

## Is there a role for therapeutic bronchoscopy in acute severe asthma?

Sir,

Provided clinical expertise, bronchoscopy is considered safe in ventilated non-asthmatic patients.<sup>[1,2]</sup> At present, however, data regarding outcomes and safety of bronchoscopy in ventilated adult patients with acute severe asthma (ASA) (formerly known as status asthmaticus) is limited to few and mostly old case reports.<sup>[3-6]</sup> Regarding a recent interesting publication in the Saudi Journal of Anesthesia on this topic by Khan *et al.*,<sup>[7]</sup> there are some relevant aspects that need reviewing:

- The sticky secretions in the asthmatic patient may be so viscous that they form casts of the smaller bronchi, known as Curshmann's spirals. Together with edematous swelling of the submucosa, large agglomerations of mucus may obstruct segmental or even larger bronchi.<sup>[8]</sup> In intubated patients with ASA, severe bronchoconstriction, mucous plugging and air trapping make management challenging. These patients are at risk of profound hypoxemia, hemodynamic collapse and death.<sup>[9-11]</sup>

- The National Asthma Education and Prevention Program guidelines suggest that “permissive hypercapnia” or “controlled hypoventilation” should be utilized to reduce the risk of barotrauma.<sup>[12]</sup>
- If neuromuscular blockade is attained during the bronchoscopy it will reduce patient-ventilator asynchronies, but there is a potential risk of induced myopathy.<sup>[9]</sup>
- Based on intubated lung models, it has been shown that to maintain volume delivery and minimize auto-positive end-expiratory pressure (PEEP) the inner diameter of the endotracheal tube should be more than 2.0-mm larger than the outer diameter of the bronchoscope.<sup>[13]</sup>
- If bronchoscopy is performed, risk of complications is even higher. Adjustment of the ventilator settings by reducing airway pressures during the procedure may decrease alveolar ventilation and lead to hypoxemia, whereas keeping a target tidal volume may lead to barotrauma and hemodynamic instability from excess airway pressure and intrinsic PEEP.<sup>[11]</sup> Besides, it is known that bronchoalveolar lavage may worsen hypoxemia.<sup>[14]</sup> And, if thick secretions are to be removed, suction may be ineffective regardless of the scope’s working channel diameter. But there is more: It is important to time each pass with bronchoscope since time may go by without the bronchoscopist realizing it, so several rapid inspections and procedures would be preferred over a single long uninterrupted procedure.<sup>[11]</sup> All these factors should be accounted for when assessing risks of a bronchoscopy in patients with ASA.

Khan *et al.*<sup>[7]</sup> in their study have reported about two intubated patients whose asthma is refractory to medical treatment and are subjected to bronchoscopy for suspected mucus plugs. The authors inform of a significant improvement in airway pressures and gas exchange after bronchial lavage in both patients and no significant immediate complications, which is a remarkable finding. However, there are a few comments we would like to make:

- First, Case 1 had septic shock from unknown origin, but one wonders if pneumonia was the focus. Case 2 had community acquired pneumonia. In such cases, the patients’ mucous plugs might not be as sticky as those with ASA, so aspiration could be easier to perform.
- Second, both patients required FiO<sub>2</sub> of 100% for adequate oxygenation before the procedure. Then, one would expect worsening airway pressures and derangement of blood gases during the procedure, but data is missing.

- Third, there is no information on endotracheal tube size, external diameter of the scope, diameter of the working channel and other procedural details. These data would give insight in such a risky process.

So we ask: Is there a role for bronchoscopy in intubated patients with ASA? If such a procedure is undertaken there should be an ongoing monitoring to estimate the benefit to risk ratio on a constant bases: Airway pressures, tidal volume and hemodynamics and gas exchange. All this findings should be reported. Finally, the authors state that robust studies are warranted to explore the potential role of bronchoscopy and lavage in these patients. We think that such studies are unlikely to be performed given the low likelihood of bronchoscopic practices in intubated ASA patients. Even though, the outcomes of bronchial toilet reported by Khan *et al.* are quite impressive and possibly thought provoking for clinicians in charge of patients with ASA, caution and expertise are compelling in a high risk procedure and a life threatening situation.

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