

Airway Management of Patients Undergoing Oral Cancer Surgery: A Retrospective Analysis of 156 Patients

Ağız Kanseri Ameliyatı Olan Hastalarda Havayolu Yönetimi: 156 Hastanın Retrospektif Bir Analizi

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Objective: Oral cancer patients have a potentially difficult airway, but if managed properly during the perioperative period, morbidity and mortality can be reduced or avoided.

Methods: The medical records of 156 patients who were operated for oral cancers were reviewed for airway management during the perioperative period.

Results: The surgical procedures ranged from excisions, wide local excisions with split skin graftings, hemiglossectomies and radical neck nodes dissections to pectoralis major myocutaneous or free fibular flaps. Intubation was assessed as difficult in 14.7% of patients because of tumour- or radiation fibrosis-related trismus, restricted neck mobility and prior similar surgeries. Twenty patients had undergone surgery for oral cancer previously and were scheduled for flap reconstruction. Nasotracheal intubation was a preferred route, and 62.8% of patients could be intubated nasotracheally after neuromuscular blockade. Tracheostomy (elective or existing) was utilised for airway control in 19.2% cases. Patients who had undergone prior radiotherapy were more likely to be tracheostomised. McCoy laryngoscopes (13.4%), gum elastic bougies (23.6%), Airtraq devices (0.006%) and fibreoptic bronchoscopes (FOBs) (0.03%) were the additional airway techniques employed. In total, 64 patients (50.7%) could be extubated immediately after surgery.

Conclusion: Proper preoperative evaluation and planning help manage difficult airways effectively with minimal need of advanced airway gadgets. Gum elastic bougies and Magill forceps are very useful in airway management and decrease the need of elective tracheostomy in oral cancer patients.

Keywords: Oral cancer, surgery, airway management

Amaç: Ağız kanseri hastaları potansiyel olarak zor bir havayoluna sahiptirler. Ancak, ameliyat süresince doğru bir şekilde yönetilirse, morbidite ve mortalite düşürülebilir veya önlenebilir.

Yöntemler: Ağız kanseri nedeniyle ameliyat edilen 156 hastanın tıbbi kayıtları perioperatif dönemde havayolu yönetimi açısından incelendi.

Bulgular: Cerrahi işlemler eksizyon, parsiyel kalınlıkta deri greftleri, hemiglossektomiler, radikal boyun nodu diseksiyonlarından pektoralis majör miyokutan veya serbest fibular fleplere değişiklik göstermiştir. Entübasyon hastaların %14,7'sinde, tümör veya radyasyon fibrozisiyle ilgili trismus, sınırlı boyun hareketliliği ve daha önceden yapılmış ameliyatlardan dolayı zor olarak değerlendirildi. Yirmi hasta daha önce ağız kanseri nedeniyle ameliyat edilmişti ve flep rekonstrüksiyonu planlandı. Nazotrakeal entübasyon tercih edilen bir yöntemdi ve hastaların %62,8'i nöromusküler blokaj sonrasında nazotrakeal olarak entübe edilebildi. Vakaların %19,2'sinde havayolu kontrolü için trakeotomi (elektif ya da mevcut) kullanıldı. Daha önce radyoterapi alan hastalarda trakeotomi ameliyatı olma olasılığı daha yüksek olarak bulundu. McCoy laringoskoplar (%13,4), gum elastik bujiler (%23,6), Airtraq cihazlar (%0,006) ve fiberoptik bronkoskoplar (FOBs) (%0,03) kullanılan diğer havayolu teknikleriydi. Toplamda 64 hasta (%50,7) ameliyattan hemen sonra ekstübe edilebildi.

Sonuç: Zor havayolları doğru preoperatif değerlendirme ve planlama ile, ileri düzeyde havayolu cihazlarına minimal düzeyde gereksinim duyarak etkili bir şekilde yönetilebilir. Gum elastik bujiler ve Magill forsepler havayolu yönetiminde çok faydalıdırlar ve ağız kanseri hastalarında elektif trakeostomi ihtiyacını azaltırlar.

Anahtar sözcükler: Ağız kanseri, cerrahi, havayolu yönetimi

Introduction

ral cancer is sixth most common cancer worldwide (1). In India, it is the most common cancer among males (2) and is related to tobacco and gutka chewing. Although human papilloma virus has recently been found to be associated with oral cancer development, other factors that are more common in India cannot be neglected. Oral cancer is a component of head and neck cancers. Surgical management is the first choice of treatment for oral cancer (1). Anaesthetic concerns during surgery are airway difficulty, mainly because of restricted mouth opening and less interincisor gap. Patients exposed to radiation (3) as the primary modality of therapy for oral cancer are likely to have limited neck movements and extension difficulties with restricted mouth opening. Considering these factors, proper detailed preoperative evaluation and anaethesiologists' skill and judgment will definitely reduce morbidity and mortality. Hence, retrospective data were collected to highlight the effect of proper perioperative planning of the airway management in oral cancers.

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Methods

We retrospectively analysed the data of 156 patients scheduled for oral cancer surgery for airway management during the perioperative period at our institution. Informed consent had been obtained from all the patients before the surgery. After ethical committee approval, we retrospectively collected data from medical records between 2014 and 2015. All patients with oral cancers scheduled for different surgical management were included. The surgeries varied from laser excision and wide local excision to free fibular graft. Patients with thyroid cancers, laryngeal cancers, pharyngeal tumours, American Society of Anaesthesiology (ASA) grade III and IV or other head and neck(thyroid cancers, squamous cell carcinoma lateral wall of orbit etc.) cancers were excluded. Preoperative records were reviewed, and data related to comorbid conditions, airway assessment and previous surgery and radiation history were recorded.

Anaesthetic techniques and techniques of airway management were reviewed along with the intubation route. Airway devices used to ease intubation were also reviewed. Airway difficulty was assessed using the Mayo Intubation Scoring System (MISS) (4). Patients who had undergone in situ tracheostomy or who had intraoperative need of tracheostomy or any other intraoperative airway complications were reviewed. Data related to on-table extubation, need of elective ventilation or intensive care unit (ICU) stay, need of elective or emergency airway management or tracheostomy in the postoperative period were recorded.

Statistical analysis

All statistical analyses were performed using IBM Statistical Package for the Social Sciences (IBM SPSS Armonk, NY, USA) version 19. Frequency and percentages were estimated for qualitative variables.

Results

Of the 156 patients analysed, 27 (17.26%) patients were sedated for airway management, and as soon as the airway was secured, general anaesthesia (GA) was given for further surgery. The remaining patients received GA from induction with invasive haemodynamic monitoring. The surgical procedures ranged from laser excisions, wide local excisions with split skin graftings, hemiglossectomies and radical neck nodes dissections to pectoralis major myocutaneous or free fibular flaps. Twenty patients had undergone surgery for oral cancer previously and were scheduled for flap reconstruction. Patients with anticipated airway problems in the form of restricted mouth opening, restricted neck movements or painful mouth opening are presented in Table 1. Nasotracheal intubation was a preferred route; 62.8% of patients could be intubated nasotracheally after the administration of a muscle relaxant (Figure 1). Nasotracheal tubes sized 6.0-6.5 ID (internal diameter) were commonly used, which reflects the decrease in potential space by tumour encroachment. Tracheostomy (elective or existing) was utilised for airway control in 19.2% of cases. McCoy laryngoscopes (13.4%), gum elastic bougies (23.6%), Magill forceps (44.1%), Airtraq devices (0.01%) and FOB laryngoscopes (0.03%) were the additional airway techniques employed (Figure 2). Intubation was assessed as difficult in 14.7% patients using MISS (0=no difficulty; 1=mild to moderate difficulty and 2=severe difficulty often requiring a change in the intubation technique) because of tumour- or

Table 1. Airway problems encountered

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Parameter	No. of patients	%
Restricted neck movements	25	16%
Trismus (pain)	83	53.2%
<1 finger mouth opening/s to radiation fibrosis	18	11.5%
Decreased space in nostrils/ compression of single nostril	13	8.33%





radiation fibrosis-related trismus, restricted neck mobility and prior similar surgeries. Postoperatively, 64 (50.7%) patients were extubated immediately. In total, 51 (40.4%) patients were extubated the next morning, while 11 patients (8.7%) had a 24–48 h delay for extubation. Of 11 patients, 3 patients were electively trache-ostomised in the ICU and the others were extubated (Figure 3). Thirty tracheostomised patients were decanulated after few days, and the duration varied among patients.



Discussion

Airway management has undergone remarkable improvement and sophistication. Periodical review of airway-associated problems and determination of a solution are required (5). The incidence of cancer is rising, and it has become the leading cause of death in the Asia Pacific region (6). Head and neck cancers are among the top 10 malignancies globally, (7) and most of the patients present with late complications with regard to airway management (8, 9). The most common factors associated with cancers are tobacco and gutka chewing, use of pan masala and poor nutrition (7, 10). Oral cancer is the main component of head and neck cancers. The anaesthetic concerns are difficulties in perioperative airway management as both intubation and extubation can be difficult, leading to a sympathetic surge in anesthesiologists and further problems. Hence, proper evaluation and planning and discussion with the surgeon are needed to avoid unnecessary complications.

The factors responsible for difficult airway during the perioperative period in oral cancer patients are as follows (11):

- a. Presence of cancer growth itself,
- b. Anatomical changes and fibrosis due to prior surgery or radiotherapy,
- c. Lengthy surgical procedure,
- d. Bulky flap for reconstruction,
- e. Oedema around the airway due to surgical manipulations,
- f. Risk of bleeding, mainly because of surgical causes or multiple attempts of airway manipulation and,
- g. Risk of pulmonary aspiration (12).

The anaesthetic concerns are as follows:

- A perioral or periglottic growth: bag and mask ventilation is difficult to impossible.
- Exophytic tumours are friable: they can undergo fracture and dislodge distally with laryngoscopes.
- They are prone to bleed: this hinders further glottic visualisation.
- Unappreciated tumour extension to the base of tongue causes tongue fixation and difficulty in laryngoscopy and intubation.
- Poor dentition as a result of tumour invasion increases the difficulty in laryngoscopy and optimal glottic visualisation.

- Video laryngoscopes provide better airway pictures but need space for introduction and can disrupt the tumour.
- Prior radiotherapy aggravates the difficulty. The incidence of tracheostomy is more likely in oral cancer patients with prior radiotherapy (3).

Considering these factors, it needs to evaluate thoroughly and gadget of difficult airway has to arrange including invasive airway technique.

Airway management in oral cancer patients can be mostly done with GA induction with or without a muscle relaxant through the nasal route as most patients are non-cooperative (13). Although performing a surgical airway in a conscious patient is occasionally necessary, the safest plan for most cases of anticipated airway difficulty is to perform tracheal intubation in conscious patients under topical anaesthesia (14). The nasal route is preferred because it gives space to surgeons while operating and because patients have better tolerance to nasal tubes. The basic management decisions for all patients are described in the ASA guidelines (15).

The preferred techniques are as follows:

- 1. Awake fibreoptic intubation: This is the gold standard technique but requires anaesthesiologists who are skilled in this technique (16, 17).
- 2. Routine general anaesthesia induction and intubation with or without muscle relaxant:
 - a. In total, 2–3 positive pressure breaths before the administration of a muscle relaxant are considered safe. Succinylcholine is an intelligent choice. Nasal intubation and McCoy laryngoscopes are preferred.
 - b. The use of bougie as a guide for nasal intubation is done if check laryngoscopy is suggestive of difficult intubation and direct manipulation of the endotracheal tube with Magill forceps would be difficult. In our study, we used gum elastic bougie in 23.6% patients because it can be easily redirected towards the trachea as it has a characteristic tip or the tip can be manipulated with the use of Magill forceps. In total, 10.2% patients needed the use of Magill forceps to manipulate the bougie towards the trachea.
- 3. Awake oral laryngoscopy: This can be performed after using a local anaesthetic spray with intravenous analgesia. The addition of volatile anaesthetics or/and low-dose propofol is required in cases amenable to bag mask ventilation.
- 4. Elective tracheostomy: This can be performed under local anaesthesia or monitored anaesthesia care with mild sedation. The decision is based on the level of airway difficulty. It has been found that tracheostomy is safe as an original procedure for airway management (18).
- 5. Blind nasal technique: This is associated with a possibility of tumour disruption and considerable bleeding. With the availability of FOB, this technique is almost not preferred.
- Previous tracheostomy: Need to check patency of tracheostomy tube. In case of metallic tube, it should be replaced by PVC tube. In such cases, 1% lignocaine spray is useful to avoid stimulation of trachea while exchanging tube.

7. Retromolar intubation, cricothyrotomy and retrograde intubation-definitive indications: Retrograde intubations are almost outdated and should only be attempted by expert anaesthesiologists.

All these techniques are to enable proper preoperative assessment of the airway, and the best technique should be used to secure the airway because persistent attempts may be associated with hypoxic injury, leading to brain damage and death (19). In this study, there was no need for emergency tracheostomy because most patients were electively managed under anaesthesia with nasotracheal intubaton without the use of advanced gadgets. With proper planning and management, we could extubate patients postoperatively (50.7%) without tracheostomy and its further complications (20).

In this study, we aimed to add to our experience to improve airway management in oral cancer patients. This study has few limitations: it is a retrospective study and the number of cases analysed are few. Large-scale data are required, but it is difficult to get a large number of cases from a single institute.

Conclusion

Gum elastic bougies and Magill forceps are 2 of the important basic airway gadgets to ease tracheal intubation. With proper evaluation and understanding of the difficulties in airway management, most oral cancers can be managed without the use of advanced airway gadgets. The unnecessary creation of tracheostomy stoma could also be avoided.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Nizam's Institute of Medical Sciences.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – A.S.; Data Collection and/or Processing – M.R.; Analysis and/or Interpretation – M.R.; Literature Search – S.A.N.; Writing Manuscript – S.A.N.; Critical Review – R.G.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study has received no financial support.

Etik Komite Onayı: Bu çalışma için etik komite onayı Nizam's Institute of Medical Sciences'nden alınmıştır.

Hasta Onamı: Yazılı hasta onamı bu çalışmaya katılan hastalardan alınmıştır.

Hakem Değerlendirmesi: Dış bağımsız.

Yazar Katkıları: Fikir – A.S.; Veri Toplanması ve/veya İşlemesi – M.R.; Analiz ve/veya Yorum – M.R.; Literatür Taraması – S.A.N.; Yazıyı Yazan – S.A.N.; Eleştirel İnceleme – R.G.

Çıkar Çatışması: Yazarlar çıkar çatışması bildirmemişlerdir.

Finansal Destek: Yazarlar bu çalışma için finansal destek almadıklarını beyan etmişlerdir.

References

- 1. Shah JP, Gil Z. Current concepts in management of oral cancer-surgery. Oral Oncol 2009; 45: 394-401. [CrossRef]
- Sankaranarayanam R. Oral cancer in India: An epidemiological and clinical review. Oral Surg Oral Med Oral Pathol 1990; 69: 325-30. [CrossRef]
- Hancock PJ, Epstein JB, Sadler GR. Oral and dental management related to radiation therapy for head and neck cancer. J Can Dent Assoc 2003; 69: 585-90.
- Burkle CM, Walsh MT, Harrison BA, Curry TB. Airway management after failure to intubate by direct laryngoscopy: outcomes in a large teaching hospital. Can J Anaesth 2005; 52: 634-40. [CrossRef]
- Bhatnagar S, Mishra S, Jha RR, Singhal AK. Predicting difficult laryngoscopy in oral cancer patients. Indian J Anaesth 2005; 49: 413-6.
- Dougherty TB, Clayman GL. Airway management of surgical patients with head and neck malignancy. Anesthesiol Clin North Am 1998; 16: 547-62. [CrossRef]
- Siddiqui AS, Dogar SA, Lal S, Akhtar S, Khan F. A. Airway management and postoperative length of hospital stay in patients undergoing head and neck cancer surgery. J Anaesth Clin Pharmaco 2016; 32: 49-53. [CrossRef]
- Bhurgri Y, Bhurgri A, Usman A, Pervez S, Kayani N, Bashir I, et al. Epidemiological review of head and neck cancers in Karachi. Asian Pac J Cancer Prev 2006; 7: 195-200.
- 9. Tumino R, Vicario G. Head and neck cancers: Oral cavity, pharynx, and larynx. Epidemiol Prev 2004; 28: 28-33.
- Anila K, Kaveri H, Naikmasur VG. Comparative study of oral micronucleated cell frequency in oral submucous fibrosis patients and healthy individuals. J Clin Exp Dent 2011; 3: 201-6. [CrossRef]
- 11. Supkis DE Jr, Dougherty TB, Nguyen DT, Cagle CK. Anesthetic management of the patient undergoing head and neck cancer surgery. Int Anesthesiol Clin 1998; 36: 21-9. [CrossRef]
- 12. Neelakanta G, Chikyarappa A. A review of patients with pulmonary aspiration of gastric contents during anesthesia reported to the Departmental Quality Assurance Committee. J Clin Anesth 2006; 18: 102-7. [CrossRef]
- 13. Burtner DD, Goodman M. Anesthetic and operative management of potential upper airway obstruction. Arch Otolaryngol 1978; 104: 657-61. [CrossRef]
- 14. Popat M. State of the art: The airway. Anaesthesia 2003; 58: 1166-71. [CrossRef]
- 15. American Society of Anesthesiologists Task Force on Management of the Difficult Airway: Practice guidelines for management of the difficult airway. Anesthesiology 2013; 118: 251-70. [CrossRef]
- 16. Hall CE, Shutt LE. Nasotracheal intubation for head and neck surgery. Anaesthesia 2003; 58: 249-56. [CrossRef]
- 17. Ovassapian A. Fiberoptic-assisted management of the airway In Barash PG, Deutsch S, Tinker JH (eds): ASA Refresher Course, vol. 19, Lippincott, 1991. [CrossRef]
- Ong SK, Morton RP, Kolbe J, Whitlock RM, McIvor NP. Pulmonary complications following major head and neck surgery with tracheostomy: A prospective, randomized, controlled trial of prophylactic antibiotics. Arch Otolaryngol Head Neck Surg 2004; 130: 1084-7. [CrossRef]
- 19. Peterson GN, Domino KB, Caplan RA, Posner KL, Lee LA, Cheney FW. Management of the difficult airway: A closed claims analysis. Anesthesiology 2005; 103: 33-9. [CrossRef]
- 20. Crosher R, Baldie C, Mitchell R. Selective use of tracheostomy in surgery for head and neck cancer: An audit. Br J Oral Maxillofac Surg 1997; 35: 43-5.[CrossRef]