

Failed fibreoptic intubation: 70° rigid nasendoscope and Frova introducer to the rescue

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ABSTRACT

Endotracheal intubation was successfully accomplished with 70° rigid nasendoscope under video guidance in two patients in whom repeated attempts to secure airway with flexible fibreoptic bronchoscope were unsuccessful. Both patients had compromised airway (laryngeal papillomatosis and a huge thyroid swelling) and were uncooperative. Frova intubating introducer was used along with 70° rigid nasendoscope to accomplish tracheal intubation under video guidance.

Key words: Airway management, endoscope, goitre, laryngeal papillomatosis, nasendoscope

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INTRODUCTION

Awake fibreoptic intubation is considered as gold standard in difficult airway scenarios with a success rate of 87–100%.^[1] Common causes for failed awake fibreoptic intubation include severe distorted airway, lack of experience, presence of secretions or blood and inadequate topical anaesthesia.^[2] We report two cases of failed fibreoptic intubation in obstructed airway where 70° rigid nasendoscope in combination with Frova intubating introducer was successfully used.

CASE REPORT

Case 1

A 45-year-old male patient, a case of laryngeal papillomatosis was posted for CO₂ Laser excision. Telelaryngoscopy revealed a pedunculated, proliferative mass arising from both vocal cords near anterior commissure which was moving in and out of the glottis with each respiratory cycle [Figure 1a]. In the operating room, difficult airway cart was kept ready with an emergency tracheostomy kit. Initially, an awake fibreoptic intubation was attempted after anaesthetising the airway with 4 ml of 4% lignocaine nebulisation and transtracheal injection of 2 ml of 4% lignocaine.

Whenever an attempt was made to negotiate the flexible tip of the fibrescope by the side of the laryngeal mass, the entire view went blurred because of the tip coming in contact with the mass. Gentle force was applied a few times with an obscured view, but that resulted in bending of the flexible tip on the mass with a significant discomfort to the patient. As an alternate option, 70° rigid nasendoscope was attempted which gave a high-resolution panoramic view of the glottis when the tip was placed just in front of the uvula without touching any of the oral structures. Frova™ intubating introducer was advanced into the mouth through the retromolar space and brought into the view near to the glottis. Two ml of 2% lignocaine was sprayed on the glottis through the hollow stylet of the Frova intubating introducer. It was advanced across the glottis chink during expiration under vision [Figure 1b]. Correct

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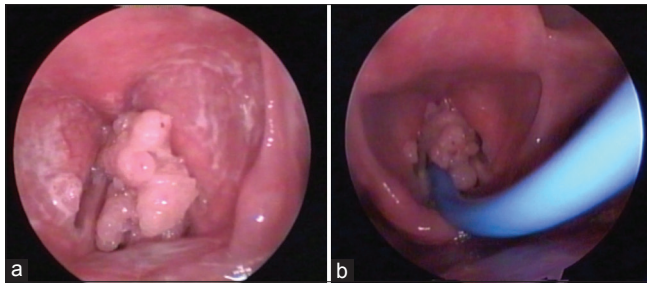


Figure 1: Case 1 - Telelaryngoscopic view of the glottis showing the mass (a) and 70° rigid nasendoscopic view showing Frova inside the glottis (b)

placement of Frova was confirmed using a capnograph after removing the stylet. Further, local anaesthesia was supplemented through the Frova with another 2 ml of 2% lignocaine, and a laser compatible 5 mm ID tracheal tube was railroaded over the Frova into the trachea under vision. Complete excision of the mass was done and trachea was extubated.

Case 2

A 60-year-old female patient weighing 55 kg presented with huge colloid goitre with stridor in the emergency department. She had no other symptoms and was clinically and biochemically euthyroid. The swelling was 12 cm × 10 cm × 12 cm in size extending from the angle of the mandible on the right side to the anterior border of the left sternocleidomastoid transversely and from the lower end of the jaw to the suprasternal notch vertically. The patient was extremely uncooperative. Airway examination revealed adequate mouth opening, prominent incisors, modified Mallampati grading III, restricted neck flexion and tracheal deviation to left. Radiological examination of the swelling showed lateral displacement of the trachea on antero-posterior view [Figure 2a] and no tracheal compression on lateral view. Telelaryngoscopic examination revealed the larynx being pushed towards the left lateral pharyngeal wall with a bulge in the posterior pharyngeal wall. Right aryepiglottic fold was seen prolapsing into the glottic inlet with inspiration. The vocal cords on both sides were hidden by the aryepiglottic folds and appeared mobile with normal and symmetrical mucosal wave pattern [Figure 2b].

Awake nasotracheal fiberoptic intubation was planned and the procedure was explained to the patient. Difficult airway cart including a rigid bronchoscope was kept ready in the operating room. After attaching monitors, oropharynx was sprayed with 10% lignocaine. The patient was positioned in a partial reclining position, and 7.0 mm polyvinyl chloride reinforced tube was

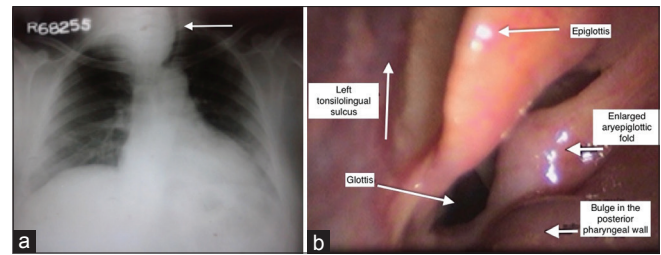


Figure 2: Case 2 - Chest X-ray posterior to anterior view showing deviated trachea (a) and telelaryngoscopic view showing distorted glottis (b)

mounted on the flexible fibrescope. Several attempts to negotiate the flexible tip across the glottis were unsuccessful. Visibility of vocal cords was hampered due to poor patient co-operation and continuous movement of the aryepiglottic folds which prevented the passage of flexible tip. An attempt was made to induce anaesthesia with sevoflurane, but the patient developed airway obstruction and there was difficulty in mask ventilation also. Inhalational agent was discontinued and the patient was awakened on 100% oxygen. 70° nasendoscope with Frova was considered as plan B intubation option. Image of the glottis was similar to that obtained with flexible fibrescope, but Frova intubating introducer could be guided across the glottis under direct vision as the view did not disappear even when the vocal folds were collapsing together. After confirming the correct placement of Frova with capnograph, lignocaine 2% was sprayed through the Frova, and 7.0 mm reinforced tracheal tube was railroaded over the Frova into the trachea. Surgery lasted for three hours and was uneventful. At the end of the surgery, when the patient was fully awake, trachea was extubated with the use of an airway exchange catheter.

DISCUSSION

Awake flexible fiberoptic tracheal intubation failed after several attempts in two cases and we were able to accomplish tracheal intubation in both the cases with 70° nasendoscope. Rigid 70° nasendoscope introduced through the mouth provides high-resolution view of the larynx without local anaesthesia. The side-on 70° angle gives full view of the glottis when placed in front of the uvula without touching any of the oral structures.^[3] It has been previously used by the authors in Pierre Robin sequence where styleted endotracheal tube was introduced under nasendoscope guidance in an anaesthetised spontaneously breathing child.^[4] However, under awake conditions, the image frequently disappears during the introduction of

styleted tube inside the mouth because limited space is available to manipulate the styleted tube. Instead, Frova intubating introducer can be introduced through retromolar space without disturbing the image and the endotracheal tube can be rail-roaded over it. Frova™ intubating introducer (Cook Critical Care, Letchworth, Hertfordshire, UK) is made of more rigid polyethylene and has a length of 65 cm, an outside diameter of 4.7 mm, with a flexible angulated tip of 65° and an internal stylet that can be inserted for rigidity up to the distal 5 cm. It is especially designed for orotracheal intubation and can also be used for emergency ventilation using a special connector. Though Frova has a high success rate for tracheal placement, it should be used with caution as it has the potential to produce airway trauma and haemorrhage, particularly when undue force is used to overcome any resistance.

In case 1, as the laryngeal mass was obstructing the glottis aperture, it was difficult to negotiate the flexible tip of the fiberoptic scope across the laryngeal mass; view invariably disappeared as the tip of the fiberoptic bronchoscope came in contact with the mass during dynamic movements of the laryngeal unit. In addition, railroading the endotracheal tube without seeing the mass can result in its dislodgement. In expert hands, the technique of using a flexible fibrescope is safe, but considerable difficulty in advancing the tracheal tube over the fibrescope occurs in 23% of cases.^[5] Videolaryngoscopy in awake patients with obstructed airway requires liberal use of local anaesthetics, and patient co-operation is mandatory.^[6] In addition, use of local anaesthesia can itself induce airway collapse resulting in complete airway obstruction even before an attempt is made to guide the endotracheal tube across the laryngeal mass.

In case 2, flexible fiberoptic-guided intubation failed because as soon as the flexible tip approached the glottis, active and excessive movements of the vocal folds hampered its advancement. The operator was blinded whenever there was an attempt to advance the flexible tip across the vocal folds, since the vocal folds came in contact with the tip and the entire view disappeared. 70° nasendoscope, on the other hand, proved to be useful since the view was side-on and not end on like flexible fibrescope. It provides better magnification and video-assisted continuous visualisation of the field during introduction of the intubating stylet and endotracheal tube.

The steps to use 70° rigid nasendoscope with Frova introducer for tracheal intubation are as follows: In step 1, patient is asked to open the mouth and protrude the tongue in supine position. In step 2, 70° nasendoscope is introduced inside the mouth under direct vision to position its tip in front of the uvula without making contact with any structures inside the mouth and the larynx will be visible. This procedure does not require local anaesthesia. If larynx is partially visible, nasendoscope can be tilted upwards by 10°–20° against lateral incisor and canine teeth space. In step 3, local anaesthesia is sprayed directly on the posterior pharyngeal wall and the base of the tongue. In step 4, Frova intubating introducer is introduced under vision inside the mouth and then under video assistance-guided between the vocal cords into the trachea. Local anaesthesia can be sprayed through the hollow stylet of Frova in the trachea and also on the vocal cords before advancing into the trachea. In step 5, correct positioning can be verified by removing the stylet and attaching the end-tidal carbon dioxide to the Frova introducer. In step 6, endotracheal tube is railroaded over the Frova introducer into the trachea.

CONCLUSION

70° rigid nasendoscope in combination with Frova intubating introducer can be a reasonable alternative in selected patients with compromised airway where awake fiberoptic intubation fails.

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Conflicts of interest

There are no conflicts of interest.

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