



CASE REPORT

Gastric rupture during fiberoptic bronchoscopy, a rare complication of oxygen administration by nasopharyngeal cannula: a case report



Inês Sucena Pereira ^{a,*}, Luisa Ferreira ^b, Eduarda Tinoco^a, Teresa Shiang^a, Ana Oliveira ^a, Ana Isabel Pereira^c

^a Centro Hospitalar Vila Nova de Gaia, Pulmonology, Vila Nova de Gaia, Portugal

^b Centro Hospitalar Tondela, Anesthesiology, Viseu, Portugal

^c Centro Hospitalar Vila Nova de Gaia, Anesthesiology, Vila Nova de Gaia, Portugal

Received 13 June 2021; accepted 19 December 2021

Available online 29 December 2021

KEYWORDS

Bronchoscopy;
Gastric rupture;
Pneumothorax;
Pneumoperitoneum;
Cardiac arrest

Abstract Concomitant use of a nasopharyngeal catheter is frequently used for oxygen supply during fiberoptic bronchoscopy (FOB). This is a procedure that presents possible complications that are not negligible. We demonstrate the case of a 61-year-old woman who underwent FOB due to a history of hemoptoic sputum. During the procedure, gastric rupture occurred with a large pneumoperitoneum and bilateral pneumothorax requiring immediate drainage of the air and an emergent laparotomy. This was probably a complication of the nasopharyngeal catheter. The knowledge of these complications is essential for their correct identification and treatment. © 2021 Published by Elsevier Editora Ltda. on behalf of Sociedade Brasileira de Anestesiologia. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Introduction

Fiberoptic bronchoscopy (FOB) is a procedure with multiple diagnostic and therapeutic applications and is often used in patients with respiratory diseases. Desaturation, hemorrhage, and arrhythmias may occur during FOB¹ and are usually easily reversible complications. Patients should be monitored during procedure,¹ and complications should be dealt with in a timely manner if they arise. There are rarer and potentially serious complications and the exchange of experiences among professionals in this area is essential.

During FOB, and to counteract the expected desaturation, a nasopharyngeal catheter is frequently placed for oxygen delivery during the procedure. Complications associated with the use of this catheter are rare but, as a common adjunct to FOB, the awareness of their existence is important.

Case report

Sixty-one-years-old female patient, with a body mass index (BMI) of 19.7 kg.m⁻² (weight 46 kg and height 153 cm), former smoker, with a personal history of previous pulmonary tuberculosis and bronchiectasis, chronic gastritis,

* Corresponding author.

E-mail: ines.sucena@gmail.com (I.S. Pereira).

osteoporosis and depression. She had complaints of hemoptoic sputum, so she underwent FOB for further evaluation in the Bronchology and Interventional Pneumology suite.

The procedure was performed under sedation with 30 mg propofol and 250 mcg alfentanil by an Anesthesiologist. Patient was monitored with non invasive blood pressure, continuous pulse oximetry and ECG. A nasopharyngeal catheter was placed with a flow rate of 4 L.min⁻¹ of oxygen. At the beginning of the exam, with the scope still in the nasal fossa and with the patient on spontaneous ventilation, there was a sudden severe abdominal distention, associated with decreased lung expansion and rapid desaturation requiring immediate bag-mask ventilation.

As assisted ventilation was about to be initiated, the patient went into cardiorespiratory arrest with pulseless electrical activity that recovered after one cycle of advanced life support with uneventful orotracheal intubation. After intubation, subcutaneous emphysema was found at the neck and anterior chest wall. There was decreased respiratory sound in the left hemithorax, and percussion was tympanic, so a needle decompression was immediately performed in the second intercostal space in the medioclavicular line, and a thoracic tube was placed in the mid-axillary line aligned with the nipple position, with immediate escape of air. The distention of the abdominal wall slightly decreased after administration of rocuronium.

A chest radiography was performed on the bronchoscopy suite that showed diffuse emphysema and pneumoperitoneum (Fig. 1). It was hard to distinguish bilateral pneumothorax due to extensive subcutaneous emphysema. The patient was then transported to Radiology department to perform a CT (computed tomography) scan that revealed bilateral pneumothorax associated with extensive pneumoperitoneum (Fig. 2), and oral contrast extravasation to the peritoneal cavity, compatible with the presence of a gastric rupture. It further revealed that the left chest tube was in the abdominal cavity. Immediately after the computed tomography scan (CT scan), a right chest tube was placed with immediate air outlet.



Figure 1 Thoracic X-ray showing pneumoperitoneum and subcutaneous emphysema.



Figure 2 Thoraco-abdominal CT scan (coronal plane) showing bilateral pneumothorax, pneumoperitoneum and subcutaneous emphysema. The arrow points the drain located in the abdomen.

The patient underwent urgent exploratory laparotomy that revealed a 10-cm gastric laceration in the lesser curvature that was sutured.

Patient was extubated 24 hours after surgery and thoracic tube was removed three days after surgery. Patient was discharged from the Intensive Care Unit four days after surgery. There were no relevant complications during hospitalization to be reported.

A written informed consent to publish this case report was signed by the patient.

Discussion

Since the 1960s, some cases have been published of patients with gastric rupture and pneumoperitoneum²⁻⁵ who were receiving oxygen therapy through a nasopharyngeal catheter. Bearing in mind that the gastric rupture and clinical deterioration happened with the bronchoscope still in the nasal fossa, and the only procedure yet performed was the placement of the nasopharyngeal catheter, this led us to conclude that this was its potential cause. If we look at the cases already described in the literature, the site of gastric rupture is mostly located in the small gastric curvature,^{4,5} which is in agreement with our clinical case.

The mechanism by which gastric rupture occurs is not well established. There are a few hypotheses raised by some authors, the placement of the catheter below the cricopharyngeal muscle³⁻⁵ being the most easily understood. However, we should keep in mind that the use of anesthetic agents is also associated with decreased cricopharyngeal muscle

tone²⁻⁴ which may contribute to the accumulation of intra-gastric gas during inspiration. It should also be noted that the location of the catheter close to the oesophageal opening may also stimulate swallowing, which leads to aerophagia.^{2,4} All these mechanisms may be the cause of gastric air accumulation and consequent rupture, associated with the use of nasopharyngeal catheter.

This is an emerging, potentially life-threatening situation that requires immediate abdominal and thoracic decompression and laparotomy as soon as possible.

Although this is a rare complication, not directly related to FOB, the widespread use of nasopharyngeal catheters for oxygen delivery makes it essential for all bronchologists and anesthesiologists to know about this complication and how to manage it. The existence of these cases may question the use of these catheters as adjuncts to FOB but, if you need to use them, the confirmation of the nasopharyngeal catheter location with the bronchoscope³ and reducing the time with the nasopharyngeal catheter to a minimum⁴ may be a good solution. Replacing the nasopharyngeal catheter with a facial mask to administer oxygen^{3,4} may also be a good strategy. It is also important to bear in mind that, although FOB is a relatively safe exam, it is nonetheless invasive and with possible life-threatening complications, so it should always

be performed in a controlled environment with a resuscitation cart nearby and by a specialized team.

Conflicts of interest

The authors declare no conflicts of interest.

References

1. Du Rand IA, Blaikley J, Booton R, et al. British Thoracic Society guideline for diagnostic flexible bronchoscopy in adults: accredited by NICE. *Thorax*. 2013;68(Suppl 1):i1–i44.
2. El-Kersh K, Karnib H. Tension pneumoperitoneum associated with nasopharyngeal catheter oxygen delivery during bronchoscopy. *Am J Respir Crit Care Med*. 2017;196:785–6.
3. Velando AG, Nieto MJR, Aldeyturriaga. Perforación gástrica durante la broncoscopia al administrar oxigenoterapia por cánula nasofaríngea. *Arch Bronconeumol*. 2018;54:293–4.
4. Yao HHI, Tuck MV, McNally C, et al. Gastric rupture following nasopharyngeal catheter oxygen delivery - a report of two cases. *Anaesth Intensive Care*. 2015;43:244–8.
5. Cigada M, Gavazzi A, Assi E, et al. Gastric rupture after nasopharyngeal oxygen administration. *Intensive Care Med*. 2001;27:939.