

## From the Desk of the Editor

# Bronchoscopy in critically ill: Its benefit outweighs the risk

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Fiber optic bronchoscopy (FOB) has become an invaluable tool for the pulmonologists and intensivists to diagnose and treat various pulmonary conditions. It is increasingly being used in ICU for its safety and portability.

Common indications for FOB can be divided into diagnostic, therapeutic, and combined. The most common use of FOB in critical care is to collect samples for microbiological analysis in suspected pneumonia when antibiotic therapy fails or to investigate potential alternative diagnoses<sup>1</sup>. In critically ill non-intubated patient diagnostic yield of broncho-alveolar lavage (BAL) is about 59%<sup>2</sup>.

Aspiration of gastric contents into lungs is an independent risk factor for development of acute respiratory distress syndrome. In particulate gastric content aspiration with clear radiographic evidence of lobar collapse or major atelectasis, a therapeutic bronchoscopy may prove helpful<sup>3</sup>.

Prompt bronchoscopic removal of aspirated gastric fluid (if substantial volume is aspirated) and solid material from the central airways, reduce inflammatory reaction, preventing atelectasis, and reducing risk of infection. A volume of gastric aspirate >0.3 ml/kg of body weight (i.e. 20–25 ml in adults) and a pH <2.5 was traditionally thought to be necessary for the development of aspiration pneumonitis. However, aspiration of particulate food even if the pH>2.5 can cause significant pulmonary damage<sup>4</sup>.

FOB is used in lobar and complete lung collapse in mechanically ventilated patients who fail to respond to treatments such as physiotherapy or recruitment maneuvers. Local, directed suction combined with instillation of saline or mucolytics (e.g., N-acetylcysteine) can be used to treat airway plugging with mucous, blood, or secretions.

Hemoptysis is a challenging, potentially life-threatening medical condition. FOB plays a relevant role helping to diagnose the etiology, localize the site, and identify the source of the bleeding, essential for successful clinical management. Moreover, it allows for removal of clots, stopping active bleeding in certain cases (by means of bronchial blocker placement), and guiding angiographic embolization. In massive hemoptysis, flexible FOB may not be able to remove enough blood where rigid bronchoscopy (RB) is better option in comparison with FOB.

FOB is a safe procedure with a low incidence of complications. Mortality rate is as low as 0.01% with a major complication rate of 0.08–2%. Hypoxemia related to FOB is associated with an increase in cardiovascular stress and workload. Despite this, clinically significant major arrhythmias are infrequent. Increases in systolic arterial

pressure and heart rate during FOB are associated with ECG changes in 15% (ST-T changes in 4%, transient right bundle branch block in 3%). Unexpected ST changes have been reported in 21% of awake patients over 60 yrs. of age<sup>5</sup>.

However, the risks and benefits of bronchoscopy should be carefully considered in critically ill patients. The hypoxic patients in ICU pose a challenge as hypoxemia is one of the known complications of bronchoscopy, and this risk is exacerbated in patients with hypoxic respiratory failure. Bronchoscopy is relatively contraindicated in patients with severe hypoxemia and coagulopathy.

Bronchoscopy with BAL is associated with a worsened oxygenation, with an 80–86% reduction in PaO<sub>2</sub>/FiO<sub>2</sub> ratio from baseline regardless of the volume of BAL used<sup>6</sup>. To avoid this, we routinely increase the FiO<sub>2</sub> to 100% prior to starting the bronchoscopy. In case of persistent desaturation below 88%, bronchoscope should be withdrawn from the airway and either FiO<sub>2</sub> or PEEP should be increased. Patient's oxygen saturation should be increased to 95% or above prior to resuming the bronchoscopy.

The decision to perform FOB in critically ill patients should be on the balance between potential benefits and risks due to frailty of critically ill patients with good clinical justification at the circumspection of the clinician.



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