An efficient method of bronchial aspiration through a flexible fibre-optic bronchoscope

Sir,

Atelectasis is common in intensive care unit patients as there are several risk factors such as decreased mucociliary clearance resulting in thick tenacious plugs, poor cough reflex, sedation, and an inflamed tracheal mucosa, resulting in bronchial obstruction. Urgent bronchoscopic removal may be a game-changer, but the bronchoscope working channel is of a narrow calibre, and thus, thick secretions are often not sucked out. We suggest a technique where a suction catheter is threaded over a paediatric bronchoscope and placed under vision at the area of mucus obstruction such that more effective suctioning can be performed.

A 40-year-old male weighing around 60 kg was tracheostomised on the pressure support mode of mechanical ventilation because of poor airway reflexes. About two days later, there was evidence of respiratory distress, and the chest radiogram revealed right-sided complete lung collapse. Various methods to clear out the secretions were tried, such as normal saline and hypertonic saline nebulisation, N-acetylcysteine nebulisation, physiotherapy using percussion methods, and suctioning, but there was no improvement in his condition. Fibre-optic bronchoscopy (adult size, 5.6 mm diameter) after pre-oxygenation and adequate sedation with fentanyl revealed the presence of thick mucus secretions which were very difficult to suck out using the bronchoscope suction channel. An 18 FG suction catheter was then rail-roaded over a paediatric flexible fibre-optic bronchoscope (FOB) after catheter hub modification [Figure 2a and b]. This was advanced into the right-sided bronchus through a 7.5 mm cuffed tracheostomy tube. After visual confirmation of the position of the suction catheter near the mucus plug, the bronchoscope was carefully pulled out and the catheter tip was left close to the mucus. Once the suction port of the catheter was attached to the suction machine, secretions could be cleared. All the vitals were monitored and maintained during the procedure. Repeat chest radiogram showed re-expansion of the right lung [Figure 1b].

Rodrigues et al. passed a Fogarty catheter over a flexible bronchoscope for the retrieval of impacted mucus in a case of total unilateral lung collapse. Catheter disruption, dislodgement of the tip, and incomplete removal are risks associated with this technique. A technique where a flexible bronchoscope with side-by-side attachment of a suction catheter was used has also been described. However, the diameter of the assembly would be large, obstructing almost the whole of the lumen of the endotracheal tube (ETT).

In this case, a paediatric bronchoscope with an external diameter of 3.4 mm, with a rail-roaded 18 G suction catheter and a total external diameter of 6.0 mm, was used. With this assembly, approach to the bronchus through a small-sized tracheostomy tube was possible. Some studies have shown that the maximum outer diameter of a flexible bronchoscope which can be passed through the ETT lumen is 7.3 mm for a tube size of 9 mm, 5.7 mm for a tube size of 8 mm, and 2.7 mm for a tube size of 6.5 mm.

A limitation of our technique is that the tip of the suction catheters is not blunt, and this may be traumatic to the

![Figure 1](a) Chest X-ray anteroposterior view showing right-sided complete lung collapse. (b) Right lung re-expansion after bronchoscopy

![Figure 2](a) Suction catheter without modification. (b) Suction catheter hub modified and rail-roaded over a fibre-optic bronchoscope
respiratory mucosa, although proper lubrication can prevent this.\[^5,6\] The concern of physical damage to the fibre-optic bronchoscope while rail-roading can be addressed by lubrication and using a suction catheter with an internal diameter about double the size of the diameter of the bronchoscope. While using an 18G catheter through a tube of an internal diameter of 7.5 mm, more than 50% of the lumen is occluded. However, the procedure takes less than 30 s, and by limiting the time, hypoxia in critically ill patients can be avoided.

As the bronchoscopic suction of thick secretions through a small-sized ETT is difficult to achieve, a wide calibre suction catheter reaching up to the mucus plug in the bronchus under direct vision to give an equivalent suction is a good alternative.

**Declaration of patient consent**
The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that his name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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There are no conflicts of interest.

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