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Airway Management with Supraglottic Devices While Transbronchial Cryobiopsies

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Abstract

Background and goal of study: Transbronchial biopsy (TB) is an endoscopic technique that allows the diagnose of pulmonary diseases. Recently, cryoprobes are being used in order to improve the diagnostic yield, they allow to obtein wider and of better quality samples of frozen tissue than the conventional biopsies. The execution of these bronchoscopic interventionist techniques is a challenge for the anesthesiologist and usually an endotracheal tube is used. We'll proceed to introducing a series of cases carried out in our hospital using supraglottic devices (SD) for airway management.

Material and Methods: Data about intraoperative management of patients who have undergone TB in the last year is gathered in a rectrospective way, indicated in the typification of neoplasias and the study of interstitial pulmonary diseases. Once the anesthetic depth goal had been reached, the SD was introduced. The SD chosen had to meet 3 requirements: first of all, it had to ensure the right ventilation of the patient; second, it had to provide a work canal big enough for the videobronchoscope and last, it had to allow the anesthesiologist intubate using the endotracheal tube if necessary. We selected the LM i-gel®. Moreover, an endobronchial blocker with spherical ball type Arndt was associated, enabling the anesthesiologist to plug a possible hemorrhage.

Results and Discussion: Our series includes patients ASA II e III. The same SD was used in all the cases. We also used the same bronchial blocker preventively in every case. No complications during the intervention were recorded, except for little hemorrhages that were quickly under control after haemostatic techniques. One of the cases had to be suspended due to a postradiotherapy stenosis that made imposible for the videobronchoscope to go thorugh.

Conclusion: In our experience, airway management during TB with SD assures the right ventilation and let enough space for introducing the necessary tools and sample's extraction. Besides, it is recommended using a bronchial blocker preventively, so to control possible iatrogenic complications related to this procedure; a previously prepared tracheal intubation set and an urgent access system to the thoracic surgery department. Taking everything into account, we consider that supraglottic airway devices could be an effective and safe alternative to the endotracheal tube for airway management in patients undergoing bronchoscopic interventionist techniques.

Keywords: *Transbronchial cryobiopsies; Supraglottic devices; Airway management; Endobronchial blocker; Anesthesiology*

Abbreviations: TB: Transbronchial biopsy; SD: supraglottic devices

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Introduction

The transbronchial biopsy is an endoscopic technique, that allows the diagnose of serious pulmonary diseases such as pulmonary masses or interstitial lung diseases. Recently, cryoprobes are being used in order to improve the diagnostic yield of this technique, for they allow us to obtein wider and of better quality samples of frozen tissue than the conventional biopsies. Though it is a new technique, transbronchial cryobiopsy eases the diagnose of pulmonary diseases, avoiding the execution of more invasive techniques as the usual surgical biopsy

The execution of these bronchoscopic interventionist techniques is a challenge for the anesthesiologist due to the patient's cormorbilities, the shared use of the airway, the procedure's complexity and the possible complications, being the pneumothorax and pulmonary hemorrhage the main ones.

There are not many articles regarding the management of the patient during the transbronchial cryobiopsy, and in the majority of cases we find endothraqueal tubes being used for the lung isolation. Now we'll proceed to introducing a series of cases carried out in our hospital using supraglottic devices for airway management.

Materials and Methods

Data about intraoperative management of patients who have undergone transbronchial cryobronchoscopy in the last year is gathered in a rectrospective way, indicated in the typification of neoplasias and the study of interstitial pulmonary diseases.

All the cases were developed in an exploration's room equipped with non-invasive hemodynamic monitoring, a respiratory assistance device, as well as a radiography mechanical arm. A team of three neurologists and five anesthesiologists participated in the whole serie.

Once in the exploration room, we proceeded to standard monitorization (EKG, SpO2, NIBP measurement, ETCO2) along with a monitorization of the anesthetic depth, which allows us to introduce the supraglottic airway device under the best conditions.

The induction was done the standard way, using propofol 2 mg/kg iv and fentanilo 1 µg/kg iv. Once the anesthetic depth goal had been reached (BIS® 40-60), the supraglottic device was introduced. After its introduction, right ventilation is verified through the auscultation of both lungs, checking the wave at the capnografhy and the pressure waves. An orogastric probe is also introduced in every patient through the gastric duct of the device.

The supraglottic device chosen had to meet three requirements: first of all, it had to ensure the right ventilation of the patient; second, it had to provide a work canal big enough for the videobronchoscope (2.8 mm diameter); and last, it had to allow the anesthesiologist intubate using the endotracheal tube if necessary.

The mask selected was the ML i-gel® (Intersugical Ltd., Wokingham, Berkshire, UK). Moreover, preventively, an endobronchial blocker with spherical ball type Arndt® (William Cook Europe, Denmark) was associated to the mentioned mask, enabling the anesthesiologist to plug a possible hemorrhage and isolate the remaining lung tissue from the hemorrhage.

The anaesthetic depth maintenance was made using TIVA with propofol. TIVA is preferred rather than sevofluorane and its bronchodilator effect in order to preserve the phenomenon of hypoxic pulmonary vasoconstriction, avoiding an increase of the shunt volume. We opted for a restricted fluid therapy and the maintenance of the temperature in a normal range. Due to the high pulmonary morbidity rate of these patients, we tried to avoid hyperinflation and autopeep by using low TV (6 ml/kg) and increasing expiratory time.

The endoscopic examination of the bronchial tree with a videobronchoscope was carried out through the laryngeal mask. Subsequently, we selected the pulmonary area desired under radiographic control, and checked the cryoprobe location. This way, transbronchial cryobiopsies were taken safely. Then, the cryoprobe was introduced through the flexible videobronchoscope. Cold was applied during three seconds and then retired, along with the videobronchoscope and the cryoprobe, with the tissue sample sticked to the opposite end. We tried to get at least four samples from each patient, though the number depended on the bronchoscopist's criteria, the appearance of complications, and the patient's tolerance. In all the cases, the cryobiopsies were done without any immediate complications. At the end of the examination, after checking that there was regular spontaneous breathing, the supraglottic device was retired.

Results and Discussion

Our series includes twelve patients ASA II – ASA III, aged between 55-85 years old. The same supraglottic device was used in all the cases, without any airway complications which impede ventilation through the laryngeal mask. We also used a bronchial blocker preventively in every case.

No complications during the intervention were recorded, except for little hemorrhages that were quickly under control after haemostatic techniques; therefore orotracheal intubation and lung isolation were not required. There were no pneumothorax nor death, and only one of the cases had to be suspended due to a postradiotherapy stenosis that made imposible for the videobronchoscope to go thorugh. Patients went home after 24 hours of observation and radiological control.

Conclusion

In our experience, airway management during endotracheal cryobiopsies with supraglottic devices, such as i-gel, assure the right ventilation and let enough space for introducing the necessary tools and sample's extraction.

Besides, it is recommended, using a bronchial blocker preventively, so to control possible iatrogenic complications related to this procedure; a previously prepared tracheal intubation set and an urgent access system to the thoracic department.

Taking everything into account, we consider that supraglottic airway devices could be an effective and safe alternative to the orotracheal intubation for airway management in patients undergoing bronchoscopic interventionist techniques.

Conflict of interest

The authors have no conflicts of interest to declare

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