



## CARDIAC DYNAMICS DURING OROTRACHEAL INTUBATION USING FIBER OPTIC LARYNGOSCOPE AND LMA CTRACH, A COMPARISON OF TWO TECHNIQUES.

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### ABSTRACT

Our objective was to study the cardiac hemodynamic response to orotracheal intubation through laryngeal mask airway C-Trach and compare it to the hemodynamic response to intubation with fiber optic laryngoscope (FOI). **Materials and Methods:** After approval from institutional ethical committee, 100 patients of ASA physical Status I and II, aged 20-65 years, posted for elective surgery were included in the trial. They were randomly divided into two groups of each 50 patients. Anesthesia technique was standardized and patients of Group I were intubated using C trach LMA, while patients of Group II were intubated with the help of FO Laryngoscope. Hemodynamic parameters, systemic blood pressure (systolic and diastolic) and heart rate were recorded before and after induction of anesthesia and every minute up to 5 minutes after intubation. **Results:** Patients of Group I recorded a minimal rise in peak systolic blood pressure (SBP) (3.73%) and diastolic blood pressure (12.69%). In comparison patients of Group II recorded a significant rise in peak SBP (16.49%) and diastolic blood pressure (25.4%). However heart rate changes recorded in the two groups were of equal measure (peak rise of 26.09% in Group I vs. 21.4% in Group II). **Conclusion:** We conclude that intubation through C-Trach generates a lower limited presser response to intubation while heart rate increase was of equal measure.

**KEYWORDS :** fiber optic, hemodynamic, Ctrach

### INTRODUCTION

Presser sympathetic response to direct laryngoscopy to facilitate endotracheal intubations an established reflex precipitating a probable 40% increase in systemic blood pressure both systolic and diastolic and heart rate (1). The increase is sudden reflex and may settle to normal levels within few minutes after intubation in anesthetized patient (2). However steep rise in these parameters may be detrimental to body majorly heart which may sustain insult or injury due to enhanced cardiac workload thus increase in oxygen demand. Most studies have reported enhanced sympathetic response following intubation using Macintosh laryngoscope treating laryngoscopy and intubation as a single stimulus, which manifestly they are not. The mechanism of hemodynamic response to laryngoscopy and orotracheal intubation is hypothesized to be by somato-visceral reflexes. Stimulation of proprioceptors at the base of the tongue during laryngoscopy induces impulse dependent increases of systemic blood pressure, heart rate and plasma catecholamine concentrations (3). Subsequent orotracheal intubation recruits additional receptors that elicit augmented hemodynamic and epinephrine responses as well as some vagal inhibition of the heart (10). However intubation with other intubating aids, fiber optic laryngoscope and Ctrach LMA may not stimulate the somato visceral reflex suggested, to the extent seen with direct rigid laryngoscope and thus cause less presser reaction. So we decided to assess the hemodynamic response to orotracheal intubation using fiber optic laryngoscope and Ctrach LMA in a single blind trial. The study was conducted in department of Anesthesia CCMMC, Kachandur, Durg from January 2019 to January 2021.

### Patients and Method

The study was conducted in the Department of Anesthesia at CCMMC, Kachandur, Durg, Chhattisgarh. Approval was obtained from the institutional scientific and ethical committee. After written informed consent, 100 patients of American Society of Anesthesiologists physical Status I and II of either sex, in the age group 20-65 years, posted for planned surgery were included in the trial. The sample size calculation was based on a previous study, [2] which indicated that minimum 35 patients in each group will be required to compare means of difference between groups by 95% confidence interval and study power 80% between groups. Patients requiring a second attempt at intubation were excluded. They were randomly divided into two groups using the sealed opaque envelope technique:

Group I: (50 patients) intubated using Ctrach LMA

Group II : (50 patients) intubated with fiber optic laryngoscope (FOL).

Patients were premedicated with tablet alprazolam (0.5 mg) on the night before surgery. In Operation Theater patients were reassured and connected to multipara monitor. Baseline hemodynamic parameters were recorded and labeled "basal." Intravenous access was achieved and injection fentanyl 2 mcg/kg was given. Anesthesia was induced with intravenous propofol 2.5 mg/kg. This was followed by muscle paralysis with 1-2 mg/kg of suxamethonium. Having achieved paralysis orotracheal intubation was performed using Ctrach or fiber optic laryngoscope. Systolic and diastolic blood pressure, heart rate, oxygen saturation and PaCO<sub>2</sub> were monitored and any adverse event was recorded. Hemodynamic recordings were made at one, two, three, four and five minutes after successful intubation and labeled T1, T2, T3, T4, and T5. Adverse event like hypoxemia and hyperkapnia were recorded. All recordings of the two groups were sent to another person for tabulation and statistical analysis applying Student t test for paired and unpaired observations.

### Observations

Average age and weight of patients in two groups were comparable and no statistically significant difference was observed. Male female distribution in two groups was similar. Table-1

GROUP	MEAN AGE IN YEARS	MEAN WEIGHT IN Kg	MALE: FEMALE
GROUP I	41.30 (15.10)	59.90 (09.99)	29:21
GROUP II	39.89 (16.70)	56.80 (12.44)	26:24
P value	>0.05 insignificant	insignificant	insignificant

Systolic blood pressure rose steeply by both statistical and clinically significant margin above basal value in group II at one minute (T1) after intubation and settled to basal level by third minute (T3) whereas in group I increase in systolic blood pressure was both statistically and clinically insignificant. A similar pattern was recorded in Diastolic blood pressure. Heart rate however rose significantly in both groups but increase in group I was more sustained at T5 and was significantly higher than basal value. Table 2

	BASAL	T1	T2	T3	T4	T5
SBP	131.2	134.8	136.1	128.9	124.1	120.1
GROUP I	(18.10)	(22.90)	(22.90)	(19.88)	(20.60)	(19.90)

SBP GROUP II	128.5 (15.96)	149.7 (17.60)	138.3 (13.40)	124.8 (11.10)	124.7 (10.60)	119.7 (08.20)
DBP GROUP I	78.80 (12.20)	88.80 (16.60)	85.10 (17.10)	77.60 (14.90)	76.10 (14.40)	74.20 (15.10)
DBP GROUP II	73.60 (06.99)	92.30 (07.90)	79.34 (08.80)	70.70 (07.90)	69.40 (07.70)	69.10 (07.30)
HR GROUP I	82.40 (16.60)	103.1 (20.70)	103.9 (22.90)	99.80 (21.60)	98.20 (24.20)	98.10 (23.30)
HR GROUP II	85.00 (15.20)	100.1 (08.98)	103.2 (10.10)	99.92 (09.91)	89.80 (09.80)	87.60 (09.80)
	MEAN (SD)	MEAN (SD)	MEAN (SD)	MEAN (SD)	MEAN (SD)	MEAN (SD)

70% patients in group I recorded significant > 20% increase in heart rate and 66% in group II. No event of extreme hypoxemia or hyperkapnia was recorded. . No event of cardiac arrhythmia was recorded in any patient during the entire study period.

## DISCUSSION

King et al first described sympathetic hemodynamic response to laryngoscopy and endotracheal intubation (4) Direct rigid laryngoscope blade exerts pressure at base of tongue thus stimulates proprioceptors, resulting in a significant proportionate increase in catecholamine and hemodynamic parameters. Passage of the tube through the trachea further aggravates this response by somato-visceral reflex followed by rapid regression of systemic blood pressure and heart rate whereas plasma catecholamine concentrations regress more slowly. Several attempts to alter the response have been published time and again. LMA as well as fiber optic laryngoscopic orotracheal intubation technique may produce mild pressure and presser response. Insertion of LMA generating lower sympathetic response has been reported by Akbar et al.(4) and Wood MLB and Forrest ETS (5). Reports of hemodynamic response following intubation with ILMA vary from minimal cardiovascular response (6) to no different from intubation with DL(7,8) Li et al. (9) reported no significant changes in hemodynamics after intubation with C trach LMA. Smith JE and Grewal MS found significant tachycardia following intubation with FOL (11). FS Xue showed significant increase in blood pressure, heart rate and rate pressure product following intubation with FOL (12). In our study we used C-Trach assembly to intubate under vision, record the hemodynamic response to intubation and compare it to the response seen after intubation with fiber optic laryngoscope. Minimal or no clinical rise in SBP (3.73%), a modest rise in DBP (12.69%) was recorded, while intubating with C-Trach LMA. In comparison, statistically and clinically significant increases were recorded in systolic and DBP (16.49% and 25.4%) after intubation using FOL. The rise recorded in systemic blood pressure was transient and settled to basal levels by second minute after intubation in FOL group. However the heart rate increase recorded in the two groups (26.09% in Group I and 21.4% in Group II) was statistically and clinically significant and of equal magnitude and stayed higher than basal values even at five minutes after intubation. Stimulation of supraglottic region by tissue tension is the major cause of sympathoadrenal response to tracheal intubation and placement of tube through cords contributes little additional stimulation. Laryngoscopy produces a balanced stimulation of vagal and cardiac accelerator fibers, whereas intubation produces less vagal stimulation (10). Our study reveals that intubation using C-Trach generates low sympathetic stress response because the proprioceptors at the base of the tongue are not stimulated. The response to the passage of tube through the trachea resulted in sympathetic stimulation, precipitating a profound increase in heart rate in both C-Trach and FOL group. Easy insertion and secure airway are other benefits of C-Trach assembly. The subdued response could be helpful in hypertensive patients where fluctuations are wide and probable higher morbidity. We conclude that CTrach assembly is a useful technique of intubation as it generates

low hemodynamic response.

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