Case Report

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Triad of safety, efficacy and patient comfort: videolaryngoscopic awake nasotracheal intubation using a lignocaine and propofol based technique

Abstract

Currently there is a paucity of guidelines for anticipated difficult airways but awake intubation holds a pivotal position in all of these. Although awake fiberoptic intubation has long been considered the gold standard for difficult airway, awake videolaryngoscopic intubation is a promising alternative which is safe and effective, with myriad benefits like shorter duration of intubation, lesser technical skills required, shorter learning curve and better visualization when blood, copious secretions, tenacious sputum or debris obscures the glottic view. A detailed description of a lignocaine-topicalization with adjunctive propofol-sedation based technique for awake C-Mac D-Blade videolaryngoscopic intubation for anticipated extremely difficult airways in three patients follows.

Keywords: Awake intubation, C-Mac D-blade, lignocaine, propofol, videolaryngoscope.

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Introduction

Safety is the key-factor behind keeping the patient awake and preserving spontaneous respiration while securing an anticipated difficult airway. Currently, awake fiberoptic bronchoscopy (FOB), is universally regarded as the gold standard for anticipated difficult airways. Patient compliance is a key-factor for successful awake FOB and the price of safety is patient discomfort. But, the advent of videolaryngoscopes has unlocked a new option for awake endotracheal intubation, which may prove superior to awake FOB in certain aspects.[1] In situations where FOB may fail due to excessive secretions/blood/slough in the oral cavity, videolaryngoscopes hold a better chance at endotracheal intubation. Also, the time taken and reliance on patient compliance is reduced while patient comfort is enhanced.[1] Skills required for videolaryngoscopy are more easily mastered since they represent the next level of the already familiar rigid laryngoscopy. Moreover, taking into consideration the ongoing COVID-19 pandemic, videolaryngoscopic intubation is safer for the anesthesiologist as well and is strongly advocated by the current guidelines.[2] We present a case series of three head-neck onco-surgical patients with anticipated extremely difficult airways whose nasotracheal intubation was successfully accomplished using awake C-Mac D-blade (Karl Storz, Tuttlingen, Germany) videolaryngoscopy[3] using a local anaesthetic and propofol based technique.

Case series

A uniform technique was employed for preparation of all three patients for awake videolaryngoscopic intubation (Figure 1). After application of standard monitors and securing an intravenous line in the Operation Theatre, nebulization with 4% lignocaine was initiated. A BIS-electrode strip was applied to the forehead while the patient was being nebulized followed by nasal preparation, transtracheal block and propofol infusion in that sequence. Nebulization with 3ml 4% lignocaine over 10 minutes, transtracheal block with 2ml 4% lignocaine and 2 puffs (10mg each) of 10% lignocaine spray over the glottis was followed by nostril preparation in all three patients. The patient was counselled about receiving an injection in the neck, to hold his breath at end-expiration and avoid swallowing movements during the transtracheal block procedure. With the neck extended in supine position, the cricothyroid membrane was identified in the midline between thyroid and cricoid cartilages. Stabilizing the trachea with the thumb and middle finger of left hand, the right hand with continuous aspiration was used to puncture the cricothyroid membrane perpendicularly, with a 20G needle attached to a 5ml syringe filled with 2ml 4% lignocaine and 3ml air. Lignocaine was injected at end expiration, once bubbles due to air aspiration were observed in the syringe and the needle swiftly withdrawn. The patient then inspired/coughed which disseminated the local anaesthetic throughout his airway.

El- Ganzouri Score		Patient 1	Patient 2	Patient 3
Mouth opening (cm)	≥4 (0) <4 (1)	1	1	1
Thyromental Distance (cm)	>6.5 (0) 6-6.5 (1) <6 (2)	1	2	2
Ability to prognath	Yes (0) No (1)	1	0	1
Body weight (kg)	<90 (0) 90-110 (1) >110 (2)	0	0	0
Modified Mallampati Grade	I (0) II/III (1) IV (2)	2	2	2
H/O Difficult Intubation:	No (0) Questionable (1) Definite (2)	2	2	0
Neck movement (Degrees)	>90 (0) 80-90 (1) <80 (2)	2	2	2
TOTAL	0-12	9	9	8
Propofol Consumption (mg)		80	60	30
Nasotracheal Intubation Time (Seconds)		30	90	22

Figure 1 Analysis of airway difficulty, time required for nasotracheal intubation and propofol consumption in the three-patient series.

The more patent nostril was selected beforehand by reviewing the MRI/CT image of the patient, point of care ultrasonography and by digital examination. The measures adopted for nasal preparation, included asking the patients to draw in 2% lignocaine jelly (2ml through the more patent nostril) via the nasal route and nasal packing with xylometazoline soaked ribbon gauze. A bispectral index guided propofol infusion (10mg/ml @ 120ml/h) was started in all three patients. Once a BIS value of 65-70 was attained the infusion was discontinued and awake videolaryngoscopic nasotracheal intubation was attempted using a C-Mac D-blade videolaryngoscope. The first patient was a 50year old 57kg male with a restricted mouth opening, poor dentition and stiff neck post Commando surgery and radiotherapy (El Ganzouri Index (EGI) score: 9)[4] posted for flap revision and locoregional flap repair. During awake intubation, the cuff of the flexo-metallic cuffed endotracheal tube (FMCETT) had to be inflated with 3ml air to angulate it enough to reach the glottis. Once the tip of the FMCETT disappeared through the glottis, the cuff was deflated and the remaining portion was slided into the trachea.

The second patient was a 67year old 48kg male who had undergone previous left extended mandibulectomy with wide local excision (Commando surgery) with free fibular flap repair and had a restricted mouth opening along with a grossly distorted airway anatomy and an orocutaneous fistula. He had received 6 cycles of chemotherapy and 33 cycles of radiotherapy post-surgery. He was now posted for revision of the free fibular flap with a pectoralis major myocutaneous flap (EGI Score 9). During awake-intubation, a Boedecker forceps was utilized to guide the tip of the FMCETT through the glottic opening taking care to avoid grasping the FMCETT-cuff during the manipulation.

The third patient, a 67year old lady weighing 60kg was an operated case of carcinoma buccal mucosa with free fibular flap repair, with restricted mouth opening, posted for multiple dental extractions (EGI score 8). The FMCETT got impacted at the glottic opening and had to be rotated 90 anticlockwise to enter the glottis. Time to intubate was 30 secs, 60 secs and 20secs and the amount of propofol used was 140 mg, 60 mg, and 148 mg respectively in the first second and third patients. Only the third patient coughed mildly while the FMCETT was being negotiated through the glottis. All the three patients tolerated the procedure well and did not desaturate or show any signs of local anaesthetic toxicity.

After auscultatory and capnographic confirmation of FMCETT placement, IV fentanyl 1µ/kg and IV propofol 1 mg/kg followed by IV atracurium 0.5 mg/kg were administered to all three patients. Sevoflurane was the volatile anaesthetic utilized along with 50% nitrous oxide for maintenance of anaesthesia in all patients. The surgery lasted nine, ten and seven hours respectively in the first, second and third patient. After reversal of anaesthesia with neostigmine all three patients were shifted to the surgical intensive care unit and tracheal extubation over a bougie was carried out the next morning.

Discussion

C-Mac D-Blade videolaryngoscopic intubation required special patient-specific manoeuvres. Manoeuvres to be mastered include inflation of ETT cuff, anticlockwise rotation through 90°, manipulating the tip of ETT using Bodecker's forceps, flexion of patient's neck by an assistant, using a bougie etc.[3] Hence, awake C-Mac D-Blade intubation is a skill-dependent procedure with a definite learning curve. The technique and adequacy of patient preparation spells the difference between a smooth and stormy awake-videolaryngoscopic intubation. Utmost care was taken not to exceed the toxic limit of lignocaine (5mg/kg body weight) which amounts to 300mg in a 60kg adult.[5] Local anaesthetic systemic toxicity (LAST) is attributed to absorption of large amounts of lignocaine, which is a factor of vascularity at the site of injection: tracheal > intercostal > caudal > paracervical > epidural > brachial plexus > subcutaneous. Topical application does not cause LAST at this dose and doses up to 9 mg/kg are recommended by the Difficult Airway Society (DAS) for topicalization.[6]

Bilateral superior laryngeal nerve blocks were not given for three reasons. Firstly, to avoid patient discomfort arising due to two unnecessary pricks in the neck, secondly, because it would add to the total dose of lignocaine bringing it closer to the toxic limit and thirdly because it has a high failure rate. Propofol was chosen as a sedative owing to its quick onset, BIS-titratable sedation levels, and blunting of the haemodynamic response to intubation. A BIS in the range of 65-70 was chosen for guiding propofol infusion to keep the patients sedated and comfortable but conscious and spontaneously breathing. EGI, although validated for C-Mac D-Blade videolaryngoscope, underestimates the difficulty in intubating the airway because it does not take into account any history of previous head-neck Commando surgery with reconstruction. Although the EGI-score of our third patient was 8 and that of the first two patients was 9, we experienced greater difficulty in intubating the third patient attributable to a history of previous oral cancer surgery. Currently there is a paucity of guidelines for anticipated difficult airways.[7] Awake intubation has secured a pivotal position in existing guidelines but a comprehensive description of how to perform awake-videolaryngoscopic intubation in such patients is lacking. We have described in detail a successful method of performing this highly underutilized technique.

Conclusion

Awake C-Mac D-blade videolaryngoscopic intubation is an equally safe and effective alternative to awake FOB in anticipated difficult airway, with better patient comfort and reduced procedural time. The technique needs to be fine-tuned to cater to airways of individual patients.

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Conflicts of interest

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