple cares in the peri-operative period were mandatory.

## **RESUMO**

O carcinoma esofágico é a sétima causa de morte no mundo.

As fístulas malignas traqueo-esofágicas, bronco-esofágicas ou, menos frequentemente, entre o esófago e o parênquima pulmonar são complicações tardias de carcinomas avançados no esófago, pulmão ou mediastino. A ocorrência de uma fístula maligna esofago-respiratória é uma complicação devastadora. A presença de uma

prótese respiratória aumenta o risco. A sua mobilização pode condicionar várias complicações incluindo obstrução total da via aérea.

Há vários problemas na abordagem anestésica de doentes com fístulas respiratórias.

Descrevemos a abordagem anestésica de um homem de 56 anos com um carcinoma esofágico metastizado, diagnosticado com uma fístula maligna bronco-esofágica e uma prótese traqueal, proposto para laparotomia urgente.

A abordagem anestésica de um doente com uma fístula esofago-respiratória maligna é um desafio importante. A presença em simultâneo de uma prótese traqueal acresce risco de complicações potencialmente fatais durante a sua abordagem. No período peri-operatório foram mandatórios múltiplos cuidados.

## **INTRODUCTION**

Esophageal neoplasm is currently the seventh cause of death from cancer in the world. The disease's incidence varies widely.<sup>1</sup>

Malignant tracheoesophageal or bronchoesophageal or, less commonly, esophago-lung parenchyma fistulas are late developments of advanced cancer of the esophagus, lung or mediastinum.<sup>2</sup> The occurrence of an esophago-respiratory malignant fistula is a devastating complication for both patient and doctor.<sup>1</sup>

There are multiple anaesthetic problems presented by patients with respiratory fistulas.<sup>3</sup> Poor nutrition, repeated aspiration to the airway and episodes of pneumonia lead to rapid deterioration and death, if this condition is left untreated.<sup>2</sup>

We describe the anaesthetic management of a 56-year-old male patient with a metastatic esophageal cancer with a malignant broncho-esophageal fistula and a tracheal

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prosthesis proposed to emergent laparotomy, discuss the problems encountered and our approach.

## CASE REPORT

We present the anaesthetic approach of a 56-year-old male patient, ASA IV, with an esquamous cell esophageal carcinoma with mediastinal, cervical and abdominal ganglionic metastasis who underwent an emergent laparotomy due to acute abdomen.

This patient was a smoker (20 cigarettes per day during 30 years), alcoholic, in palliative care, being fed by a gastrostomy (due to repeated episodes of lung aspiration) with a body mass index (BMI) of 17.6 kg/m<sup>2</sup> and on domiciliary oxygen therapy. He had a tracheal prosthesis in the middle third of the trachea and an esophageal prosthesis in the proximal esophagus (between 21 and 35 cm). Furthermore, the previous bronchoscopy, performed two months before, had revealed a significant stricture of the main right bronchus, caused by invasion and external compression, he also had a fistula in the posterior wall at about 1 cm of the tracheal spur, that could not be corrected due to short caliber of the endobronchial lumen. Computed tomography scan of the thorax showed a communication of this fistula with the esophageal lumen.

He was admitted to hospital for dyspnea, abdominal pain and inferior limbs edema. On physical examination, he was frail (ECOG scale 2) and presented pain during abdominal palpation. The blood investigations, including blood gas analysis, were unremarkable. The thorax radiography revealed subphrenic free air (Fig. 1). This patient presented an intermediate risk of post-operative pulmonary complications (ARISCAT score: 34 points) and classe II risk of major cardiac events (according to the revised cardiac risk index for pre-

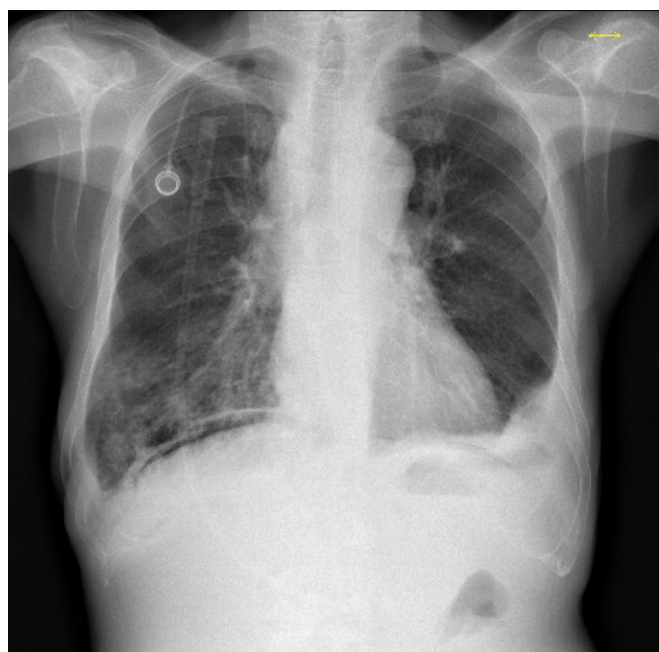


Figure 1. Thorax radiography

operative risk).

The surgical team decided to perform an emergent laparotomy. Due to the complexity and risks involved, a multidisciplinary approach was necessary. After discussion between surgeon, anaesthesiologist and pulmonologist it was decided to perform this surgical intervention under general anaesthesia with orotracheal intubation guided by bronchofibroscopy. The patient was aware of the serious nature of his condition and consented to anaesthesia and surgery. In the operating room he was monitored (standard monitorization, invasive arterial pressure TOF and BIS), a radial arterial cannula was inserted and he was premedicated with ranitidine 50 mg and metoclopramide 10 mg IV. Intubation was performed by a pulmonologist using bronchofibroscopy guidance and under light sedation achieved with fentanyl 50 µg and midazolam 1 mg. A 6.5 tube was used which cuff was deliberately placed at the level of the tracheal prosthesis in order to minimize its movements during intubation and extubation. The induction was achieved with propofol 50 mg and rocuronium 30 mg. Anaesthesia was maintained sevoflurane and he was ventilated with intermittent positive pressure, using pressure regulated volume control mode, to minimize inspiratory pressures. During the procedure a MAC between 0.7 to 0.9 and a BIS between 40 to 60 were kept. Analgesia was provided by fentanyl (total of 150 µg). All intravenous fluids were warmed and the inspired gases were warmed and humidified. The surgical procedure (abominal lavage and tightening of the gastrostomy) lasted for 90 minutes. At the end of this intervention decurarization was achieved with sugamadex 200 mg (4 mg/kg according to neuromuscular monitoring). There were no anaesthetic or surgical complications and the patient was smoothly extubated at the end of the procedure. The postoperative course occurred in the post-anaesthetic care unit and was also uneventful

## DISCUSSION

Bronchoesophageal fistulas are rare but represent a major anaesthetic challenge.<sup>3</sup> Normally, the goal of anaesthetic management in patients with a respiratory fistula is, first, to isolate the fistula using endobronchial intubation to prevent aspiration, and, second, to let the patient ventilate safely without applying any positive pressure to the fistula.<sup>4</sup> In this patient it was also mandatory to prevent the displacement of the tracheal prosthesis. Important issues to be dealt by the anaesthesiologist are as follows:

- Difficulty in oxygenation and/or ventilation depending on the site and size of fistula;
- Pulmonary changes due to recurrent aspiration;
- Ventilatory management;
- One-lung ventilation;
- Prevention of soiling of the other lung;
- Postoperative analgesia.<sup>5</sup>

Postoperative care must be directed to prevention and management of pulmonary complications.<sup>6</sup>

In this patient the anaesthetic approach was further complicated by the presence of a tracheal prosthesis.

Several problems related to airway and ventilatory management of this patient were faced. Due to the fistula, the right lung should be excluded, however the airway prosthesis precluded the use of a double-lumen tube (due to the higher caliber) and there were no bronchial blockers available. Another option was to maintain spontaneous ventilation using a neuroaxial anaesthesia technique. However the surgery proposed was a high laparotomy: both a subarachnoid block and an epidural block might have led to an emergent airway approach. Furthermore, an epidural block might not guarantee a sufficient anaesthesia, and a subarachnoid block could have led to significant cardiovascular changes. After discussing this case with the pulmonologist, the team was informed that there was a high probability of fistula closure. It was decided to perform an awake tracheal intubation under bronchofibroscope guidance, in order to place the tube's cuff at the level of the tracheal prosthesis to minimize its mobilization as it could have led to a total airway obstruction. The pulmonologist was present in operating room to accomplish a rigid bronchophybroscopy if needed and, as he had greater experience in the approach of airway prosthesis, he performed the intubation. If mechanical ventilation with positive pressure led to airway leak through the fistula the team was prepared to place the tube in the left bronchus under bronchofibroscope guidance. If the tracheal prosthesis was mobilized a rigid bronchoscopy and an emergent thoracic surgery would have been needed. The thoracic surgeon was present during the procedure and the rigid bronchoscope was in the operating room.

The anaesthetic management of a patient with an esophageal-respiratory malignant fistula is a serious challenge that by its own that obligates to multiple cares in the periooperative period. This patient had a tracheal prosthesis that also raised life-threatening problems during his anaesthetic management. In this case a meticulous pre-operative evaluation, was mandatory in order to optimize the patient clinical status and to be prepared to the possible devastating complications. To provide the best possible medical care it was necessary to weigh the risks and benefits of several possible approaches. The multidisciplinary discussion was essential to choose the best plan.

#### Responsabilidades Éticas

**Conflitos de interesse:** Os autores declaram não possuir conflitos de interesse.

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