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COMPARISON OF THE EASE OF NASOTRACHEAL INTUBATION AND HAEMODYNAMIC RESPONSE BETWEEN MC COY LARYNGOSCOPE AND C-MAC VIDEO LARYNGOSCOPE IN PATIENTS UNDERGOING MAXILLOFACIAL SURGERY : A PROSPECTIVE STUDY

Anesthesiology

Singam Geetha Assistant professor, Dept of Anaesthesia, NIMS, Panjagutta, Hyderabad - Corresponding Author

K.Geeta Associate professor, Dept of Anaesthesia, NIMS, Panjagutta, Hyderabad

R.Gopinath Professor and HOD , Dept of Anaesthesia, NIMS, Panjagutta, Hyderabad

ABSTRACT

Introduction: Nasotracheal intubation is often required for surgical access in patients posted for maxillofacial surgery. Intubation may be difficult due to airway oedema and trauma. Various designs of laryngoscopes are available in the clinical practice. Mc Coy laryngoscope has a hinged tip at the blade to elevate epiglottis aiding in intubation. C-Mac video laryngoscope has a small digital camera at the tip of the blade facilitating better glottis view over direct laryngoscopy.

Aims and objectiveness: to compare the intubation parameters (duration of intubation, Number of attempts of intubation, Number of persons for intubation, Cormac-Lehane view of laryngoscopy, side effects and additional maneuvers) and haemodynamic response (HR, SBP, DBP, MAP., SPO2) between CMac and Mccoy laryngoscopes.

Methods: We conducted a prospective randomized study on 50 patients divided into 2 groups (CMac group and MCcoy group) of 25 each. After connecting to monitors, our patients were premedicated, induced and intubated nasotracheally with CMac/ Mccoy laryngoscopes. The intubation response and haemodynamic response were observed.

Results: Demographic data was statistically similar in both Cmac and Mccoy groups in terms of age (P=0.720), weight (P= 0.157), height (P=0.426), gender (P=0.609), and ASA grade (P=1.000). There was also no significant statistical difference in Haemodynamic response in both Cmac and Mccoy groups in terms of heart rate, systolic blood pressure, diastolic blood pressure, mean arterial blood pressure and oxygen saturation. Regarding intubation response, Cmac laryngoscope is better than Mccoy laryngoscope in duration for intubation (P<0.001 with Mean ± SD of 40.76±10.25 seconds in CMac group and Mean ± SD of 59.16±12.44 seconds in Mccoy group) and number of attempts (P=0.088). other intubation parameters: No. of Persons required for intubation (P=0.490), Cormac lehane grade distribution (P=0.332), additional maneuvers required (P=0.702 and side effects (P=0.667) were almost comparable in both groups.

Conclusion: CMac laryngoscope improves nasotracheal intubation with less duration of intubation and less number of attempts than Mccoy laryngoscope.

KEYWORDS:

cmac laryngoscope,mccoy laryngoscope, nasotracheal intubation, maxillofacial surgery

Introduction

Nasotracheal intubation is often required for surgical access in patients posted for maxillofacial surgery. As the patients have airway oedema, restricted mouth opening, blood and other secretions in nasal and oral cavities, intubation may be difficult [1,2]. Various designs of laryngos copes are available in the clinical practice and are compared with Mcintosh laryngoscope [3-9]. Mc Coy laryngoscope has a hinged tip at the blade to elevate epiglottis aiding in intubation when glottis opening is limited.[10]. C-Mac video laryngoscope has a small digital camera at the tip of the blade facilitating better glottis view over direct laryngoscopy [11-13]. As the literature on comparison between Mc Coy and C-Mac video laryngoscope for nasotracheal intubation is scarce, we planned to compare the ease of nasotracheal intubation and haemodynamic response between Mc Coy and C-Mac video laryngoscopes in patients undergoing maxillofacial surgery.

Materials and methods:

After getting approval from the institute ethical committee and written informed consent from the patients, we conducted a prospective randomized, observational study of 50 patients undergoing elective maxillofacial surgery divided into 2 groups (CMac and Mccoy group) of 25 patients each (by computer generated random numbers) . Our patients included both genders aged between 18-65 years with ASA I-II grade and posted for elective surgery Patients with ASA status III-IV, having history of difficult airway, pregnant patients, patients with cervical spine pathology, patients with neck mass and patients with gastro- oesophageal reflux disease were excluded from the study.

All the patients were premedicated orally with tablet Alprazolam 0.5 mg and tablet Ranitidine 150mg night before and on the morning of day of surgery.

In the operating room, baseline heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP), mean arterial blood pressure (MAP),end tidal carbon dioxide (ETCO2) and oxygen saturation (SpO2) were monitored. Xylometazoline drops was applied to both the nostrils. After obtaining iv access, Premedication was with Inj. glycopyrrolate 0.1mg and Inj. fentanyl 2mcg/kg intravenously. All the patients were preoxygenated with 100% oxygen for 3 minutes. Standard induction was with Inj. thiopentone 5mg/kg intravenously and Inj. Suxamethonium chloride 1.5 mg/kg intravenously for muscle relaxation. Sevoflurane or isoflurane was the inhalational agent. Nasotracheal intubation was performed with appropriate sized endotracheal tube by an experienced anaesthesiologist .

Nasotracheal intubation was done in CMac group of 25 people with CMac vedio laryngoscope and McCoy group of 25 people with Mccoy laryngoscope. The intubation parameters (duration of intubation from the time of passage of endotracheal tube from nostrils till vocal cords, Number of attempts of intubation, Number of persons for intubation, Cormac-Lehane view of laryngoscopy, side effects like nasal or oral bleed and additional maneuvers (magills forceps/ external laryngeal manipulation) needed during intubation were noted. Haemodynamic response (HR, SBP, DBP, MAP,SPO2, baseline, 1minute. 2 minutes, 3 minutes, 4 minutes, 5 minutes, 10 minutes and 15 minutes after intub ation) with both the laryngoscopes were noted.

Results: Results were calculated as

A. demographic data including age, sex, height, weight, ASA (American society of Anaesthesia) grade.
B. Haemodynamic response including heart rate, SBP, DBP, MAP, SPO2 (baseline, 1minute. 2 minutes, 3 minutes, 4 minutes, 5 minutes, 10 minutes and 15 minutes after intubation)
C. Intubation parameters including duration of intubation, Number of attempts of intubation, Number of persons for intubation, Cormac-Lehane view of laryngoscopy , side effects like nasal or oral bleed and additional maneuvers like magills forceps/ external laryngeal manipulation)

A. DEMOGRAPHIC DATA

As per **demographic data** both CMac and Mcoy groups are statistically similar .

patients were age matched (P=0.720, t-test in table1), weight matched (P= 0.157 in table1), height matched (P=0.426 in table1), gender matched (P=0.609 in table2), and ASA grade matched (P=1.000 in table3) in CMac and Mcoy groups

Table 1: Comparison of age, Height and Weight in two groups of patients

	CMac laryngoscope group	MCcoy laryngoscope group	Total	P value
age	30.08±11.79	31.24±10.92	30.66±11.26	P=0.720
Height (cm)	164.2±6.09	165.48±5.13	164.84±5.61	0.426
Weight (kg)	66.56±7.53	64.04±4.47	65.3±6.26	0.157

Table 2: Gender distribution of patients

Gender	CMac laryngoscope group	MCcoy laryngoscope group	Total
Female	3(12%)	1(4%)	4(8%)
Male	22(88%)	24(96%)	46(92%)
Total	25(100%)	25(100%)	50(100%)

Samples are gender matched with P=0.609, Chi-Square test

Table 3: ASA Grade distribution in two groups of patients studied

ASA Grade	Cmac laryngoscope group	MCcoy laryngoscope group	Total
I	23(92%)	23(92%)	46(92%)
II	2(8%)	2(8%)	4(8%)
Total	25(100%)	25(100%)	50(100%)

P=1.000

A. HAEMODYNAMIC RESPONSE

Regarding haemodynamic response, both CMAC group and MCcoy groups were statistically similar as per heart rate (HR) in table 4, systolic blood pressure (SBP) in table 5, Diastolic blood pressure (DBP) in table 6, Mean arterial blood pressure (MAP) in table 7, and oxygen saturation (SPO2) in table 8.

Table 4: Comparison of Heart rate (bpm) distribution in two groups of patients

Heart rate (bpm)	CMac laryngoscope group	MCcoy laryngoscope group	Total	P value
Baseline	80.28±8.93	80.64±8.93	80.46±8.84	0.887
1 min	87.12±10.93	87.56±10.04	87.34±10.39	0.883
2 min	84.88±9.69	84.68±8.95	84.78±9.23	0.940
3 min	86.92±10.47	88.04±10.56	87.48±10.42	0.708
4 min	82.80±9.03	84.08±8.79	83.44±8.84	0.614
5 min	84.44±6.67	83.72±6.91	84.08±6.73	0.709
10 min	82.08±7.15	83.24±8.70	82.66±7.90	0.609
15 min	79.36±6.52	78.32±5.28	78.84±5.89	0.538

Table 5: Comparison of systolic blood pressure :SBP (mm Hg) distribution in two groups of patients

SBP (mm Hg)	Cmac laryngoscope group	Mccoy laryngoscope group	Total	P value
Baseline	111.20±10.98	112.96±9.75	112.08±10.32	0.552
1 min	122.36±10.78	123.92±10.10	123.14±10.37	0.600
2 min	128.56±11.20	129.88±7.71	129.22±9.54	0.630
3 min	127.40±13.64	130.36±12.73	128.88±13.14	0.432
4 min	125.52±8.21	128.28±9.45	126.90±8.87	0.276
5 min	120.04±12.42	120.60±13.07	120.32±12.62	0.877
10 min	120.04±10.94	124.40±10.41	122.22±10.80	0.155
15 min	121.52±9.39	123.84±11.42	122.68±10.41	0.436

Table 6: Comparison of Diastolic blood pressure (DBP) (mm Hg) distribution in two groups of patients

DBP (mm Hg)	CMac laryngoscope group	Mccoy laryngoscope group	Total	P value
Baseline	55.16±9.80	55.76±8.53	55.46±9.10	0.818
1 min	61.84±10.38	65.48±12.20	63.66±11.36	0.261
2 min	65.00±12.38	65.92±7.94	65.46±10.30	0.756
3 min	64.68±12.81	67.36±12.28	66.02±12.49	0.454
4 min	63.72±9.84	63.36±7.52	63.54±8.67	0.885
5 min	59.44±8.94	60.48±12.06	59.96±10.52	0.731
10 min	57.52±8.12	61.00±7.74	59.26±8.05	0.128
15 min	59.08±7.49	61.44±9.99	60.26±8.82	0.349

Table 7: Comparison of Mean arterial blood pressure (MAP) distribution in two groups of patients

MAP(mm Hg)	CMac laryngoscope group	MCcoy laryngoscope group	Total	P value
Baseline	77.24±9.94	78.92±8.36	78.08±9.13	0.521
1 min	86.12±8.93	88.08±10.66	87.10±9.78	0.484
2 min	89.16±10.68	89.80±6.46	89.48±8.74	0.799
3 min	89.60±11.95	92.12±10.66	90.86±11.28	0.435
4 min	87.44±7.70	89.52±8.71	88.48±8.20	0.376
5 min	83.56±10.23	84.20±11.65	83.88±10.85	0.837
10 min	82.56±7.68	86.32±8.40	84.44±8.19	0.105
15 min	82.36±7.24	84.56±9.48	83.46±8.43	0.361

Table 8: Comparison of oxygen saturation (SpO2%)distribution in two groups of patients

SpO2%	CMac laryngoscope group	MCcoy laryngoscope group	Total	P value
Baseline	98.60±0.82	98.52±0.87	98.56±0.84	0.739
1 min	98.76±0.66	98.52±0.82	98.64±0.75	0.262
2 min	98.96±0.54	98.96±0.45	98.96±0.49	1.000
3 min	98.96±0.61	98.88±0.60	98.92±0.60	0.643
4 min	98.92±0.57	99.00±0.41	98.96±0.49	0.572
5 min	99.04±0.61	98.92±0.70	98.98±0.65	0.522
10 min	98.92±0.57	98.96±0.61	98.94±0.59	0.812
15 min	99.12±0.44	98.92±0.57	99.02±0.51	0.172

A. INTUBATION PARAMETERS

There was statistical difference in duration of intubation between CMac and Mccoy groups . (P<0.001 with Mean ± SD of 40.76±10.25 seconds in CMac group) and Mean ± SD of 59.16±12.44 seconds in Mccoy group as shown in Table 9).

The number of attempts for intubation was less in CMac group than Mccoy groups (P=0.088 in table 10).

Cmac group and Mccoy groups were statistically comparable in No. of Persons required for intubation (P=0.490 in table 11), Cormac lehane grade distribution (P=0.332 in table 12), additional maneuvers required (P=0.702 in table 13) and side effects (P=0.667 in table 14).

Table 9: Duration of intubation (sec) distribution in two groups of patients

Duration of intubation(sec)	CMac laryngoscope group	MCcoy laryngoscope group	Total
<35	9(36%)	0(0%)	9(18%)
35-70	16(64%)	19(76%)	35(70%)
>70	0(0%)	6(24%)	6(12%)
Total	25(100%)	25(100%)	50(100%)
Mean ± SD	40.76±10.25	59.16±12.44	49.96±14.61

P<0.001** significant, Student t test

Table 10: No. of Attempts for intubation in two groups of patients

No. of Attempts	CMac laryngoscope group	Mccoy laryngoscope group	Total
1	22(88%)	17(68%)	39(78%)
2	3(12%)	8(32%)	11(22%)
Total	25(100%)	25(100%)	50(100%)

P=0.088+, significant, Fisher Exact test

Table 11: No. of Persons required for intubation in two groups of patients

No. of Persons	CMac laryngoscope group	MCcoy laryngoscope group	Total
1	25(100%)	23(92%)	48(96%)
2	0(0%)	2(8%)	2(4%)
Total	25(100%)	25(100%)	50(100%)

P=0.490, Not significant, Fisher Exact test

Table 12: Cormac lehane grade distribution in two groups of patients

Cormac lehane grade	Cmac laryngoscope group	MCcoy laryngoscope group	Total
I	21(84%)	16(64%)	37(74%)
II	2(8%)	5(20%)	7(14%)
`III	2(8%)	4(16%)	6(12%)
Total	25(100%)	25(100%)	50(100%)

P=0.332, Not significant, Fisher Exact test

Table 13: Additional maneuvers distribution in two groups of patients

Additional manouvers	CMac laryngoscope group (n=25)	MCcoy laryngoscope group (n=25)	Total (n=50)
Nil	22(88%)	20(80%)	42(84%)
Yes	3(12%)	5(20%)	8(16%)
• ELM	3(12%)	5(20%)	8(16%)
• Magills	2(8%)	5(20%)	7(14%)

P=0.702, Not significant, Fisher Exact test

Table 14: Side Effects distribution in two groups of patients

Side Effects	Cmac laryngoscope group (n=25)	MCcoy laryngoscope group (n=25)	Total (n=50)
Nil	23(92%)	21(84%)	44(88%)
Yes	2(8%)	4(16%)	6(12%)
• Nasal bleed	2(8%)	2(8%)	4(8%)
• Nasal+oral bleed	0(0%)	2(8%)	2(4%)

P=0.667, Not significant, Fisher Exact test

Discussion:

Nasotracheal intubation is often difficult in patients undergoing maxillofacial surgery due to difficult airway . Variuos designs of laryngoscopes are available in clinical practice. Mccoy blade has a hinged tip at the laryngoscope blade that helps in intubation[10]. Cmac blade with a video camera at the tip of laryngoscope blade also is a better aid for intubation .[11-13]

In our study we found that the demographic data was similar in both CMac and Mccoy laryngoscope groups . Other studies done by Divya Jain, Indu Bala etal, in cervical spine injuries15 also had similar results.

Heamodynamic response was almost statistically same in both CMac and Mcoy groups . we found that the type of the blade blade do not much influence the haemodynamics In our study, Cmac blade helped us in better visualization of the glottis than Mcoy blade . So duration of nasotracheal intubation was less with CMac laryngoscope than Mccoy laryngoscope leading to significant statistically difference ($p<0.001$). This is similar to a study conducted by Divya Jain, Indu Bala etal, in cervical spine injuries15 in terms of intubation parameters. Another study done by Vinuta V Patil, Bala H Subram anyaetal also showed that CMac helps in intubating conditions[16].

As the glottis was better seen with CMac blade than Mccoy blade, we required less number of attempts for intubation in CMac blade than Mccoy blade.Other intubation parameters like No. of Persons required for intubation ,Cormac lehane grade distribution, additional maneu vers required ,and side effects were almost same in Cmac and Mccoy groups.

Conclusion: Cmac video laryngoscope improves nasotracheal intubation with less duration of intubation and less number of attempts than Mccoy laryngoscope.

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