



## EDITORIAL

### Flexible bronchoscopy in critical care units<sup>☆</sup>

### Broncoscopia flexible en unidades de críticos

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Since the introduction of flexible bronchoscopes (initially measuring 4.9 mm in diameter in the 1970s and posteriorly of other diameters), their use for diagnostic and therapeutic purposes in critical patients subjected to mechanical ventilation and in Intensive Care has become widespread. This number of the journal presents two studies<sup>1,2</sup> that describe the experience of two Spanish Intensive Care Units with flexible bronchoscopy.

Globally, both studies confirm that the technique is useful, with both diagnostic (microbiological studies of respiratory infection, identification of the origin of hemoptysis, etc.) and therapeutic indications (resolution of atelectasis secondary to the retention of secretions, difficult airway, etc.). Likewise, flexible bronchoscopy has been shown to be very effective as an aid to other procedures such as selective intubation or visual control during percutaneous tracheostomy. Considering these studies together with previous publications, it is notorious that although a large percentage of microbiological studies prove negative, flexible bronchoscopy makes a significant contribution to patient clinical management in almost one-half of all cases in which the technique is indicated.

There are practically no strict contraindications to bronchoscopy in the Intensive Care Unit. Nevertheless, there are situations characterized by a marked increase in risk in which the advisability of bronchoscopy should be assessed on an individualized basis, according to the benefit expected from the procedure. In this context, serious coagulation disorders, very severe and refractory hypoxemia, intense hemodynamic instability despite the use of vasoactive drugs, uncontrolled arrhythmias or acute myocardial ischemia are

all situations in which bronchoscopy is not advisable except when its use implies important potential benefit (e.g., the resolution of atelectasis). Patient ventilation with a tube under 8 mm in diameter is likewise not a formal contraindication. In fact, with adequate material and adopting the pertinent precautions, 7-mm and even smaller tubes allow us to perform bronchoscopy with fiber bronchoscopes of standard size and offering similar efficacy and safety results. In addition, there are bronchoscopes of smaller caliber that allow us to maintain a good number of the commented indications in Pediatric Intensive Care Units.

The most common indication of flexible bronchoscopy in the two mentioned studies was the collection of respiratory samples for microbiological study in patients with clinically or radiologically suspected respiratory infection. An early and specific etiological diagnosis of nosocomial pneumonia or ventilator associated pneumonia, or in patients with comorbidities or immune suppression, is of great prognostic relevance. In this sense it should be remembered that bronchial aspiration, and particularly bronchoalveolar lavage and telescopic protected catheter bronchial brush, are the most widely used techniques. In any case, it is necessary to apply the required quality controls in each procedure, in order to guarantee that the bacterial burden is representative. Bronchoalveolar lavage implies an important dilution effect; consequently, in order to assume probable pneumonia, we must perform a cell count (squamous epithelial cells and percentage of neutrophils and inflammatory cells) that allows the sample obtained to be regarded as optimum.

The obtainment of biopsies via bronchoscopy can also be useful in application to both endobronchial lesions (bronchial biopsy) and to lung parenchyma (transbronchial biopsy). However, in this latter case the potential risk-benefit ratio associated with the collection of parenchymal samples in patients with undiagnosed peripheral lung

<sup>☆</sup> Please cite this article as: Torrego Fernández A. Broncoscopia flexible en unidades de críticos. *Med Intensiva*. 2012;36:385–6.

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infiltrates and subjected to mechanical ventilation has not been well established, and further prospective studies involving new technical modalities (such as the use of cryoprobes) are needed in order to clarify the pertinence of this important indication. Both studies also mention other possible indications of interest, such as endobronchial drug instillation or the treatment of bronchial fistulas. There is no doubt that the diagnostic–therapeutic possibilities of flexible bronchoscopy are increasing, and that consequently part of this development can give rise to applications in critical patients.

With regard to safety, the data presented are consistent with the findings of earlier studies which suggest that bronchoscopy in the Intensive Care Unit is generally safe, and that while some patients (10–15%) develop complications during the procedure (hypoxemia, hypotension, tachycardia, extrasystoles, etc.), these tend to be transient and of scant clinical importance. Bronchoscopy is usually performed in the sedated patient (cough complicates or hinders exploration), and volume control is the most frequently used ventilation mode. For safety reasons, a 100% inspiratory oxygen fraction (FiO<sub>2</sub>) is used, and in order to lessen the risk of barotrauma we suspend positive end-expiratory pressure (PEEP) or keep it at  $\leq 5$  mmHg during the procedure. Nevertheless, if necessary, and under adequate supervision, bronchoscopy can be performed with pressure-controlled ventilation modes.

Flexible bronchoscopy is a pneumological technique that allows us to quickly visualize and gain access to the airway, with a broad range of diagnostic and therapeutic indications.

These characteristics, and the safety and efficacy data provided by the studies carried out to date, justify inclusion of the technique among the possibilities and resources available in the Intensive Care Unit. It is also clear that flexible bronchoscopy is an invasive procedure, and should be performed by people with the required theoretical knowledge and practical experience. In effect, the obtainment of good results is only possible if the professional performing the technique has received the required training, and in Spain such training (minimum rotation period of 5 months among residents) and healthcare activity corresponds to the Pneumology Unit. Thus, in hospitals with bronchoscopy units and pneumology duty shifts, this activity should be the responsibility of pneumologists—particularly of those specialized in respiratory endoscopy. In centers lacking these possibilities, or under concrete circumstances, other specialists (intensivists, anesthesiologists, chest surgeons, etc.) can be trained in the use and maintenance of bronchoscopy systems, and therefore may perform the technique in the Intensive Care Unit—though in this case the range of indications and uses is possibly more limited.

## References

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