

Journal of Anesthesia and Perioperative Care

Airway Management in Head and Neck patients is Awake Video laryngoscopy a Credible Choice? 4 Cases and a Literature review

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Abstract

Difficult airway management in head and neck surgical patients is common. Fiberoptic-assisted intubation is the usual accepted standard. In this case series, we suggest that the Glidoscope is a credible and easier alternative.

Keywords

Anticipated Difficult Airway, Predictors, Video Laryngoscope, Fiberoptic Bronchoscopy, Head and Neck Surgery, NAP 4, ASA Algorithm

Case (1)

A 70 years old male, 75 Kg, known Type II diabetic and hypertensive with no smoking history. He had hemi glossectomy 3 months back for tongue squamous cell carcinoma with mandibulectomy and reconstruction of mouth floor using pectorals flap and a tracheostomy. A week later, he needed debridement of ischemic oral & neck tissues. Reconstruction of the mouth floor followed after eleven days by another graft with reapplication of the mandibular prosthesis. A full radiotherapy cycle was followed by decannulation of his tracheostomy one month ago. He presented with a new malignant tongue lesion for debridement of both tongue, mandible and the graft site. Preoperative airway examination showed a Mallampati (MP) 4, an interincisor gap of 18 mm, a class II Upper Lip Bite Test (ULBT) [lower incisors cannot reach upper lip vermilion line], severely-restricted cervical movement, an orocutaneous fistula and marked fibrosis of the lower mandible and neck tissues (radiotherapy) (Figure 1). In OR, O2 saturation (SpO2) was 95% on room air, BP 130/80, HR 90/min, RR 18/min and fasting blood glucose 6.33. ECG showed Rt BBB. Chest XR and CT did not show any metastasis or indication of laryngeal or tracheal wall invasion. VL produced a nearly 30% of Glottic Opening (POGO) and intubation accomplished at first trial.

Case (2)

A 49 Y old female, 65 Kg, medically free except for maxillary bone squamous cell carcinoma for which she had Rt inferior maxillectomy & tracheostomy 2 y ago. When later decannulated, it was complicated with a tracheocutaneous fistula. She presented with progressive dysphagia secondary to disease recurrence. For palliation, surgeons planned for a tracheostomy & PEG tube insertion. Preoperative airway examination showed a MP 4, an interincisor gap 15 mm, a protruding edematous tongue, a retracting & immobile mandible (previous surgery + large tongue) with limited neck movement (tethering tracheocutaneous fistula) (Figure 2). In OR, BP was 150/88, HR 72/min, RR 14/min & SpO2 97% On room air. VL produced a POGO of about 50% and intubation was on first trial.

Case (3)

A 76-y old female, 75 Kg, known Rheumatoid Arthritis for 20 y (on Steroids & Methotrexate). No anesthetic chart for a total knee replacement operation few years ago was available (different hospital). Presented with a progressively enlarging thyroid gland with worsening pressure symptoms and hoarseness over few months. Preoperative airway examination: MP 1, interincisor gap 3.5 cm, thyromental distance 6 cm, class I ULBT but limited neck movement (mass causing pain). She denied previous any radiculopathy or weakness but there was unfortunately no CT neck to indicate Rheumatoid effects. Pemberton's sign was -ve. She denied any snoring or orthopnea. Fine needle aspiration returned Hashimoto's thyroiditis. Her MRI showed well delineated big heterogeneous Lt Thyroid lobe with irregular hypodense nodules and calcification causing tracheal deviation & esophageal compression. The mass extended into retrosternal space for 2 cm below manubrial notch. (Figure 3,4).

Case (4)

50 y old female, 55 kg with a history of (metastatic) follicular thyroid cancer for

Article Information

DOI: 10.31021/JAPC.20191103
Article Type: Case Report
Journal Type: Open Access
Volume: 1 **Issue:** 1
Manuscript ID: JAPC-1-103
Publisher: Boffin Access Limited
Received Date: 10 December 2019
Accepted Date: 19 December 2019
Published Date: 20 December 2019

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Citation: Ba Agagah MO, ELgindy AS, Kattan MA. Airway Management in Head and Neck patients is Awake Video laryngoscopy a Credible Choice? J Anesth Perioper Care. 2019 Dec;1(1):103

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Figure 1: Orocutaneous fistula and marked fibrosis of the lower mandible and neck tissues

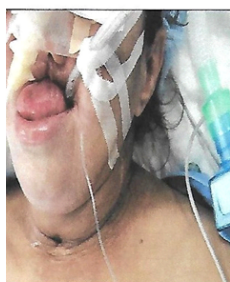


Figure 2: Tethering tracheocutaneous fistula

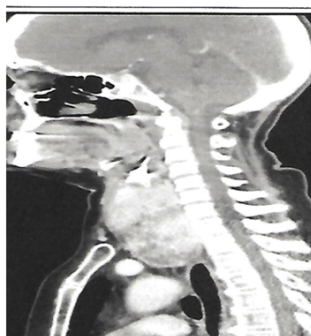


Figure 3: Delineated big heterogeneous Lt Thyroid lobe with irregular hypodense nodules

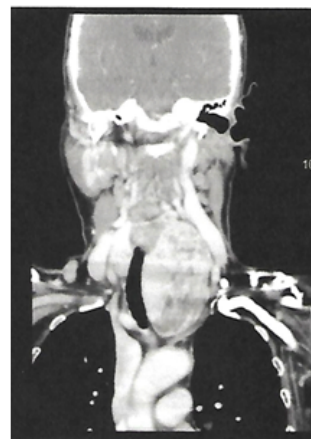


Figure 4: Thyroid lobe showing calcification and esophageal compression



Figure 5: CT showed soft tissue thickening in retropharyngeal area

which she had total thyroidectomy & neck dissection 3 months back. Rr admitted with dysphagia & voice hoarseness. Diagnosed as a recurrence. CXR showed left hemorrhagic pleural effusion with atelectasis (metastatic). Airway examination showed MP 4 (intra oral mass), limited interincisor gap 2.2 cm, thyromental distance 6 cm, grade 3 ULBT, good cervical extension limited by previous neck surgery. CT showed soft tissue thickening in retropharyngeal area with a mass effect extending to oropharynx & pushing the right false vocal cord (Figure 5). In OR, BP 171/89, HR 99/MIN, RR 21, SpO₂ 95% on room air. VL showed a POGO of 30% with intubation on second attempt (re arranging the blade to allow oral tube introduction around the mass). See the video. <https://drive.google.com/file/d/10jeerOif8Da9pFKXjZrtWBopyDYZcuUS/view?usp=drivesdk>

Procedure

With a scrubbed & gowned surgeon in the OR, patients were in a supine position with their heads rested on a 7-cm headrest. A peripheral IV line was placed together with standard monitoring (ECG, non-invasive BP, pulse oximeter). Oxygen was streamed at 2-4 L/min via a nasal cannula with CO₂ monitoring. Glycopyrrolate

was given as 3ug/Kg IV. Airway topicalization was standardized. Lidocaine at a maximum dose of 8mg/kg was calculated for all used routes. Five puffs of 10% metered spray were directly sprayed onto the tongue from its tip backwards. 2% was nebulized over 10 minutes via a small tight-fitting Hudson nebulizer. 5% gargle followed for 5 times where the patient was asked to hold it for as long as possible then spit. As a test, a suitable-sized Guedel airway was inserted to test for tolerability. When judged adequate, a Glidoscope (GL) blade was gently manipulated into the mouth & if not tolerated, a hand-held atomizer was used to top up airway anesthesia. Within the calculated dose, a dose of lidocaine was kept for the latter. It is notable that none of these patients needed that top up.

Discussion

Serious adverse respiratory events are associated with difficult airway management [1,2]. The two most important factors likely to lead to the inability to oxygenate patients are failure to predict difficulties before managing the airway [3] followed by inability to view the vocal cord when trying to intubate [4]. Human factors were considered to have contributed to almost all serious adverse outcomes in the UK NAP4, specifically the disconnect between what we know and what we actually do in our clinical practice [2]. ENT, oral and maxillofacial patients have famously challenging airways especially after a previous surgery. Their anatomy is distorted by scars, the tongue is usually not as mobile as normally and soft tissue of the mouth floor is hardened by fibrotic remodeling especially when subjected to radiotherapy, which can cause marked airway edema if the patient presented during or early after the treatment. Do we need a different approach when dealing with their airways? The first step in the ASA algorithm [5] calls for a decision whether awake intubation is mandated. This will depend on "predicting" face mask ventilation [FMV] and intubation difficulty. Significant predicted difficulty with both is a strong signal to consider awake

intubation, particularly in a cooperative, elective surgical patient [6]. Although complications of up to and including airway loss can occur during attempted awake intubation [7,8], an awake approach confers a safety benefit. Above all, the ultimate goal of airway management is oxygenation. Failure to intubate does not directly lead to death or brain injury [9,10]. It is now obvious that prediction of difficulty in airway management is not completely reliable [11-13]. Some investigators tried to find specific predictors that will assess more precisely these patients' difficult airways [14] but concluded that a diagnosis of cancer, previous radiotherapy and a periglottic lesion are associated with difficult FMV in these patients. These are all already included in the usual lists of difficult factors [15,16].

Awake intubation can be via either surgery (tracheostomy) or endoscopic-assisted. Awake tracheostomy is probably the safest option in significantly obstructing airway pathology where patients are maintaining airway patency with considerable efforts. The surgeon has a dual role in such cases: preoperative localization of the tumor and its nature (friability) and providing the ultimate surgical definitive airway if needed. Awake tracheostomy can pose sudden major risks to the airway. Typically, these patients are smokers with COPD, compromised pulmonary function and low respiratory function reserve. Unexpected coughing, anxiety, panic, motion or inability to maintain a supine position or a still neck under extension in addition to distorted anatomy are unique risks that need to be expected. These can result in oxygen desaturation, bleeding, pneumothorax, actual loss of airway and seeding of tumor in the peristomal access [17,18].

Endoscopic-assisted intubation is traditionally aided by fiberoptic bronchoscopy [FOB] but with the progressively-wider use of VL since 2003, the focus has been shifting. FOB has its own problems. It offers a narrow frontal view of airway structures. It is not infrequent for an operator to struggle to recognize laryngeal landmarks as a result of this narrowness. It requires skill and time management that places restriction on its routine use and still very much dependent on the operator's skill (and its maintenance). Any blood or excessive airway secretions can easily block the view. "Bottle-neck" complete airway obstruction can be precipitated by the scope itself interacting with a critically-obstructed airway [19]. Additionally, as in NAP4, anesthesiologists can be driven away from such a "standard" despite clear preoperative recognition of difficult airway when unfamiliarity or unavailability of FOB is an issue [2]. Apart from specialist centers where FOB is a routine, it's technically-challenging for the staff and a psychologically-stressful experience for patients [20-22].

On the other hand, VL offers a panoramic view of the airway. The 60-degree blade of the Glidoscope (GL) lifts the base of the tongue away from the pharyngeal wall soft tissue yielding a much broader frontal view of the glottis and its surrounding structures. Its anatomical shape means that pharyngeal tissues do not need to be retracted & compressed to achieve a straight line of sight [23] and there is no need for significant lifting force to visualize the glottis [24,25]. Topical tongue and pharynx lidocaine usually make patients tolerate the GL with minimal discomfort [26]. A modified spray-as-you-go: using a suction catheter passed down the tube can provide not only local anesthesia to the glottis & subglottic area but also acts as a test for intubation readiness [27]. It is noticeable that none of our patients needed any top-up. Clouding by blood or secretions is avoided by placing the camera away from the tip and providing a heated lens (stops fogging) [28]. The widest part of its blade is 18 mm which is the limiting factor in providing airway access to those with limited mouth openings (surgery/radiotherapy). Unfortunately, there are increasing frequency of reported upper airway injuries due to improper insertion methods [29,30]. Two recent studies comparing VL with FOB have been published [31,32]. Both nasal and oral routes yielded similar results for both times taken and success rates. A recent systematic review and a meta-analysis video laryngoscopy for awake tracheal intubation showed a shorter intubation time. It also seems to have a success rate and safety profile comparable to fiberoptic bronchoscopy [33]. There was no significant difference between the two techniques in the failure rate or the first-attempt success rate.

The level of patient satisfaction was similar between both groups. No difference was found in two reported adverse events: hoarseness/sore throat and low oxygen saturation. This may indicate the fast uptake and acceptance of VL as a credible alternative to FOB with the latter's established reputation as the go-to standard. To conclude, we presented a simplified, safe and practical airway management scheme where awake VL proved to be a credible alternative to FOB in patients with anticipated difficult airway in head and neck patients.

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