

Topicalisation of airway for awake fibre-optic intubation: Walking on thin ice

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ABSTRACT

Topicalisation of the airway by various techniques has routinely been recommended for awake fibre-optic bronchoscopy in cases of difficult airway. However, topicalisation by itself can cause airway obstruction by decreasing the tone of the laryngeal muscles and causing a dynamic air inflow obstruction. Two cases of difficult airway are illustrated where anaesthetising upper airway with nebulisation with 4% lignocaine (Xylocaine™) or 2% lignocaine (Xylocaine™) jelly resulted in stridor and upper airway obstruction. This is the first reported case of airway obstruction after lignocaine (Xylocaine™) jelly. We would like to highlight that topicalisation of airway, once thought as a relatively safe technique, can cause airway collapse if not detected and anticipated at the earliest. Pre-operative spirometry and airway ultrasonography can be useful in detecting the patients at risk of developing airway obstruction. Using a nasopharyngeal airway during topicalisation can serve as a valuable device in preventing total airway obstruction in susceptible patients.

Key words: Difficult airway, dynamic airflow limitation, topicalisation

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INTRODUCTION

Awake fibre-optic intubation (AFOI) is the gold standard for the anticipated difficult airway. In an awake, unprepared patient with excessive salivation, gag and cough reflexes can make intubation extremely challenging. Several highly effective topical and regional anaesthesia techniques are being practised which obtund these reflexes and facilitate intubation. These techniques of airway topicalisation are relatively safe with low complication rate. We report two cases of difficult airway where topicalisation with lignocaine (Xylocaine™) resulted in stridor and upper airway obstruction, (one after nebulisation and second after anaesthetising nasopharynx with lignocaine jelly). This is probably the first reported case where lignocaine (Xylocaine™) jelly instilled in nasopharynx resulted in such a complication. Written consent has been taken from the patients for reporting and publishing these complications of local anaesthesia.

CASE REPORTS

Case 1

A 56 years old, 76 kg, hypertensive female patient presented with complaints of ulcer on the lateral

border of the tongue. She had a thick tongue with a limited protrusion, short neck and mallampati Grade 3. She was posted for partial glossectomy with neck dissection. She had no history of psychiatric problems or drug allergy. In view of anticipated difficult intubation, she was planned for awake fibre-optic nasotracheal intubation. Injection glycopyrrolate was given intramuscularly before shifting to the operation theatre. In the operation theatre after applying standard monitors and intravenous access, the airway was nebulised with 4% lignocaine (4 ml) in propped up position. Airway blocks could not be administered because of the presence of large neck nodes. Two to three minutes later, she suddenly developed stridor and difficulty in breathing, and her saturation dropped to 90% associated with tachycardia and hypertension. A 7.0 size thermo softened endotracheal tube was

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immediately introduced through her nostril and fibre-optic bronchoscope-guided intubation was done. Bronchoscopy revealed normal vocal cords with no evidence of laryngospasm or paradoxical movement of the vocal cords. Following intubation, her saturation and vitals returned to normal. She was administered general anaesthesia thereafter and the intraoperative period was uneventful. At the end of surgery, the trachea was not extubated electively and she was shifted to post-anaesthesia care unit with endotracheal tube *in situ*. She was extubated the next day over an airway exchange catheter.

Case 2

A 45 years old, 70 kg, male diagnosed case of carcinoma thyroid presented with a huge thyroid swelling with retrosternal extension. He complained of hoarseness of voice of 2-month duration and recent onset of dysphagia. A pre-operative direct laryngoscopy examination revealed left vocal cord palsy. Airway examination revealed modified Mallampati Grade 2 with a large neck mass and restricted neck extension. Airway ultrasound with linear probe (5–12 MHz) confirmed left vocal cord palsy and mild narrowing of trachea [Figure 1].

He was planned for AFOI under spray as you go (SAYGO) technique. Injection glycopyrrolate was given intramuscularly before shifting to the operation theatre. Following standard monitors and intravenous access, xylometazoline nose drops and liberal amount of lignocaine (Xylocaine™) 2% jelly (approximately 15 mg) was instilled in right nostril for lubrication and anaesthetising up to the nasopharynx. Within a minute, the patient developed stridor. Immediately, fibre-optic bronchoscopy was done, and to our surprise widely abducted vocal cords [Figure 2] were seen. The

endotracheal tube was railroaded over the bronchoscope without any resistance. His perioperative period was uneventful, and we extubated him the next day under fibre-optic guidance ruling out tracheomalacia.

DISCUSSION

Topicalisation of airway is the spreading of local anaesthetic over a region of mucosa to achieve local uptake and neural blockade of that region. Various techniques used are nasal packing, gargles, 10% lignocaine spray, nebulised or atomised 4% lignocaine, SAYGO, superior laryngeal nerve blocks and trans-tracheal instillation of the local anaesthetic. As regional nerve blocks were not feasible in both the cases due to neck mass, we resorted to nebulisation/SAYGO technique for anaesthetising the upper airway. In both the cases, the probable cause of airway obstruction was the loss of upper airway muscle tone,^[1] which had exacerbated collapse of upper airway structures during deep inspiratory efforts due to panic. Pre-existing swelling of supraglottic structures could have an additive effect. The loss of airway tone was precipitated by nebulisation in the first case while in the second case mere instillation of lignocaine (Xylocaine™) jelly caused significant supraglottic anaesthesia. Both the patients did not receive any sedation which could have been catastrophic. Functional stridor and paradoxical vocal cord movement^[2,3] were unlikely because the Glottic inlet, briefly observed during the passage of the bronchoscope in both the cases, did not appear to be the cause of the obstruction.

Local anaesthesia of the upper airway is known to cause a decrease in maximum inspiratory flows and



Figure 1: Preoperative ultrasound image showing vocal cord palsy

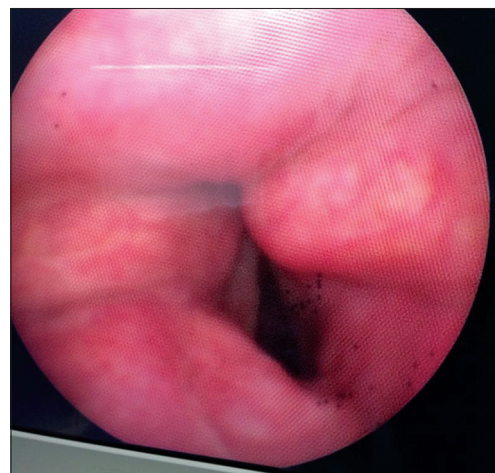


Figure 2: Bronchoscopic view showing no paradoxical movement just before intubation

supraglottic airway pressures.^[4-7] Preoperatively, computed tomography, magnetic resonance imaging, and ultrasonography can delineate static structural abnormalities. Spirometry in the form of a flow-volume loop may detect dynamic airflow obstruction. However, there are no imaging and spirometry criteria to predict severe or complete airway obstruction after local anaesthesia. One could only speculate that failure of the patient to perform the flow-volume loop exercise or successful performance with alarming results would indicate critically compromised upper airway with very little margin of safety, and would suggest that there is a significant risk of complete airway obstruction after local anaesthetic.

We suggest that nebulisation with local anaesthetic be done with a splitted nasopharyngeal airway *in situ* as it will provide a mechanical support and prevent the collapse of upper airway. The patient should not be left unattended and unmonitored during nebulisation with local anaesthetic. However, non-invasive it may seem, airway topicalisation should be carried out in the presence of a competent and experienced bronchoscopist. Equipment for an emergency surgical airway should be on standby in the operating room. Topicalisation and airway blocks for AFOI should always be done in the operation theatre in the presence of a difficult airway cart. It is also prudent that in such patients, trachea be extubated the next day over an airway exchange catheter.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the

patients have given his their consent for their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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