

Video rhino-laryngoscope modified into a fiberoptic bronchoscope

INTRODUCTION

Obstruction of the central airway is a rare but life-threatening complication. Most common causes include mucus plugs, blood clots, foreign bodies and benign or malignant growths.^[1] Definitive treatment requires clearing of the airway with the use of virtual and fiberoptic bronchoscopy (FOB), microdebrider, bronchopulmonary lavage (BPL), and rarely pneumonectomy, depending upon the aetiology, patient's condition, urgency, availability of facilities, site of blockade and experience of treating clinician.^[2] We modified paediatric video rhino-laryngoscope (VRL) into FOB for clearing the bronchial obstruction.

CASE REPORT

A 68-year-old male patient, diagnosed case of Guillain–Barre syndrome, was referred to our Intensive Care Unit (ICU) for supportive management. Within 24 h of admission, the disease progressed acutely to involve thoracic muscles of respiration requiring intubation and mechanical ventilation (MV). For intubation, intravenous injections of fentanyl (100 µg), propofol (60 mg) and midazolam (2 mg) were administered, and patient was intubated with 8.5 mm cuffed endotracheal tube (ETT) and was put on MV. During the next 30–60 min, patient's oxygen (O₂) demand increased necessitating increase in fraction

of inspired O₂ from 30% to 80%, but he remained haemodynamically stable. Auscultation of the chest revealed decreased air entry on the right side. Arterial blood gas (ABG) analysis showed hypoxia with hypercapnia. Chest X-ray showed complete collapse of the right lung tissue with mediastinal shift to right [Figure 1]. A provisional diagnosis of right main-stem bronchus obstruction either due to blood clot or mucus plug was made.

As FOB was not available in the ICU, we decided to proceed with VRL (Karl-Storz 11101 Series, Michigan, USA) which was available in difficult airway cart in operation theatre. It was a paediatric version of VRL, with a working length of 30 cm. Due to its shorter length, it could not have been possible to reach up to the right bronchus if passed through the full length of ETT, and hence it was cut at 22 cm mark. A suction catheter of 8G was attached along the length of VRL and taped with micropore at four sites as the instrument does not have an in-built suction port [Figure 2]. This whole assembly was kept for 20 min in Cidex OPA solution for sterilisation. Care was taken to see that the taped micropore should not get loosened and dislodged within the airway at each point when the scope was withdrawn and number of tapes was counted each time after withdrawal. The arrangement was such that the tip of catheter was just short of the tip of VRL so that it should not hamper the vision but at the same time should be able to bend and follow the path of VRL [Figure 2]. It was passed through the lumen of ETT which revealed normal trachea and left main-stem bronchus. Examination of right bronchus showed large mucus plug completely obstructing the lumen just distal to the carina. With gentle to and fro movements of the newly designed

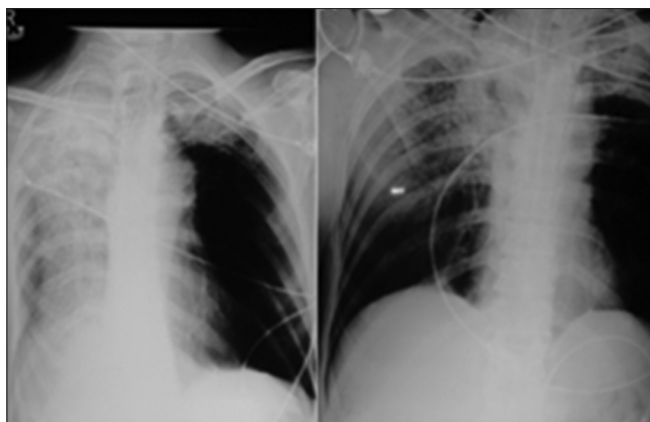


Figure 1: Pre- and post-procedure chest X-rays showing right lung collapse with mediastinal shift and re-expansion, respectively



Figure 2: Paediatric video rhino-laryngoscope taped with 8G suction catheter whose tip is falling just short of the tip of video rhino-laryngoscope

assembly and saline wash through the suction catheter, all the debris were cleared and patent opening of the bronchus could be visualised. Patient's O_2 requirement gradually decreased over next 4–6 h. ABG showed improvement in oxygenation, and X-ray chest revealed good aeration of the right lung tissue [Figure 1].

DISCUSSION

Airway gadgets, such as bronchoscopy,^[3,4] and microdebridors,^[5,6] are commonly used to clear central airway obstruction. Bronchoscopy helps in the diagnosis of tracheobronchial, thoracic and mediastinal lesions.^[3] It can be performed with the help of FOB, which remains the best modality for the evaluation of endoluminal and mucosal lesions of the respiratory tract or with virtual bronchoscope which provides an excellent overview of the trachea, main stem and lobar bronchi up to the fourth order.^[4] Microdebridors are excellent addition to the spectrum of interventions

available for the management of central airway obstruction with advantages including accuracy and immediate removal of debris without need for separate suctioning or limitation in oxygenation.^[5] However, many of the microdebridors, similar to our device, have short length (37 cm) which limits their use up to the trachea and proximal main-stem bronchi only.^[6]

In our case, as the FOB was not available and BPL was not feasible, we decided to proceed with VRL. It includes flexible endoscope with an integrated light emitting diode located in the handle for optimal illumination and a monitor for visual display. It has a working length of 30 cm, outer diameter of 3.7 mm, with 140° of deflection which provides large angle of view for ideal orientation. Lack of an in-built suction port is the major drawback of this airway gadget which was overcome by attaching a suction catheter using micropore tapes. The dislodgement of micropore tapes within the airway was a possibility precipitating the underlying obstruction. Alternatively suture tie to hold the catheter in place was also considered, but was not used due to the possibility of a tight knot kinking the lumen of suction catheter and a loose knot causing disconnection.

CONCLUSION

Availability of different airway devices such as FOB, microdebridors and adequate training of BPL are necessary to manage central airway obstruction. In circumstances where FOB and BPL facilities are not available, VRL can be used as alternative device on emergency basis to remove secretions and mucus plugs from the central airway. However, care must be taken to prevent accidental dislodgement of the micropore tapes within the tracheo-bronchial tree.

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Conflicts of interest

There are no conflicts of interest.

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