Difficult nasal intubation in patients with cancer of the tongue and tonsils

B. Dimitrova, Ts. Marinov

Department of Anesthesiology and Intensive Care; University Hospital "Queen Giovanna"- ISUL; Medical University-Sofia

Abstract:
Introduction: Airway management in patients with cancer of the tongue or tonsils can be complicated. Depending on its size and localization tumor can lead to obstruction of the upper airway.
The Aim of the study is to determine and characterize the frequency of difficult nasal intubation in patients undergoing cancer surgery of the tongue and tonsils.
Materials and methods: A 4-year prospective cohort study of 40 patients who underwent major oral cancer surgery in the Department of ENT Surgery; University Hospital „Queen Giovanna"-ISUL; Medical University-Sofia.
Results and discussion: The mean age of the patients is 61.75 years. We found that 77.5% of the patients are men and 22.5% are women. In the 1st group – patients with cancer of the tongue the frequency of difficult nasal intubation (IDS ≥ 5) was 15% or 3 of the patients. In the 2nd group – patients with cancer of the tonsils the frequency of difficult nasal intubation was 5% or 1 of the patients. There are a number of options available to achieve tracheal intubation in patients with cancer of the tongue and tonsils. In the published literature there is no comparison between different techniques. The decision to proceed with a specific technique will be guided by the airway anatomy of patient, the availability of appropriate equipment and the skills of the multidisciplinary airway team.
Conclusion: Patients with cancer of the tongue are characterized with higher frequency of difficult nasal intubation than patients with cancer of the tonsils.
Key words: Airway management, difficult nasal intubation, oral cancer surgery

Introduction

Squamous cell carcinoma represents the most common form of head and neck cancer. Surgical management combined with adjuvant radiation therapy and systemic chemotherapy is the primary treatment strategy for oral squamous cell carcinoma.[1] Airway management in patients with cancer of the tongue or tonsils can be complicated. Depending on its size and localization tumor can lead to obstruction of the upper airway. This will increase the risk of a difficult airway management. [2] Anesthetic concerns during surgery are mainly because of restricted mouth opening and less interincisor gap. Access to the glottis via the oral route may be compromised. Airway anatomy may be unrecognizable due to the presence of the lesion or bleeding of necrotic tissues. Patients exposed to radiation as the primary modality of therapy for tongue or tonsils cancer are likely to have limited neck movements and extension difficulties.[3] Complications related to surgery like postoperative bleeding, swelling, and edema can cause airway compression and compromise oxygenation and ventilation of patients.[4] A comprehensive preoperative assessment is very important for identifying potential difficulties. Endotracheal intubation plays a critical role in airway managing, especially for patients undergoing tongue or tonsils cancer surgery. To secure the airway, oral or nasal intubation are the primary methods used, but the presence of a tracheal tube should not impede the surgical operation. Therefore, nasal intubation is preferred in the case of cancer of the tongue or tonsils.[5] When the nasal route is used, it is important to minimize the risk of traumatic epistaxis which will make airway management more challenging. If oral or

Correspondence address:

Tsvetomir Marinov, MD, PhD
Department of Anesthesiology and Intensive Care
University Hospital „Queen Giovanna" – ISUL
Byalo More Str 8
Medical University-Sofia
E-mail: ts.marinov@abv.bg

nasal intubation is compromised because of the significant obstruction of the mouth tracheostomy might be performed under local anesthesia. Poor judgment and airway management planning are the main reasons for morbidity and mortality in patients undergoing major oral cancer surgery.[6, 7]

The Aim of the study is to determine and characterize the frequency of difficult nasal intubation in patients undergoing cancer surgery of the tongue and tonsils.

Materials and methods

A 4-year prospective cohort study of 40 patients who underwent major oral cancer surgery in the Department of ENT Surgery; University Hospital „Queen Giovanna" – ISUL; Medical University-Sofia. A general anesthesia was performed in all patients. They were divided into 2 groups according to the pathological factors: 1st group – 20 patients with cancer of the tongue; 2nd group – 20 patients with cancer of the tonsils. In each group we investigated patients according to the Intubation Difficulty Scale (IDS). The IDS takes into account seven parameters, including the number of attempts, number of operators, number of alternative techniques, Cormack-Lehane grade, lifting force required, laryngeal pressure needed, and vocal cord mobility, to provide a comprehensive assessment of the intubation procedure.[8, 9] After nasal intubation, patients were divided into 2 groups based on their IDS score estimated with 7 variables: normal (IDS < 5) and difficult (IDS ≥ 5) groups.

Results

The mean age of the patients is 61.75 years. We found that 77.5% of the patients are men and 22.5% are women. (fig.1)

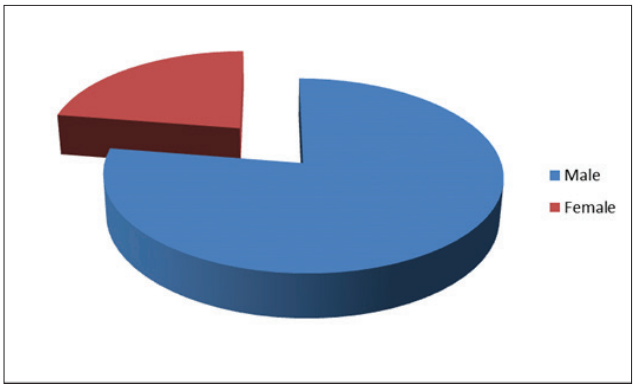

Fig. 1. *Distribution of patients by gender*

According to anesthesia risk assessment 15% of the patients are with ASA 2 class and 72.5% of them are with ASA 3 class and 12.5% of the patients are with ASA 4 class. (fig.2).

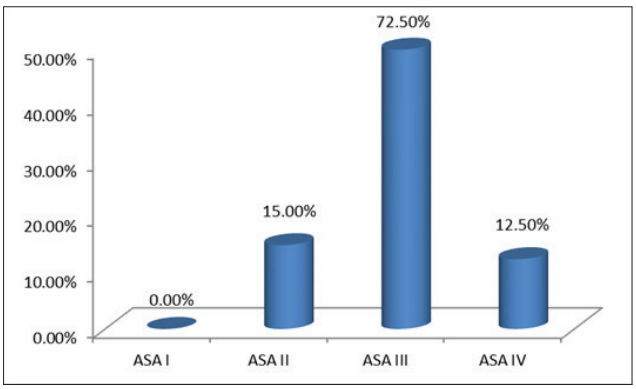

Fig. 2. *Distribution of patients by ASA*

In the 1st group – patients with cancer of the tongue the frequency of difficult nasal intubation (IDS ≥ 5) was 15% or 3 of the patients. In the 2nd group - patients with cancer of the tonsils the frequency of difficult nasal intubation was 5% or 1 of the patients. (fig.3).

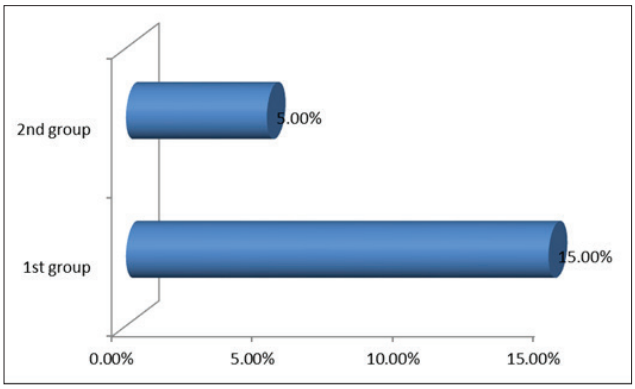

Fig. 3. *Frequency of difficult nasal intubation*

Discussion

There are a number of options available to achieve tracheal intubation in patients with cancer of the tongue and tonsils. In the published literature there is no comparison between different techniques. The decision to proceed with a specific technique will be guided by the airway anatomy of patient, the availability of appropriate equipment and the skills of the multidisciplinary airway team.[10] An awake tracheostomy may be indicated in patients with significant airway pathology. The primary technique in this situation is a surgical tracheostomy but a percutaneous tracheostomy may also be used. Awake tracheostomy should be performed following local anesthetic infiltration.[11] Standard intraoperative monitoring should be applied (non invasive blood pressure at 5 minutes interval, ECG and pulse oximetry). Delivering 100% oxygen through face mask or nasal catheter is very important for the proper oxygenation of the patient during awake tracheostomy. The anesthesiologist must be very careful with the sedative techniques because of the risk of respiratory depression.

The incidence of difficult airway varies widely in the literature. The range which is reported can vary from 1.5% to 18.5% depending on the definition used, the population studied, and the experience of the practitioners involved.[12] Two studies in Thailand reported an incidence of difficult endotracheal intubation in general practice between 2.2 and 6%.[13, 14] The definition of difficult intubation has evolved and modernized with the time. According Benjawaleemas P. et al. in recent study difficult intubation is defined *as at least 3 attempts to perform an endotracheal intubation with conventional or video laryngoscopy on the same patient by anesthesiologist personnel who had at least one year of experience before commencing surgery.* In their study for the period 2015–2020 the incidence of difficult intubation in general practice was 0.27%.[15] This may be due to the use of modern anesthetic techniques such as video laryngoscopy. Nevertheless this number is different when we speak about head and neck pathology especially oral cancer. One study reported an incidence of difficult nasal intubation in patient undergoing oral cancer surgery of 14.7%.[3]

In our study the demographic analysis showed that the mean age of the patients is 61.75 years. Most of them are men. According to anesthesia risk assessment most of the patients are ASA III grade. The incidence of difficult nasal intubation varies between the two groups. In the 1st group - patients with cancer of the tongue the frequency of difficult nasal intubation was 15%, which correlates with the frequency of difficult airway in patients undergoing oral cancer surgical procedures. In the 2nd group – patients with cancer of the tonsils the frequency of difficult nasal intubation was 5%, which is in the range or a little bit higher than the number of difficult intubation in general practice taken from the literature, but is lower from the number for patients undergoing oral cancer surgery. This can be explained with the impaired vision and access to the laryngeal structures from the tumor mass from the tongue. The size and character of the lesions of the tonsils were not big enough to compromise the visualization of laryngeal structures. Difficult airway guidelines provide algorithms for the assessment and management of the difficult airway, but do not specifically address airway management in patients undergoing oral cancer surgery. Intubation of patients with head and neck pathology, especially in oral cavity, can be particularly challenging because of the obstruction of the upper airway.

Conclusion

Patients with cancer of the tongue or tonsils have difficult airway and often require advanced airway management techniques. Choice of technique is influenced by the patient's unique airway, the availability of appropriate equipment and the experience of the multidisciplinary team. Patients with cancer of the tongue are characterized with higher frequency of difficult nasal intubation than patients with cancer of the tonsils.

References

1. Cancer Research UK, Available online: https://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/head-and-neck-cancers/incidence#heading-Three. Accessed January 2023.
2. STURM, Patrick, et al. Airway management in patients with surgical treatment of oral cavity carcinoma. BMC anesthesiology, 2025, 25.1: 195.
3. NIKHAR, Sapna Annaji, et al. Airway management of patients undergoing oral cancer surgery: a retrospective analysis of 156

patients. Turkish journal of anaesthesiology and reanimation, 2017, 45.2: 108.
4. MEROLA, Raffaele; VARGAS, Maria; BATTAGLINI, Denise. Airway management for oral cancer surgery: a multidisciplinary patient-based approach is needed. Journal of Anesthesia, Analgesia and Critical Care, 2025, 5.1: 52.
5. Park DH, Lee CA, Jeong CY, Yang HS (2021) Nasotracheal intubation for airway management during anesthesia. Anesth Pain Med (Seoul) 16(3):232–247.
6. Bryan YF, Morgan AG, Johnson KN, et al. Procedural Challenges During Intubation in Patients With Oropharyngeal Masses: A Prospective Observational Study. Anesth Analg 2019;128:1256-63. 10.1213/ANE.0000000000004089310947 97.
7. Endlich Y, Beckmann LA, Choi SW, et al. A prospective six-month audit of airway incidents during anaesthesia in twelve tertiary level hospitals across Australia and New Zealand. Anaesth Intensive Care 2020;48:389-98. 10.1177/0310057X20 94532533104443.
8. K Nasa V, S Kamath S. Risk Factors Assessment of the Difficult Intubation using Intubation Difficulty Scale (IDS). J Clin Diagn Res. 2014 Jul;8(7):GC01-3. doi: 10.7860/JCDR/2014/8506.4560. Epub 2014 Jul 20. PMID: 25177576; PMCID: PMC4149082.
9. Seo SH, Lee JG, Yu SB, Kim DS, Ryu SJ, Kim KH. Predictors of difficult intubation defined by the intubation difficulty scale (IDS): predictive value of 7 airway assessment factors. Korean J Anesthesiol. 2012 Dec;63(6):491-7. doi: 10.4097/kjae.2012.63.6.491. Epub 2012 Dec 14. PMID: 23277808; PMCID: PMC3531526.
10. Desai N, Ratnayake G, Onwochei DN, et al. Airway devices for awake tracheal intubation in adults: a systematic review and network meta-analysis. Br J Anaesth 2021;127:636-47. 10.1016/j.bja.2021.05.02534303493
11. Adams TRP, Ricciardelli A. Airway fire during awake tracheostomy using high-flow nasal oxygen. Anaesth Rep 2020;8:25-7. 10.1002/anr3.1203832211610.
12. Cook, T. M., N. Woodall, and C. Frerk. „Major Complications of Airway Management in the UK: Results of the Fourth National Audit Project of the Royal College of Anaesthetists and the Difficult Airway Society. Part 1: Anaesthesia.“ British Journal of Anaesthesia, vol. 106, no. 5, 2011, pp. 617–631. https://doi.org/10.1093/bja/aer058.
13. Narasethkamol, A., Charuluxananan, S., Kyokong, O., Premsamran, P. & Kundej, S. Study of model of anesthesia related adverse event by incident report at King Chulalongkorn memorial hospital. J. Med. Assoc. Thai 94, 78–88 (2011).
14. Mantaga, S., Mitmak, P., Samankatiwat, S. & Siriussawakul, A. The evaluation of difficult intubation among obese patients by using the intubation difficulty scale (IDS) at Ratchaburi hospital: a descriptive study. Thai J. Anesthesiol. 45, 7–14 (2019).
15. BENJAWALEEMAS, Pannawit, et al. Clinical predictors for perioperative anticipated and unanticipated difficult intubation: a matched case-control study. Scientific Reports, 2025, 15.1: 9078.