

Comparison of the Stress Response, Laryngoscopic View and External Manipulation During Laryngoscopy and Intubation Using Macintosh Versus Flexitip (Trupty) Blade

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ABSTRACT

Introduction: laryngoscopy and intubation is known to have profound cardiovascular effects like a pressure response and tachycardia associated with increase in catecholamine concentrations. The hinged blade tip (MacCoy) laryngoscope blade allows elevation of epiglottis with exertion of lesser force and hence reducing stress response. This laryngoscope blade is also found to be useful in improving laryngeal view in difficult airway. Study aimed to compare flexitip (Trupty) blade with standard Macintosh blade during laryngoscopy and intubation with regard to Heart rate, Blood pressure and laryngoscopic view.

Material and Methods: We studied 100 patients, with 50 each in Group 1 and Group 2, of age 18 - 60 years, ASA 1 and 2 in elective surgery under general anaesthesia with endotracheal intubations. Arterial pressure and heart rate were recorded at baseline preoperative and after sedation, later on after intubation till the end of the surgery and laryngeal view also assessed. Data within each group were analysed using repeated measured analysis of variance and both the groups using student's 't' test

Results: In our study, there was significant reduction ($p = 0.0202$) in stress response i.e. heart rate and blood pressure with the use of flexitip laryngoscope blade. Also there was reduction in requirement of number of attempts, external manipulations with flexitip blade though it was not statistically significant.

Conclusion: To avoid stress response to laryngoscopy and further complications, use of flexitip (Trupty) blade is a good choice, also there were improvement in laryngoscopic view, requirement of attempts and external manipulations.

Keywords: Stress Response, Trupty Blade, McIntosh Blade, Laryngoscopy

increases as the degree of difficulty increases; the flexitip laryngoscope blade is useful to facilitate the difficult visualization of the larynx^{1,2}. Flexitip blade results in significantly less force being applied during laryngoscopy and hence less stress response⁷.

We did a prospective study of a comparison of stress response, laryngeal view, requirement of external manipulations and number of attempts during laryngoscopy and intubation using Macintosh and flexitip (Trupty) blade.

MATERIAL AND METHODS

A prospective randomised study of comparison of Macintosh and flexitip (Trupty) laryngoscopic blades in intubation. Study was carried out in 100 patients after institutional ethics committee approval. Inclusion criteria's were, ASA 1 and 2 patients with the age group of 18 - 60 years, posted for elective surgeries under general anaesthesia with endotracheal intubation.

Exclusion criteria's were anticipated difficult intubations with inter incisor gap < 5 cm or two finger breadths, body mass index > 30 kg /square meter, Neck circumference > 18 cm, mallampatti classification grade 3 and 4, thyromental distance < 6.5, history of reflux esophagitis, ASA 3 and 4, patient's refusal to participate in the study and difficulty in communication.

Patients were investigated for routine blood and radiological examinations and were randomly assigned to one of the two groups using computer generated random codes. Group A is Macintosh and group B is flexitip.

After taking informed and written consent, monitors were attached, pulse oximeter, cardioscope, noninvasive BP cuff. Patients were premedicated with IV Glycopyrolate 0.004mg / kg, IV Midazolam 0.03 mg / kg, IV Fentanyl 1 microgram / kg. Arterial pressure and heart rate were recorded at baseline preoperative and after sedation.

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INTRODUCTION

Laryngoscopy and Intubation is the major cause of sympathoadrenal response believed to arise from stimulation of supraglottic region by laryngoscope blade and tracheal tube placement and cuff inflation^{1,3}.

Laryngoscope blade allows elevation of epiglottis with exertion of lesser force and hence reducing stress response. This laryngoscope blade is also found to be useful in improving laryngeal view in difficult airway, there are two different blades used here one is Macintosh and other is flexitip. When laryngoscopy is difficult, the force applied

Patients were induced with IV Thiopentone sodium 5mg / kg, Neuromuscular blockade were given with IV Succinylcholine 2 mg / kg, laryngoscopy were performed with any of the two blades enabling a clear view of the vocal cord. Larynx were visualised with the Macintosh blade with forward movement of the whole instrument and with the Flexitip (TruTip) blade by just pressing the lever and lifting the blade upwards. Laryngeal view were classified according to Cormac Lehane.

Trachea was intubated, Heart rate, blood pressure, were recorded for five minutes with one min. interval after intubation and later on every five min. interval till the end of the surgery.

Two attempts of intubations with or without external manipulations BURP (Backward, upward, rightward, posterior) were allowed. All intubations were performed in less than 15sec.

STATISTICAL ANALYSIS

Data with each group were analysed using repeated measured analysis of variance and both the groups using student's 't' test. P value of < 0.05 was considered significant.

RESULTS

Both groups were compared with respect to Heart rate, systolic and diastolic Blood pressure, number of attempts for intubation, external manipulation required for laryngoscopy to visualize the vocal cords, laryngeal view (Cormac Lehane). Heart rate - in preoperative and after sedation in both groups had no significance. Table 1 shows that heart rate was increased in group A patients where Macintosh blade was used during laryngoscopy and intubation, it was significantly increased in first 10 min. ($p < 0.0001$). Mean heart rate was increased by 9 - 20 / minute

(from 12% to 26.66%) above preoperative value in group A, in group B patients it was increased by 1-6 / minutes (1.33% to 8%).

Systolic blood pressure in preoperative and after sedation in both the groups had no significance. Table 2 shows that Systolic blood pressure was increased in group A patients with the use of Macintosh blade, after laryngoscopy and intubation. It was significantly increased for first three min. after intubation ($p = 0.0596$), ($p = 0.0005$), ($p = 0.0204$) at first, second and third min. respectively. Mean systolic blood

Time Point	Group A (Macintosh)			Group B (Flexitip)			P value
	Mean	SD	SEM	Mean	SD	SEM	
Pre op	75.58	4.572	0.6466	76.4	5.743	0.8122	0.4315
Sedation	74.26	4.619	0.6533	75.12	5.773	0.8165	0.4128
1 min	95.66	14.843	2.099	82.28	13.784	1.949	<0.0001
2 min	94.38	13.561	1.918	81.82	13.102	1.853	<0.0001
3 min	92.68	12.904	1.825	81.56	12.977	1.835	<0.0001
4 min	92.26	12.62	1.785	80.00	12.646	1.704	<0.0001
5 min	91	12.169	1.74	79.64	12.042	1.703	<0.0001
10 min	84.8	10.829	1.531	77.26	9.15	1.296	0.0003

Table-1: Comparison of heart rate at various intervals between group - A and group - B using chi-square t-test

Time Point	Group A			Group B			P-value
	Mean	SD	SEM	Mean	SD	SEM	
Pre op	118.34	8.616	1.218	116.44	8.567	1.212	0.2715
Sedation	111.22	19.331	2.734	113.68	11.84	1.674	0.4447
1 min	124.16	22.664	3.205	117.84	11.085	1.568	0.0596
2 min	126.5	14.646	2.071	116.88	11.912	1.685	0.0005
3 min	121.36	14.931	2.112	114.7	15.446	2.184	0.0204
4 min	116.78	19.617	2.774	114.56	11.339	1.604	0.4901
5 min	118.2	14.784	2.091	114.56	9.416	1.332	0.1452
10 min	113.08	14.372	2.033	111.94	7.408	1.048	0.6192

Table-2: Comparison of systolic blood pressure at various intervals between group - A and group - B using chi-square t-test

Time Point	Group A			Group B			P-value
	Mean	SD	SEM	Mean	SD	SEM	
Pre op	76.84	5.464	0.7227	77.4	5.555	0.7856	0.6124
Sedation	74.36	7.159	1.012	75.32	5.385	0.7615	0.4504
1 min	83.24	9.623	0.361	79.06	8.001	1.132	0.0202
2 min	82.52	10.981	1.553	78.5	8.355	1.182	0.042
3 min	79.54	8.906	1.259	77.74	6.942	0.9818	0.02624
4 min	75.14	8.202	1.16	76.78	7.249	1.025	0.3828
5 min	75.56	9.154	1.295	76.04	6.866	0.971	0.7674
10 min	73.72	8.91	1.26	74.44	5.953	0.8418	0.6358

Table-3: Comparison of diastolic blood pressure at various intervals between group - A and group - B using chi-square t-test

No of Attempts	Group A (%)	Group B (%)	P - value (Fisher's exact test)
I	47(94%)	48(96%)	1.00
II	3(6%)	2(4%)	1.00

Table-4: Comparison of number of attempts between two groups, group - A and group - B using fisher's exact-test

External Maneuver	Group A	Group B	P-value (Fisher's exact test)
Yes	10 (20%)	3 (6%)	0.0713
No	40 (80%)	47 (94%)	

Table-5: Comparison of external maneuver required for laryngoscopy to visualize the vocal cords in between two groups, group - A and group - B using fisher's exact-test

pressure was increased by 3 - 6 mmHg (6% to 12%) in group A patients, and in group B, it was increased by 0 - 2 mmHg (0% to 4%).

Diastolic blood pressure in preoperative ($p = 0.6124$) and after sedation ($p = 0.4504$), in both the groups had no significance. Table 3 shows that Diastolic blood pressure was increased in group A patients with the use of Macintosh blade for laryngoscopy and intubation, it was increased for first three min. after intubation ($p = 0.0202$), ($p = 0.042$), ($p = 0.02624$) at first, second, and third min. respectively. Mean diastolic blood pressure was increased by 3 to 7 mmHg (6% to 14%) in group A, and in group B.

Comparison of number of attempts in two groups had no significant difference ($p = 1.000$). Table 4 shows that out of 50 patients, three patients (6%) in group A, and two patients (4%) in group B required second attempt.

Table 5 shows that out of 50 patients, ten patients (20%) in group A and three patients in group B (6%) required external manipulation thus, there was no significant difference ($P = 0.0713$) observed between requirement of external manipulations for laryngoscopy in both the groups.

DISCUSSION

The reflex nature of the pressure response to laryngoscopy and intubation is due to changes that initiated by laryngoscope blade pressing on the base of the tongue or lifting of epiglottis. In past, flexitip (MacCoy) and Macintosh blade has been compared with regard to pressure, heart rate and rhythm changes in response to laryngoscopy where MacCoy blade had been shown to require less force than Macintosh blade for visualization of larynx⁶. In another study, laryngoscopic view and hemodynamic changes with flexitip (MacCoy) and Macintosh laryngoscope blades, laryngoscopic view has improved in patients with limited neck extension¹.

In this, randomised prospective study of a comparison of the stress response, laryngoscopic view and external manipulation during laryngoscopy and intubation using Macintosh versus flexitip (Truption) blade. We studied 100 ASA1 and 2 patients between the age group of 18 - 60 yrs. Undergoing elective surgery under general anaesthesia.

Study conducted by E.P.McCoy et al⁴ found that among Macintosh blade group, there was significant increase in both heart rate (33%) and arterial blood pressure (27%) after laryngoscopy ($p < 0.01$), similar findings were observed in our study also. Study conducted by R.K.Afferty et al⁵ found that use of McCoy blade results in significantly less force being applied during laryngoscopy; this may be the reason force reduction in stress response. Similar findings were observed in our study.

J.P.Tuckey et al⁸. did a study among 230 patients found that there was minimal increase in heart rate, blood pressure with the use of flexitip laryngoscope blade, which further helps in avoiding stress related complications, similar findings were noted in our study.

CONCLUSION

To avoid stress response to laryngoscopy, use of flexitip (Truption) blade is a good choice, there was minimal increase in heart rate, blood pressure with the use of flexitip laryngoscope blade, which further helps in avoiding stress related complications

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