

Original Research Article

Retrospective analysis of airway management strategies in head and neck cancer surgeries in a tertiary care hospital

Bangera A¹, Sayeed S.A², Krishna Prasad³

¹Professor and Head, Department of Anaesthesiology and critical care, K.S Hegde Medical Academy, Mangalore, Nitte University; Karnataka, India

²Resident, K.S. Hegde Medical Academy, Mangalore, Karnataka, India

³Associate professor, K.S Hegde Medical Academy, Mangalore, Nitte University, Karnataka, India

***Corresponding author**

Dr Syed Abu Sayeed

Email: drsasayeed@gmail.com

Abstract: Anaesthetic management of patients with head and neck carcinomas (HNC) is challenging because of the risk involved in their airway management due to associated anatomic and physiologic changes as well as complications arising from radiotherapy and chemotherapy. The aim of this study was to conduct a retrospective analysis of modalities of airway management in patients undergoing HNC surgeries. Medical records of 104 patients, treated from January 2012 to December 2013 were reviewed for airway management in the perioperative period. Out of 104 patients who presented with HNC, 52 patients were managed conservatively which included both chemotherapy and radiotherapy. 52 patients were treated surgically which included wide excision with or without reconstructive procedures. Mouth opening was restricted in 52% of patients due to malignancy. 29% of patients had Modified Mallampati class III and 26% had class IV. 67 % patients were intubated by conventional direct laryngoscopy and 23 % (12) were intubated using fiberoptic bronchoscope. Elective tracheostomy was performed in 1 patient preoperatively and in 1 postoperatively. 66 % (34) of patients were extubated immediately after the procedure. Malignancies involving head and neck are a potential for difficult airway scenario. Proper planning and management during the perioperative period reduces the morbidity in these patients. Nasotracheal intubation is the preferred technique of airway management in most of these cases, thus decreasing the need for and complications associated with tracheostomy.

Keywords: Airway management, Head and neck cancer surgeries, Retrospective study, Nasotracheal intubation, Tracheostomy

INTRODUCTION

Head and neck carcinomas (HNC) constitute one of the most common cancers in India [1]. They include carcinomas (ca) involving lip, tongue, gingiva, palate, floor of the mouth, oropharynx, nasopharynx, hypo pharynx and larynx. Management of airway during head and neck ca surgeries is unique because the operative area is the upper airway or the adjacent structures and the anaesthesiologists must share the airway with the surgeon through all phases of the surgery. The risk of difficult airway is relatively high for patients undergoing head and neck surgeries. Both bag-mask ventilation (BMV) and endotracheal intubation may be potentially or obviously difficult because of the nature of the patients underlying conditions [2]. Patients with HNC may require anaesthesia for minor procedures like evaluation of extent of tumor (direct laryngoscopy and biopsy), laser

procedures or for major surgical procedures like laryngectomy, glossectomy, hemimandibulectomy, maxillectomy radical neck dissection including reconstructive procedures. These patients are challenging for anaesthesiologists not only with respect to the inherent problems of the airway due to tumor mass but also due to the comorbidities [15]. We conducted a retrospective study to analyse the airway management strategies in patients undergoing HNC surgeries in a tertiary care hospital.

METHODOLOGY

A retrospective analysis was conducted on 104 patients undergoing HNC surgeries from January 2012 to December 2013 at K. S Hegde Medical Academy, Mangalore. Medical records of these patients were reviewed for perioperative anaesthetic management. Pre-anaesthetic evaluation was reviewed for the

assessment of difficult airway predictors and comorbidities. Intraoperative management was reviewed for choice of induction, techniques of airway management, the timing of extubation, requirement of tracheostomies and postoperative complications.

RESULTS

Medical records of 104 patients were reviewed. 52 patients were managed conservatively with radiotherapy and chemotherapy. Out of 52 patients who were conservatively managed, 1 patient underwent temporary tracheostomy along with radiotherapy and chemotherapy and 1 patient discharged against medical advice without the completion of the treatment.

52 patients underwent surgical treatment. Out of 104 patients, 90 were males and 14 were females. Mean age was 56.19 ± 12.79 years. Medical history of patients who underwent conservative treatment could not be recovered from the records in comparison with the detailed preanaesthetic evaluation of patients who underwent surgical treatment. Pre existing medical conditions of patients who underwent surgical treatment are depicted in table 1

Table 1: Demographic variables and associated medical conditions

Gender (M/ F) (n= 104)	90/14
Mean Age	56.19 ± 12.79 years
Associated medical conditions	
Hypertension	12
Diabetes Mellitus	7
Tuberculosis	4
COPD	4
Bronchial Asthma	2
HBsAg Positive	1

Airway Examination:

27% of patients had interred incisor distance (IID) of 2 fingers and 25% of patients had IID of less than 2F. 12% of patients had Modified Mallampati class I, 33% had class II, 29% had class III and 26% had class IV. (Table 2)

Table 2: Airway examination

Inter-incisor distance	
>2F	48% (25)
2F	27% (14)
<2F	25% (13)
Modified Mallampati classification	
I	12% (6)
II	33% (17)
III	29% (15)
IV	26% (14)

Perioperative variables

Premedication's and preparation

Details of premedication are summarized in table 3. Superior laryngeal nerve block along with trans tracheal block was given in all the 12 patients in whom awake fiberoptic bronchoscope (FOB) aided intubation was performed.

Table 3: Premedication and preparation received by patients

Diazepam	69% (36/52)
Glycopyrrolate IM	19% (10/52)
Superior Laryngeal Nerve block with trans tracheal block	23% (12/52)

Intubation techniques

Out of 52 patients, intubation was performed by conventional direct laryngoscopy in 35(67.3%) patients. FOB aided endotracheal intubation was performed in 12(23.07%) patients. In 2 of the patients, plan A was to perform FOB aided endotracheal intubation, but failed and intubation was subsequently performed by direct laryngoscopy. Elective tracheostomy was performed before induction under local anaesthesia in 1 patient. Details are summarized in table 4

Table 4: Intubation techniques

Direct laryngoscopy	35
Failed FOB guided intubation followed by direct laryngoscopy	2
Elective tracheostomy	1
Fiberoptic aided	12
Without muscle relaxant	3
With muscle relaxant	
Succinylcholine	6
Vecuronium	3
Bonfils Retro molar Intubation Fiberscope	1
Tru view laryngoscope	1

Extubation

It was possible to reverse the residual neuromuscular blockade and extubated the patient immediately after procedure in 34 patients. 5 patients were extubated after 5 – 10 hours, 11 patients extubated after 24 hours. 1 patient was extubated after 2 days and 1 after 4 days where both the patients required elective mechanical ventilation. Details are summarized in table 5

Table 5: Extubation following surgery

Immediate postoperative	34
After 5 – 10 hours	5
After 24 hours	11
After 2 days	1
After 4 days	1

Complications :

1 patient had an episode of bronchospasm following intubation with direct laryngoscopy and 1 patient had an episode of bradycardia during preoxygenation and both were treated accordingly.

DISCUSSION

Anatomical and physiological changes in patients with HNC make airway management during perioperative period very difficult [2]. Obvious and potentially difficult mask ventilation or difficult intubation scenarios should be discussed with the surgeon and thoughtful discussion about sequential steps of airway management should be decided before anaesthetic induction and especially before attempting intubation. Bag-mask ventilation (BMV) and endotracheal intubation may be potentially or obviously difficult because of the nature of the patient's underlying conditions. Prior conservative management with radiotherapy makes mask ventilation and intubation more difficult due to loss of anatomical landmarks and fibrosis. Since these surgeries take longer duration and also due to the possibility of flap reconstruction, there are increased chances of airway oedema making extubation difficult [2, 3].

In this study, we found that airway management in patients with malignancy involving head and neck includes

- Awake FOB aided nasotracheal intubation following airway blocks
- Direct laryngoscopy with muscle relaxation using succinyl choline if mask ventilation is adequate
- Elective tracheostomy under local anaesthesia

Awake intubation requires anaesthetizing the airway by the following methods:

- Nasal Cavity : Nasal pledgets soaked in 4% lignocaine with epinephrine 1 : 200000
- Oropharynx : Lignocaine gargle with 2% lignocaine
- Oropharynx and laryngopharynx : Lignocaine 10% spray, Nebulization using 4% lignocaine
- Larynx : Superior laryngeal nerve block and trans tracheal block
- Trachea: Spray as you go (SAGO) technique with aliquots of 0.2 to 1.0 mL of 2% to 4% lignocaine.

To reduce bleeding following nasotracheal intubation, nasal decongestants like oxymetazoline are employed. Performing nerve blocks may also prove to be difficult due to malignancies which may sometimes cause episodes bleeding and laryngospasm. Awake intubation is technically difficult due to anatomical changes and passing the ET tube over FOB is difficult or sometimes impossible during awake intubation. Coughing and straining during awake intubation may

cause trauma and bleeding from a tumor further worsening the condition.

In our institute, the preferred techniques of intubation for anticipated difficult airway include:

- Awake FOB aided nasal intubation with airway blocks
- Inhalational induction followed by FOB aided intubation with prior airway blocks
- If mask ventilation is adequate, short acting muscle relaxants like succinyl choline is administered followed by intubation using FOB or by direct laryngoscopy

Respiration may become obstructed when the patient first loses consciousness with inhalational induction. Insertion of a nasopharyngeal airway at this stage may help in smooth induction of anaesthesia [4, 5]. Approximation of soft palate to the posterior pharyngeal wall was found to be the main reason for obstruction in recent studies and not the tongue fall back as previously thought [6, 7].

In patients with anticipated difficult airway, we routinely performed airway blocks. Induction was done using incremental doses of sevoflurane in oxygen, maintaining spontaneous ventilation, followed by FOB aided nasotracheal intubation. In patients with adequate mask ventilation, we administered short acting muscle relaxants like succinyl choline followed by nasotracheal intubation either by using FOB or conventional direct laryngoscopy. Short acting muscle relaxants are preferred for direct laryngoscopy or FOB aided intubation in patients with no obvious or expected airway compromise [3].

65% of patients were extubated immediately following surgery. Many factors dictated the timing of extubation which included the size of tumour, extent of tumour resection and method of reconstruction. A pectoralis major flap tunneled through the neck carried a greater of airway obstruction due to the bulk than did a free flap [2, 8]. So, in cases where there was a greater risk of airway obstruction (e.g following PMMC flap reconstruction or bilateral neck dissection), we retained the endotracheal tube in situ with adequate sedation and oxygen supplementation overnight, assessed the airway the next day and extubation was done over an airway exchange catheter following fulfillment of extubation criteria.

Only one patient had to undergo elective tracheostomy preoperatively. Performing tracheostomy is technically difficult in patients with malignancies involving neck and also the tracheostomy tube connected to the breathing circuit hinders the neck dissection and flap reconstruction. Elective

tracheostomy at the end of the procedure was performed in 1 patient

Tracheostomy was the traditional method for maintaining the airway in patients who had a radical dissection for HNC. The role of tracheostomy in these cases is debatable because the need for a secure airway has to be balanced against the increased morbidity associated with the tracheostomy. Complications associated with tracheostomy include obstructed or displaced tracheostomy tubes, stomal recurrence, airway distortion, trachea – esophageal fistula and tracheal stenosis. Therefore, patients requiring elective tracheostomy should be properly selected [9]. In our study, none of the patients had complications due to tracheostomy.

A similar study was conducted by Merwein *et al.*; where a total of 40 patients were divided into 2 groups. Primary tracheostomy was not performed in the first group versus primary tracheostomy in the second group. It was concluded that not performing routine tracheostomy in patients who met the inclusion criteria for the delayed extubation approach was safe. Benefits of not performing routine tracheostomy included shorter operation time and additional patient comfort in terms of postoperative rehabilitation. Overall perioperative complications were comparable between two groups with no perioperative airway complications [10].

Complications with nasotracheal intubation are unlikely if period of intubation is less than 48 hours [11, 12]. Nasotracheal intubation avoids the potential risks and morbidities associated with tracheostomy [13, 14]. In our study, none of the patients had complications in whom nasotracheal intubation was performed. Two patients required elective mechanical ventilation and were extubated after 2 and 4 days respectively.

CONCLUSION:

Cancers involving head and neck have potential difficulties in managing airway in the perioperative period. Proper planning of airway management before induction and its execution reduces the incidence of morbidity and mortality during the perioperative period. Succinylcholine is the preferred muscle relaxant in patients with anticipated difficult airway. The need of elective tracheostomy should be considered only in selected patients as it is associated with longer hospital stay and complications. Thus, nasotracheal intubation is a safe and better alternative in patients undergoing head and neck cancer surgery.

REFERENCES

1. Mehrotra R, Singh M, Gupta RK, Singh M, Kapoor AK. Trends of prevalence and pathological

spectrum of head and neck cancers in North India. Indian journal of cancer. 2005 Apr 1;42(2):89

2. Supkis Jr DE, Dougherty TB, Nguyen DT, Cagle CK. Anesthetic management of the patient undergoing head and neck cancer surgery. International anesthesiology clinics. 1998 Jul 1; 36(3):21-30.
3. Hagberg CA. Benumof and Hagberg's airway management. Elsevier Health Sciences; 2012 Sep 24.
4. Bonner S, Taylor M. Airway obstruction in head and neck surgery. Anaesthesia. 2000 Mar 1; 55(3):290-1.
5. Mason RA, Fielder CP. The obstructed airway in head and neck surgery. Anaesthesia. 1999 Jul 1; 54(7):625-8.
6. Nandi PR, Charlesworth CH, Taylor SJ, Nunn JF, Doré CJ. Effect of general anaesthesia on the pharynx. Br J Anaesth. 1991 Feb; 66(2):157-62.
7. Mathru M, Esch O, Lang J, Herbert ME, Chaljub G, Goodacre B. Magnetic Resonance Imaging of the Upper Airway Effects of Propofol Anesthesia and Nasal Continuous Positive Airway Pressure in Humans. The Journal of the American Society of Anesthesiologists. 1996 Feb 1; 84(2):273-9.
8. 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 Feb; 35(1):43-5.
9. Kim Y-H, Kim M-Y, Kim C-H. Elective tracheostomy scoring system for severe oral disease patients. J Korean Assoc Oral Maxillofac Surg. 2014 Oct; 40(5):211-9.
10. Airway management in head and neck cancer patients undergoing microvascular free tissue transfer [Internet]. Swiss Medical Weekly. [cited 2015 Feb 10]. Available from: <http://blog.smw.ch/airway-management-in-head-and-neck-cancer-patients-undergoing-microvascular-free-tissue-transfer/>
11. Berlauck JF. Prolonged endotracheal intubation vs. tracheostomy. Crit Care Med. 1986 Aug;14(8):742-5.
12. Bowes JB, Kelly DF, Peacock JH. Intubation trauma. Effects of short-term endotracheal intubation on the tracheal mucous membrane of the pig. Anaesthesia. 1973 Nov;28(6):603-10.
13. Coyle MJ, Shrimpton A, Perkins C, Fasanmade A, Godden D. First do no harm: should routine tracheostomy after oral and maxillofacial oncological operations be abandoned? Br J Oral Maxillofac Surg. 2012 Dec;50(8):732-5.
14. Mathew SA, Senthilnathan P, Narayanan V. Management of post-operative maxillofacial oncology patients without the routine use of an intensive care unit. J Maxillofac Oral Surg. 2010 Dec; 9(4):329-33.

15. Garg R, Darlong V, Pandey R, Punj J. Anesthesia for Oncological ENT surgeries: Review. The Internet Journal of Anesthesiology. 2009; 20(1).