Journal of Cardiovascular Disease Research

ISSN:0975 -3583,0976-2833 VOL14,ISSUE 03, 2023

Original research article

Difficult laryngoscopy based on Cormac lehane grading: Determinants

[1]Dr. Rajashree SM, [2]Dr. Deeksha Singh, [3]Dr. Raksha MH, [4]Dr. Ashwini A

[1]Senior Resident, Department of Anesthesiology, KIMS, Bengaluru, Karnataka, India

[2]Senior Resident, Department of Anesthesiology, Safdarjung Hospital, Delhi, India

[3]Post Graduate, Department of Anesthesiology, KIMS, Bengaluru, Karnataka, India

[4]Associate Professor, Department of Anesthesiology, KIMS, Bengaluru, Karnataka, India

Corresponding Author:
Dr. Ashwini A

Abstract

A "difficult airway" is a problem in establishing or maintaining gas exchange through a mask or through any artificial airway or can be both. Failure to secure the airway and interruption of gas exchange, for even a few minutes, can result in catastrophic outcome such as brain damage or even death. The problems associated with Airway management continue to be the single most common cause of morbidity and mortality attributable to anesthesia. Tracheal intubation was done with an appropriately sized endotracheal tube. If the intubation was found to be difficult, the anaesthesiologist would first perform an optimal external laryngeal manipulation46 to improve the glottic exposure. If this failed to improve the glottic view, the size of the blade was changed or a McCoy Blade used or a gum elastic bougie was employed as preferred by the anaesthesiologist. In our study we observed 39 patients with difficulty laryngoscopy. As for distribution of age to difficult laryngoscopy is concerned, 18 patients were less than 45 years of age and 21 patients were more than 40 years. The BMI of the patients ranged from 12.6 to 45.0. The mean BMI was 23.0. In our study we observed 39 patients with difficulty laryngoscopy. As for distribution of BMI to difficult laryngoscopy is concerned, 32 patients were of BMI less than 30 and 7 patients were of BMI more than 30. This is statistically not significant.

Keywords: Difficult laryngoscopy, Cormac lehane grading, Determinants

Introduction

Anatomically, airway is a passage where air, gas passes during respiration. The airway extends from mouth or nose to terminal bronchioles. It is divided into an upper and a lower airway. Anatomical structures relevant to endotracheal intubation include mouth, oral cavity, pharynx, larynx and trachea.

The American of Anaesthesiologists (ASA) defines a difficult airway which is "The clinical situation where a conventionally trained anaesthesiologist has trouble in mask ventilation, difficulty in tracheal intubation or one of the above." This difficulty is due to complex interaction between patients, the clinical scenario and the skills and the preference of the practitioner.

The ASA task force defined difficult endotracheal intubation as occurring when "proper insertion of the tracheal tube with conventional laryngoscopy requires more than three attempts or more than ten minutes". An optimal or best attempt at laryngoscopy is 30 seconds [1].

A "difficult airway" is a problem in establishing or maintaining gas exchange through a mask or through any artificial airway or can be both. Failure to secure the airway and interruption of gas exchange, for even a few minutes, can result in catastrophic outcome such as brain damage or even death. The problems associated with Airway management continue to be the single most common cause of morbidity and mortality attributable to anesthesia [2]. The reported incidence of difficult laryngoscopy and intubation is 1.5%-13% and cannot intubate and cannot ventilate is 0.0001%-0.02%. A number of studies have been done on airway management to predict difficult laryngoscopy, as tracheal intubation has become a routine part of general anesthesia. Successful intubation depends on the direct laryngoscopy to visualize the vocal cords through the originally curved oral airway space. The direct line of vision from the mouth to the glottic opening is achieved by aligning the oral, pharyngeal, and laryngeal axes with some degree of flexion at the lower cervical spine and extension at the atlanto-occipital joint. Failure of these structural alignment in response to direct laryngoscopy will result in difficult in intubation. Unanticipated difficult airway and associated morbidity can be reduced if difficult airway could be predicted during the preoperative assessment [3]. These may also be difficult to apply in emergency and critical care settings, where patients are frequently confused, uncooperative and unable to follow instructions. After direct laryngoscopic visualization by placing the intubating blade in the patient‟s airway, we can find out the Cormack-Lehane grading and if it becomes grade 3/4, then it will pose dreaded feature unless we are prepared for the difficult airway [4].

ISSN:0975 -3583,0976-2833 VOL14,ISSUE 03, 2023

Methodology

A standard general anesthesia protocol was followed for all cases. All patients received premedication, inj midazolam 0.02 mg/kg, inj glycopyrrolate 0.01mg/kg and inj fentanyl 2 µg/kg intravenously, after attaching standard monitors. After preoxygenation with 100% O2 in each patient, anesthesia was induced with 5-7mg/kg of thiopentone sodium and 0.9 mg/kg of Rocuronium given intravenously to facilitate tracheal intubation after ensuring mask ventilation. Laryngoscopy and endotracheal intubation was attempted with the patient‟s head and neck in optimal intubating position with a pillow under the occiput during intubation (sniffing position), using an appropriate size Macintosh curved blade for all patients by an anaesthesiologist having minimum two years of experience in clinical anaesthesia. The anaesthesiologist who performed the laryngoscopy and intubation was blinded to the study, and the glottic view was graded using the Cormack and Lehane's classification as follows

Grade 1: A full view of glottis.
Grade 2: 2a.a part of cords are visible. 2b.only the arytenoids or very posterior origin of the cords are visible.
Grade 3: only the epiglottis is visible.
Grade 4: No glottis structure visible.

The Cormack and Lehane's Grades 3 and 4 was considered as difficult laryngoscopy.
Tracheal intubation was done with an appropriately sized endotracheal tube. If the intubation was found to be difficult, the anaesthesiologist would first perform an optimal external laryngeal manipulation46 to improve the glottic exposure. If this failed to improve the glottic view, the size of the blade was changed or a McCoy Blade used or a gum elastic bougie was employed as preferred by the anaesthesiologist. Endotracheal intubation was considered difficult, if Cormack and Lehane grading was III and IV32, 47 and this was the end of study. Patient‟s vital signs were monitored through out the procedure. At the end of surgery patients were adequately reversed with Inj. Glycopyrrolate 0.01 mg/kg and Inj. Neostigmine 0.05 mg/kg and trachea was extubated after thorough oral suctioning. After stabilization, patients were shifted to the post anaesthesia care unit for further monitoring.

Inclusion criteria

1. Patients Undergoing neurosurgery.
2. Patients of either gender of Age group of 20 to 60 years.
3. ASA grade I -II.
4. Patients willing to give informed consent to participate in the study.

Exclusion Criteria

1. Patients with obvious distorted anatomy of head and neck.
2. Traumatic Cervical spine.
3. Inability to sit and stand.
4. Need of rapid sequence induction.
5. Patients with midline neck swellings.
6. Edentulous patients.
7. Uncooperative patients.
8. More than 2 attempts of intubation.

Results

Table 1: Age v/s Cormack lehane’s grading.

S. No		Cormack lehane grade 1 & 2	Cormack lehane grade 3 & 4
	Age	N-221(%)	N-39(%)
1	15-25	35	01
2	26-35	55	11
3	36-45	48	06
4	46-55	49	10
5	56-65	31	11
6	>65	03	0

Chi square value: 9.833, p value: 0.086, DF:5

In our study we observed 39 patients with difficulty laryngoscopy. As for distribution of age to difficult laryngoscopy is concerned, 18 patients were less than 45 years of age and 21 patients were more than 40 years. This is statistically not significant.

Table 2: Gender wise distribution of patients

ISSN:0975 -3583,0976-2833 VOL14,ISSUE 03, 2023

S. No	Gender	n-260	%
1	Male	149	57.31
2	Female	111	42.69

260 patients were enrolled in our study. Out of these 260 patients admitted to undergo direct laryngoscopy 149 (57.31%) were men and 111 (42.69%) were women.

Table 3: Gender v/s Cormack lehane's grading.

		Cormack lehane grade 1 & 2	Cormack lehane grade 3 & 4
S. No	Gender	N-221(%)	N-39(%)
1	Male	93	19
2	Female	128	20

Chi square value: 0.356 p value: 0.551 DF:1

Distribution of gender against difficult larngoscopies showed that patients were females and 22 were males. The means of male and female were not statistically significant.

Table 4: Distribution of BMI according to Cormack lehane grading

S. No		Cormack lehane grade 1 & 2	Cormack lehane grade 3 & 4
	BMI	N-221(%)	N-39(%)
1	10.1-15.0	13	2
2	15.1-20.0	72	7
3	20.1-25.0	71	12
4	25.1-30.0	38	11
5	30.1-35.0	20	6
6	35.1-40.0	7	0
7	40.1-45.0	0	1

Chi square value: 12.752, p value: 0.047 DF:6

The BMI of the patients ranged from 12.6 to 45.0. The mean BMI was 23.0. In our study we observed 39 patients with difficulty laryngoscopy. As for distribution of BMI to difficult laryngoscopy is concerned, 32 patients were of BMI less than 30 and 7 patients were of BMI more than 30. This is statistically not significant.

Table 5: Socio demographic profile of patients (N-260)

S. No	Variable	Mean	S.D
1	Age(yr)	41.33	13.52
2	Weight(kg)	60.08	14.40
3	Height(mt)	1.62	0.09
4	Body mass index	22.95	5.58

Table 6: Socio demographic profiles of patients on basis of Cormack-Lehane grading

S. No	Variable	Mean+_ S.D	
		Cormack leane grade 1 & 2	Cormack lehane grade 3 & 4
1	Age(yr)	40.48+13.54	46.12+12.54
2	Weight(kg)	59.25+14.08	64.75+15.44
3	Height(mt)	1.62+0.09	1.62+0.10
4	Body mass index	22.67+5.47	24.49+6.03

Discussion

Airway management remains an important challenge in the contemporary practice of anaesthesia and preoperative airway assessment facilitates appropriate preparation when difficulty with intubation or ventilation is anticipated prior to induction of anaesthesia. Direct laryngoscopy is the gold standard for tracheal intubation. There is no single definition of difficult intubation. Difficult glottic view on direct laryngoscopy is the most common cause of difficult intubation

We proposed to conduct this study to compare 7 airway assessment factors in patients undergoing Neurosurgeries requiring general anaesthesia and endotracheal intubation in Medical College and attached Hospital‟s in correlation with Cormack lehane grading. Two hundred and sixty patients between the ages of 18 and 75 were included in our study. The incidence of difficult intubation in our study was 15%, which is comparable to the results obtained by Frerk [5] and Savva [6] and higher than the incidence reported by Kaniyil *et al*, which was 5.33% possibly because the laryngoscopic view was assessed without application of any external manoeuvres. However the incidence of difficult intubation from 1-15% has

ISSN:0975 -3583,0976-2833 VOL14,ISSUE 03, 2023

been reported. The wide range of incidence reported in studies could be due to several reasons such as lack of uniformity in the practice of laryngoscopy and intubation as in head and neck positioning, application of Sellick manoeuvre, external laryngeal manipulation, multiple attempts, type of blade used, different anthropometric features among populations and varying skill of anesthesiologists. There were no failed intubations in our study. There were no patients with difficult mask ventilation during our study.

We noted no statistical significance between male and female gender vs difficult laryngoscopy in our study. Of the 39 patients with difficult intubation, 27 patients were intubated in the first laryngoscopic attempt. These 27 patients were successfully intubated with an optimal external laryngeal manipulation which improves the view of glottis [7]. Of the remaining, three patients required Mc coy laryngoscope, where in there was no improvement of glottic view on optimal external laryngeal manipulation. 6 patients required a change of blade size. Stillete was used for facilitating intubation in patients with Cormack lehane grade III and none of the patients had grade IV and were subsequently intubated without any significant events or difficulty. All intubations were done by a senior anaesthesiologist. There was neither any significant airway trauma nor episode of desaturation noted. All had no difficulty in mask ventilation. The anesthesiologists who recorded the laryngeal view by the Cormack Lehane classification in our study were unaware of the airway evaluations of the patients prior to anesthesia. This blinded method reduced observer bias. In order to eliminate any bias from inter-observer variability, a single investigator performed all the pre-operative measurements. The rulers and laryngoscope blades used were the same in order to decrease instrumental bias [8].

Conclusion

- In our study we observed 39 patients with difficulty laryngoscopy. As for distribution of age to difficult laryngoscopy is concerned, 18 patients were less than 45 years of age and 21 patients were more than 40 years. This is statistically not significant.
- The BMI of the patients ranged from 12.6 to 45.0. The mean BMI was 23.0. In our study we observed 39 patients with difficulty laryngoscopy. As for distribution of BMI to difficult laryngoscopy is concerned, 32 patients were of BMI less than 30 and 7 patients were of BMI more than 30.

References

1. Klock PA, Benumof JL. Definition and incidence of the difficult airway. In: Hagberg CA, editor. Benumof‟s Airway Management: Principle and Practice. 2nd ed. Philadelphia: Mosby Elsevier; c2007. p. 215-33.
2. Oates JDL, McLeod AD, Oates PD. Comparison of Two Methods for Predicting Difficult Intubation. Br J Anaesth. 1990;65:400-14.
3. Nichol HC, Zuck D. Difficult laryngoscopy - the “anterior” larynx and the Atlanto-occipital gap. British Journal of Anaesthesia. 1983;55:141-3.
4. Cormack RS, Lehane J. Difficult Tracheal Intubation in Obstetrics. Anaesthesia. 1984;39:1105.
5. Frerk CM. Predicting difficult intubat ion. Anaesthesia. 1991;46:1005-8.
6. Savva D, Prediction of Difficult Tracheal Intubation. Br J Anaesth. 1994;73:149-53.
7. Tindall VR, Beard RW, Sykes MK, Tighe JR, Hibbard BM, Rosen M. Report on Confidential Enquiries into Maternal Deaths in the United Kingdom 1985-87. Rep Health SocnSubj (Lond); c1991, p. 1-164.
8. Samsoon GL, Young JR. Difficult tracheal intubation: A retrospective study. Anaesthesia. 1987;42:487-90.