Bronchoscopy examination of a patient with tracheobronchial injury having intractable cough: Role of sevoflurane sedation and paraoxygenation

To the Editor,

Anesthesia or sedation for intervention or examination of the tracheobronchial tree is a challenging task. Presence of an intractable cough during the procedure is distressing for the patient as well as the examiner. To achieve an adequate level of conscious sedation without obtunding the airway reflexes is the key to success in procedures where positive pressure ventilation may be hazardous. Obtaining sedation in such patients is challenging as the options are limited.

A 22-year-old, well-built, non-smoker, without any known comorbidity, presented to emergency with increasing breathing difficulty and intractable coughs for 2 days following a road traffic accident. He was asymptomatic on the day of the accident except for a small abrasion over the right scapular region; he did not attend any trauma or medical centre. Examination revealed pulse-rate 110 per min, blood pressure 110/76 mmHg, respiratory rate 24 per min, and room air saturation 96%. Emphysema over the anterior part of the neck and chest up to the nipple line, including the axillary area on both side (more on the right) was noted. These features suggested a possible mild pneumothorax, but, emergency X-ray and point of care ultrasound could not rule out pneumothorax due to subcutaneous air. The patient underwent an emergency
tracheobronchial examination under anesthesia/sedation; emergency tracheostomy was planned in case of airway compromise.

Intravenous Glycopyrrolate 0.2 mg, 3 ml of 2% xylocaine nebulization, and intravenous paracetamol 1 gm were administered. With standard American Society of Anesthesiologists’ monitoring, a 7.5 mm ID nasopharyngeal airway inserted and connected to the closed-circuit system of Mindray A7 workstation through endotracheal tube adapter, and 100% O\textsubscript{2} was delivered. The patient was asked to breathe with the mouth closed, and the anesthesiologist manually closed the other nostril to prevent leak. Sevoflurane concentration increased from 1 to 5% over 2 min, and MAC-age 0.6–0.8 maintained. The fibreoptic bronchoscope was inserted through the other nostril and revealed injury at the junction of the trachea and primary bronchus on the right side [Figure 1].

Tracheobronchial tree injury in blunt trauma can be caused by multiple mechanisms and the injury noted near the carina is explained by the shearing force theory.\textsuperscript{16} It is associated with inflamed airway, vigorous coughing, and air leak in surrounding tissue, which may cause pneumothorax and subcutaneous emphysema, and breathing difficulty.\textsuperscript{15} Bronchoscopy in this situation is often difficult due to the need for a calm and cooperative patient with obtundated cough and still keeping airway reflexes intact. Moreover, positive pressure ventilation in this situation, if required, may further aggravate the air-leak increasing breathing difficulty. The sedation should be aimed at maintaining spontaneous breath and obtundation of coughing. Controlled sevoflurane administration at a MAC\textsubscript{age} 0.6–0.8 suppressed cough, ensured control over the airway and kept airway reflexes intact while maintaining sedation and amnesia. Additionally, sevoflurane is a bronchodilator, non-irritant, and does not cause apnoea when used in an escalating dose.\textsuperscript{16} Furthermore, it helps to avoid the untoward effect of opioids and benzodiazepine. Miakami \textit{et al.} studied dexmedetomidine in Guinea pig for awake sedation and reported that it has a favourable effect on airway smooth muscle and cough suppression,\textsuperscript{17} but human data is not available. Dexmedetomidine-based conscious sedation can also be used in such patients, but, sevoflurane offers easy manoeuvrability of depth of sedation with intact airway reflexes.

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There are no conflicts of interest.

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**REFERENCES**

1. Sengupta S, Saikia A, Ramasubban S, Gupta S, Maitra S, Rudra A, \textit{et al.} Anaesthetic management of a patient with complete tracheal rupture following blunt chest trauma. Ann Card Anaesth 2008;11:123–6.

2. Zhao Z, Zhang T, Yin X, Zhao J, Li X, Zhou Y. Update on the diagnosis and treatment of tracheal and bronchial injury. J Thorac Dis 2017;9:E50-6.

3. Mohammed S, Biyani G, Bhatia PK, Chauhan DS. Airway management in a patient with blunt trauma neck: A concern for anaesthesiologist. Egyptian J Anaesth 2014;30:431-3.

4. Altinkok T, Can A. Management of tracheobronchial injuries. Eurasian J Med 2014;46:209-15.

5. Hyeon Oh J, Jun Hong S, Soo Kang S, Mi Hwang S. Successful conservative management of tracheal injury after forceful coughing during extubation: A case report. Anesth Pain Med
Can central venous oxygen saturation replace arterial blood gas sampling in patients with end-stage renal failure having arteriovenous fistula?

To the Editor,

A 50-year-old male patient with hypertension, diabetes, and end-stage renal failure on regular dialysis was admitted to our hospital for acute coronary syndrome. He underwent coronary artery angiography. Heparin was used for blood anticoagulation. Unfortunately, he developed intracranial bleeding and became unconscious. He was then shifted to our intensive care unit (ICU). He had Glasgow Coma Scale of 7 at the time of admission in ICU, so he was intubated and put on full ventilatory support of volume-controlled mode with \( \text{FiO}_2 0.5 \). Ultrasound was done with a plan to insert a catheter into the right internal jugular vein (IJV) to monitor the central venous pressure (CVP) and for fluid management. But this site had previously been used for dialysis catheter, due to which the IJV had a small diameter. It was decided to insert one catheter into the left IJV. Size 7 Fr triple lumen catheter (TLC) was inserted into the left IJV using Seldinger technique. The procedure succeeded in the first attempt. The monitor showed typical venous waveform with a pressure reading of 10 mm Hg. A blood sample was taken, through the proximal port of the TLC, to analyze venous blood gas. Surprisingly, it showed high oxygen saturation and high oxygen tension as if it was an arterial sample. It showed oxygen saturation of 97.8% with partial pressure of oxygen (\( \text{pO}_2 \)) of 107 mmHg. It gave the impression that the catheter had been inadvertently placed in the artery. The arterial blood sample from the right radial artery was taken, which showed a saturation of 97.9% with \( \text{pO}_2 \) of 124 mmHg. The operating physician informed the senior anesthesiologist, who ordered an immediate chest X-ray and another ultrasound. Both procedures confirmed that the catheter was in the vein and was placed correctly. We collected blood samples from the remaining two ports of the catheter. The middle port had a saturation of 96.3% with \( \text{pO}_2 \) of 96 mmHg. The distal port had a saturation of 87.6% with \( \text{pO}_2 \) of 57.8 mmHg. We noticed that the patient had an arteriovenous fistula (A-V fistula) in the left arm which was made for his intermittent dialysis.

In another case, a 61-year-old male patient with coronary artery disease, hypertension, chronic renal failure, and A-V fistula in the left arm got admitted with congestive heart failure. He was treated with diuretics, analgesics, and oxygen through a face mask at 5 L/min. A TLC was inserted in his left IJV for CVP monitoring and fluid management. Chest X-ray and ultrasound confirmed that the catheter tip was correctly placed. The blood samples taken from the proximal port, the middle port, and the distal port showed the saturation of 94.7%, 80.4%, and 70.1%, respectively, with \( \text{pO}_2 \) of 85.8, 44, and 38.1 mmHg, respectively. The blood sample taken from the right radial artery showed a saturation of 97.8% with \( \text{pO}_2 \) of 89.6 mmHg.

Patients with end-stage renal disease require hemodialysis. To facilitate dialysis, an AV fistula is made in the upper limb, most commonly on the left side. High pressure in the artery leads to backflow in the venous system.