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Original Article

Comparative Study of Intraocular Pressure and Haemodynamic Responses to Laryngeal Mask Airway and Endotracheal Tube

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Abstract

Introduction: Laryngoscopy and endotracheal intubation is the most common method of securing a definitive method for administering anesthesia. However, it is associated with tachycardia, hypertension, and increase in intraocular pressure.

Materials and Methods: The present study was undertaken between August 2004 and October 2005. The approval for the study was obtained from the ethics committee.

Results: The time taken for tracheal tube (TT) intubation was slightly more than that of laryngeal mask airway (LMA) (14.00 ± 1.58 vs. 13.37 ± 2.09). Basal reading was taken, and the next reading taken was after induction and ventilation with 100% oxygen for 3 min. Hence, the heart rate response to anesthetic induction might not have been observed. Basal and postinduction values between the two groups did not differ significantly. Increase in heart rate in LMA and TT groups after insertion of airway was from 84.53 ± 7.79 to 92.13 ± 10.83 and from 87.43 ± 9.90 to 98.20 ± 9.45, respectively. Heart rate remained elevated till 4 min in TT group whereas in LMA group tachycardia resolved by the 3rd min.

Conclusion: It was observed that after premedication with midazolam 0.05 mg/kg, IV pentazocine, 0.5 mg/kg. IV glycopyrrolate 4-6 µg/kg causes decrease in all the parameter in both the groups individually, but comparison between the two groups was not significant. Time taken for insertion of LMA was more as compared to endo TT, but the difference was not significant. After insertion of airway, heart rate, systolic blood pressure, diastolic blood pressure, mean arterial pressure, SpO_2, and intraocular tension were noted. It was observed that 9.17% increased in pulse rate over basal value in LMA group and 12.78% increased in TT group.

Key words: Anesthesia, Endotracheal, Laryngoscopy

INTRODUCTION

Laryngoscopy and endotracheal intubation is the most common method of securing a definitive method for administering anesthesia. However, it is associated with tachycardia, hypertension, and increase in intraocular pressure (IOP). These changes have been associated with a rise in plasma noradrenaline levels, confirming a predominantly sympathetic response to it.[1-3] The rise in IOP may also be secondary to increased sympathetic activity causing vasoconstriction and an increase in central venous pressure which has a closer relationship with IOP than systemic arterial pressure. The hemodynamic effects are likely to be deleterious in patients with pre-existing hypertension or coronary ischemia whereas the rise in IOP may be detrimental in patients with glaucoma, perforating eye injury, and compromised retinal or optic disc circulation.[4,5]

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The laryngeal mask airway (LMA) was introduced by Brain in 1983.[6] LMA fills the gap in airway management

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between tracheal intubation and face mask, both in terms of anatomical location and degree of invasiveness. Over the past 10 years, its use has progressed from a novelty to an important part of an anesthetist's equipment. Among its advantages in comparison with the tracheal tube are:

1. Minimal risk of esophageal or endobronchial intubation.
2. No requirement for laryngoscope or a muscle relaxant.
3. Better tolerance at lighter levels of anesthesia.
4. Less incidence of sore throat.
5. Less resistance to breathing.
6. Minimal cardiovascular response to insertion.
7. Minimal effects on IOP.

Since its initial introduction, many advantages of the LMA have become apparent. It is now proposed as

- A routine airway for general anesthesia.
- As an aid in the management of the difficult airway.

As mentioned earlier, the benefits of the LMA on IOP and pressor response might prove it to be useful in certain groups of patients in whom a marked response might be detrimental. Many techniques to attenuate the response to the TT have been attempted. Perhaps, the LMA might replace the TT as the device of choice for airway management in these types of patients.[7-10]

Hence, the present study was designed to assess the hemodynamic and IOP response by LMA and TT.

Aims and Objectives

1. To study the hemodynamic changes by LMA and TT.
2. To study the IOP changes by LMA and endoTT.

MATERIALS AND METHODS

The present study was conducted between August 2004 and October 2005. The approval for the study was obtained from the ethics committee.

Study Population

A total of 60 American society of Anesthesiologists (ASA I) patients aged 20-40 years undergoing elective or emergency surgical or orthopedic procedures of 2-3 h duration were included in the study.

Design of Study

This was a randomized, prospective, and single-blinded study.

Inclusion Criteria

1. Patients of ASA physical status I.
2. Age of patients between 20 and 40 years.
3. Patients who were nil by mouth for 6-8 h.
4. Patients have minimum mouth opening of 3 cm.
5. Patients posted for duration of up to 2-2½ h of surgical or orthopedic procedures.

Exclusion Criteria

- Patients with history of hypertension, ischemic heart disease, diabetes mellitus, bronchial asthma.
- Patients with glaucoma.
- Inability to open the mouth more than 2 cm or have restriction in neck movements.
- Patients having pharyngeal pathology (abscess, hematoma).
- Patients with potential risk for gastric regurgitation, obesity, hiatus hernia.
- Patients with low lung compliance or high airway resistance (Chronic smokers, bronchospasm, thoracic trauma).
- Patients taking drug treatment known to affect heart rate, blood pressure, or hormonal stress response.
- Patients requiring more than one attempt at airway insertion.

Intervention Allocation

The patients were randomly divided into one of the two groups (random allocation by draw of chits).

1. Group I (n = 30)
   They were induced and LMA was inserted.
2. Group 2 (n = 30)

They were induced and laryngoscopy and then endotracheal intubation was done. The same set of hemodynamic monitors and equipment were used for each group.

Preoperative Preparation

- Informed consent was obtained from all patients.
- Basal pulse rate per minute, systolic blood pressure (SBP) (mmHg), diastolic blood pressure (DBP) (mmHg), SpO_2 (%), IOP (mmHg) were recorded by Schiotz tonometer after instillation of 4% lignocaine drops.
- Intravenous ranitidine 1 mg/kg and intravenous metoclopramide 0.15-3.0 mg/kg was administered half an hour before induction.
- Standard monitoring including manual blood pressure, pulse oximetry probe, electrocardiography.

Both the groups received following premedication.

- Intravenous glycopyrrolate: 4-6 μg/kg.
- Intravenous midazolam: 0.04 mg/kg.
- Intravenous pentazocine: 0.5 mg/kg.

Induction and Maintenance

- Oxygen at 6 l/min was delivered through a face mask for 2 min. Anesthesia was induced with 5-6 mg/kg of 2.5% thiopentone sodium followed by 0.10 mg/kg vecuronium.

- Patients were ventilated using a face mask with O_2 for 3 min. After 3 min, the patients were either intubated orally using a Macintosh laryngoscope and cuffed endoTT or an LMA was inserted using Brain's classical method. Patients requiring more than one attempt at airway insertion were excluded from the study.
- Cuff of LMA was inflated with 20 ml size 3 (MA) or 25-30 ml (size 4) of air and cuff of TT inflated with 3-5 ml of air
- The airway was connected to Bain circuit. Proper placement of LMA or ETT was confirmed by auscultating the breath sounds on both sides of chest during controlled ventilation. After confirmation of placement of airway, airway was fixed. Anesthesia was maintained using a mixture of nitrous oxide and oxygen (67%; 33%) with halothane (0.5-1%). Supplemental vecuronium was administered if necessary.
- Ventilation was controlled with Bain breathing system. At the end of the procedure, neuromuscular block was antagonized by 0.05 mg/kg neostigmine and 0.02 mg/kg glycopyrrolate; patients were ventilated with 100% O_2 for few minutes following which airway device was removed after assessing adequate reversal.

The parameters to be studied, i.e., IOP, heart rate, blood pressure (SBP, DBP, and mean arterial pressure [MAP,]) were measured. MAP = DBP +1/3 (SBP-DBP).

1. Just before intubation.
2. After premedication.
3. Immediately following intubation.
4. Each minute following intubation for 5 min.

The right eye was used for all IOT measurements.

Statistical Analysis

IOP and hemodynamic values were compared with baseline preinduction and preinsertion values by paired *t*-test.

At each point of measurement, the IOP and hemodynamic values between the two airway management groups were compared by an analysis of variance and by an unpaired Student's *t*-test. Non-parametric variables within the two groups were compared using Chi-square test. Results were decided as follows:

- $P < 0.001$: Highly significant.
- $P < 0.01$: Significant.
- $P < 0.05$: Probably significant.
- $P > 0.05$: Not significant.

RESULTS

This is hospital-based, randomized, controlled, single-blinded clinical study. This study was carried out during the period from August 2004 to October 2005, in Government Medical College and Hospital, Nagpur.

The study was approved by the Ethics Committee of Government Medical College and Hospital, Nagpur.

A total of 60 patients of either sex, undergoing surgical, orthopedic procedures of 1-2 h duration and satisfying the inclusion criteria were included in the study.

The patients were divided into two groups of 30 each.

Group I (*n* = 30): Patients in which LMA was inserted.

Group 2 (*n* = 30): Patients in which endoTT (TT) was used (Table 1).

Patients belonging to the age group of 20-40 years were included in the study (Table 2).

The patients included in the study weighed between 40 and 70 kg with maximum number of patients falling in the range of 40-50 years (Table 3).

The average age of the patients in the groups was 28.38 ± 6.70 years in Group I and 30.50 ± 5.91 years

Table 1: Distribution of patients according to age

Age	*n* (%)	
	Group I (*n*=30)	Group II (*n*=30)
20-30	19 (63.3)	17 (56.7)
31-40	11 (36.7)	13 (43.3)

Table 2: Distribution of patients according to weight

Weight (Kg)	*n* (%)	
	Group I (*n*=30)	Group II (*n*=30)
40-50	23 (76.7)	17 (56.7)
51-60	6 (19.9)	12 (39.9)
61-70	1 (3.4)	1 (3.4)

Table 3: Demographic characteristics of the patients in the 3 study group

Characteristics	Mean±SD		*P* value
	Group I (*n*=30)	Group II (*n*=30)	
Age (years)	28.83±6.70	30.50±5.91	0.311
Weight (Kg)	48.63±5.55	50.40±5.56	0.223

SD: Standard deviation

in Group II. The age of the two study groups were comparable and have insignificant difference ($P > 0.05$).

Similarly, the average weight of the patients was comparable, with average weight of 48.63 ± 5.55 in Group I and 50.40 ± 5.56 in Group II and they have an insignificant difference ($P > 0.05$).

The percentages of male patients in Groups I and II were 60 and 63.34, respectively, while percentages of female patients in Groups I and II were 40 and 36.66, respectively. Both the groups are comparable with respect to their sex (Table 4).

A maximum number of patients were subjected to hydrocele followed by fractured patella. All of the above surgeries required about 1-2 h. Most of the patients were made ambulatory in 6-8 h. Intravenous fluids given were lactated ringer solution and dextrose normal saline. There was no blood replacement (Table 5).

Table 4: Distribution of patients according to sex

Sex	*n* (%)		Total
	Group I (*n*=30)	Group II (*n*=30)	
Males	18 (60)	19 (63.34)	37
Females	12 (40)	11 (36.67)	23

Table 5: Distribution of patients according to the type of surgery

Type of surgery	*n* (%)		Number of cases
	Group I (*n*=30)	Group II (*n*=30)	
Fracture medial malleolus	2 (6.7)	2 (6.7)	4 (6.7)
Fractures humerus	2 (6.7)	2 (6.7)	3 (5)
Hydrocele	7 (23.4)	6 (20)	13 (2.6)
Orchidopexy	2 (6.7)	3 (10.05)	4 (6.7)
Excision of breast lump	2 (6.7)	1 (3.3)	3 (5)
Appendicitis	5 (16.6)	5 (16.6)	10 (16.6)
Fracture patella	5 (16.6)	4 (13.3)	9 (20.1)
Amputation below knee	4 (13.3)	3 (10.05)	7 (11.6)
Herniorrhaphy	1 (3.3)	4 (13.3)	4 (6.7)

The basal pulse, SBP, DBP, MAP, oxygen saturation, and IOP were comparable and their difference is not significant ($P > 0.05$) (Table 6).

After premedication, although there is decrease in value from the basal line in both groups individually, but when the two groups were compared after premedication, two groups were comparable with insignificant difference ($P > 0.05$).

Table 7 shows the insertion time for the airway in two groups. In Group I, mean time taken for insertion is 14.00 ± 1.58 and in Group II it is 13.37 ± 2.09. Insertion time was marginally less in Group II than Group I, but the difference is comparable and is insignificant ($P > 0.05$).

Table 8 shows the change in mean pulse rate after premedication and for 5 min after airway insertion. The basal pulse rate in both the groups was comparable ($P > 0.05$).

There was rise in pulse rate in both groups after insertion of airway with maximum rise in Group I at 0 min and at 1 min in Group II.

The maximum increase in Group II is at 1 min with mean of 100.68 ± 9.13 (14.82% over the basal value).

The maximum mean heart rate at 0 min in Group I is 92.13 ± 10.83 (9.17% increase over the basal value), and the mean heart rate at 0 min of Group II is 83. 72 ±7.82 (12.78%) increase over the basal value) which is more than the maximum increase of Group I which is at 0 min.

Hence, there is more rise in heart rate in Group II than Group I ($P < 0.05$).

Heart rate fell to baseline by the 5th min in Group II whereas in Group I tachycardia resolved by the 3rd min.

The increased heart rate was significantly more with TT till the 5th min after intubation ($P < 0.05$), with maximum significant difference is at 1 min (P =0.000).

Table 6: Comparison of Basal haemodynamic parameters, intraocular tension and after premedication

Parameter	Mean±SD				*P* value
	Group I		Group II		
	Basal	Premedication	Basal	Premedication	
Pulse±SD	84.53±7.79	84.97±7.86	87.43±9.90	83.72±7.82	>0.05
SBP±SD	124.33±10.1	109.67±10.43	126.13±8.22	113.73±7.75	>0.05
DBP±SD	78.87±5.48	75.33±5.39	79.33±5.28	73.87±5.68	>0.05
MAP±SD	93.77±5.97	86.73±6.21	95.03±5.23	87.13±4.99	>0.05
SpO_2±SD	99.10±0.84	98.67±0.76	99.43±0.86	98.60±0.93	>0.05
IOT±SD	13.86±1.57	13.86±1.99	137.43±1.527	13.49±1.40	>0.05

IOT: Intraocular pressure change, SD: Standard deviation, MAP: Mean arterial pressure, DBP: Diastolic blood pressure, SBP: Systolic blood pressure

Table 9 shows the changes in mean SBP in the two groups.

The basal SBP in both the groups were comparable ($P > 0.05$).

After premedication, the SBP was decreased, but when two groups compared, difference was not significant ($P > 0.05$). The fall in two groups was similar.

Both airway groups demonstrated a rise in SBP after insertion, with the maximum increase in both groups at 0 min. In Group I, mean SBP is 128.00 ± 16.73 (3.05% increase above the baseline value) and in Group II it is 154.27 ± 8.82 (22.56% increase above the baseline).

SBP remains elevated for 4 min in Group II, but it reached baseline value in 2 min in Group I; there was highly significant difference between the two groups till 2 min ($P = 0.000$), but it remains significant throughout the 5 min ($P = 0.01$).

Table 10 shows the change in mean DBP in two groups. The basal and postinduction values were comparable ($P > 0.05$) and not statistically significant.

DBP fall with induction of anesthesia, and then rose with airway insertion. Maximum increase in both groups is at 0 min, with mean of 80.40 ± 5.42 (2.23% increase over the basal value) in Group I and mean DBP in Group II at 0 min is 94.37 ± 6.48 (with 19.34% increase over is basal value). The difference between the two groups is highly significant ($P = 0.000$) and it remains significant till 2 min ($P = 0.010$).

DBP falls to its preintubation value around 3rd min in Group II and 2nd min in Group I.

Table 11 shows the change in MAP at various time intervals.

The basal MAP values were comparable in two groups with $P > 0.05$. Although MAP fell with induction of anesthesia in both groups, it did not differ much between two groups ($P > 0.05$).

Laryngoscopy and intubation were accompanied by a rise in MAP that remained above preinsertion levels even by 5 min. LMA insertion in contrast was associated with rise in MAP that fell to preinsertion values after 1st min.

Maximum mean MAP achieved was 114.30 ± 6.23 with Group II (20.59% increase over the basal value) and 96.23 ± 8.34 (2.31% over basal value) in Group I. The maximum mean MAP is at 0 min and is highly significant ($P = 0.000$) and it remained highly significant till 2 min ($P = 0.000$). The change, however, remains significant till 5 min ($P < 0.05$).

The changes in mean SpO_2 in both groups were comparable at all times. The mean SpO_2 in both groups was between 97% and 99% (Table 12).

Table 7: Insertion time of airway on two groups

Insertion time (s)	*n* (%)	
	Group I (*n*=30)	Group II (*n*=30)
5-10	1 (3.3)	3 (10)
11-15	26 (86.7)	24 (80)
16-20	3 (10)	3 (10)
Mean±SD	14.00±1.58	13.37±2.09
P value	0.191	

SD: Standard deviation

Table 8: Mean pulse rate changes in two groups

Mean pulse rate	Mean±SD		*P* value
	Group I (*n*=30)	Group II (*n*=30)	
Basal	84.53±7.79	87.43±9.90	0.213
Post induction	84.47±7.86	83.72±7.82	0.713
Post insertion T0	92.13±10.83	98.20±9.45	<0.05
Post insertion T1	90.13±11.40	100.68±9.13	0.000
Post insertion T2	87.13±9.89	95.33±9.25	<0.005
Post insertion T3	84.80±8.30	91.54±11.17	<0.05
Post insertion T4	83.5±8.48	83.38±9.52	<0.05
Post insertion T5	87.13±8.48	81.84±5.83	<0.01

SD: Standard deviation

Table 9: Mean SBP at various time intervals

Mean SBP	Mean±SD		*P* value
	Group I	Group II	
Basal	124.33±10.01	126.13±8.22	0.450
Post induction	109.67±10.43	113.73±7.75	0.092
Post insertion T0	128.00±16.73	154.27±8.82	0.000
Post insertion T1	125.67±14.07	142.40±11.12	0.000
Post insertion T2	119.27±12.67	132.80±12.56	0.000
Post insertion T3	117.08±11.14	127.07±11.87	0.001
Post insertion T4	113.73±10.41	123.27±11.15	0.001
Post insertion T5	113.13±9.77	120.80±11.43	0.007

SD: Standard deviation, SBP: Systolic blood pressure

Table 10: Mean DBP at various time intervals

Mean DBP	Mean±SD		*P* value
	Group I	Group II	
Basal	78.87±5.48	79.33±5.49	0.465
Post induction	75.33±5.39	73.87±5.68	0.309
Post insertion T0	80.40±5.72	94.37±6.48	0.000
Post insertion T1	79.47±5.73	88.27±8.00	0.000
Post insertion T2	78.27±5.30	83.40±9.20	0.010
Post insertion T3	77.13±5.16	79.87±9.57	0.172
Post insertion T4	76.13±5.56	78.46±8.74	0.222
Post insertion T5	75.13±5.53	76.73±7.31	0.343

SD: Standard deviation, DBP: Diastolic blood pressure

Table 13 shows the change in mean IOP at various time intervals.

The basal values of the both groups were comparable ($P > 0.05$). Induction of anesthesia was accompanied by a negligible fall in IOP.

After insertion of airway of airway, there was marked rise of IOP that remained above baseline by 5 min in Group II whereas in Group I IOP fall to preinsertion value by 3 min.

Maximum mean IOP immediately following insertion at 0 min was 16.11 ± 2.36 (16.32% over the basal value) while it was 20.71 ± 1.83 in Group II (52.62% over the basal value).

The rise in IOP was highly significantly in Group II when compared to Group I ($P = 0.000$) till 1 min and remained significant till 3rd min ($P < 0.05$) of airway instrumentation.

Head position had to be changed for placement of airway. In Group I, 3 patients, i.e., 10% of the total patients, need head positing but in Group 2 change of head position was not needed. The difference was however not significant ($P = 0.076$) (Table 14).

Cough was present after the removal of airway and present in 7 patients (23.34%) in Group II and I (3.34%) in Group I. The numbers of patients in Group II showed statistical significant difference ($P = 0.01$).

Vomiting was present more in Group I; 6 (20%) patients had vomiting in Group I and only 1 (3.34%) patient had vomiting in Group 2. The number of patients showing vomiting was thus significantly more in Group I when compared to Group II ($P = 0.044$).

Thus, it was seen that the incidence of change of head position and vomiting was more in Group I. However, the change of head position was not significant. Cough is more in Group II as compared to Group I.

Table 11: Mean Arterial blood pressure at various time intervals

MAP	Mean±SD		*P* value
	Group I	Group II	
Basal	93.97±5.97	95.03±5.23	0.465
Post induction	86.73±6.21	87.13±4.99	0.784
Post insertion T0	96.23±8.34	114.30±6.23	0.000
Post insertion T1	94.80±7.33	106.40±7.91	0.000
Post insertion T2	91.90±6.87	99.87±9.47	0.000
Post insertion T3	90.50±5.63	95.57±9.02	0.012
Post insertion T4	88.63±5.96	93.40±8.23	0.013
Post insertion T5	87.80±6.28	91.40±7.36	0.045

SD: Standard deviation, MAP: Mean arterial pressure

Table 12: Mean SpO_2 changes in two groups

Mean SpO_2	Mean±SD	
	Group I	Group II
Basal	98.77±0.57	98.83±0.53
Post induction	98.57±0.57	98.47±0.78
Post insertion T0	98.60±0.56	98.00±0.87
Post insertion T1	98.60±0.56	98.20±0.76
Post insertion T2	98.80±0.41	98.60±0.56
Post insertion T3	98.90±0.31	98.80±0.48
Post insertion T4	98.90±0.31	98.93±0.25
Post insertion T5	99.90±0.31	98.93±0.25

Table 13: Mean IOT between two groups

Mean IOT	Mean±SD		*P* value
	Group I	Group II	
Basal	13.86±1.51	13.743±1.527	0.761
Post induction	13.86±1.99	13.49±1.40	0.409
Post insertion T0	16.11±2.36	20.71±1.83	0.000
Post insertion T1	15.43±2.04	18.39±1.96	0.000
Post insertion T2	14.69±1.93	15.78±1.47	0.017
Post insertion T3	13.86±1.46	14.99±1.50	0.004
Post insertion T4	13.81±1.42	14.42±1.76	0.148
Post insertion T5	13.73±1.44	14.22±1.88	0.266

IOT: Intraocular pressure change, SD: Standard deviation

Table 14: Intra and post operation complication

Complication	*n* (%)		*P* value
	Group 1	Group 2	
Head positing	3 (10)	0	0.076
Cough	1 (3.34)	7 (23.34)	0.01
Vomiting	6 (20)	1 (3.34)	0.044

DISCUSSION

Laryngoscopy and tracheal intubation to achieve airway control in anesthesia practice have been consistency bothering anesthesiologists with regard a regular occurrence of the pressor response associated with it even in normal patients, the process of airway insertion or removal is accompanied by significant pressor as well as IOP response.[11-13]

The hemodynamic responses, manifesting as increase in heart rate and blood pressure, are due to reflex sympathoadrenal discharge provoked by epilaryngeal and laryngotracheal stimulation subsequent to laryngoscopy and tracheal intubation. The stress response to tracheal intubation and extubation is also associated with increase in IOP. The mechanism of increase in IOP is secondary to increased sympathetic activity. Adrenergic stimulation causes increase in IOP by causing vaso- and veno-constriction, and increase in central venous pressure, and by increasing the resistance to the outflow of aqueous humor in trabecular meshwork between anterior chamber and Schlemm's canal.[14-17]

To attenuate such consequences during induction of anesthesia, various methods have been employed which include certain pharmacological agents, such as sublingual nifedipine, lignocaine, c\narcotic agents, sodium nitroprusside, and beta adrenergic blockers. The use of LMA in place of endoTT has also been shown to have attenuated hemodynamic response and IOP changes after its insertion.[18-20]

In this study, a total of 60 patients were selected aged 20-40 years posted for orthopedic or surgical procedure of 2-3 h. The patients satisfying the inclusion criteria were divided into 2 groups of 30 each as follows:

Group I: In this group after induction LMA was inserted.

Group 2: After induction laryngoscopy was done and endoTT inserted.

All the patients were premedicated with intravenous ranitidine 1 mg/kg and IV metoclopramide 0.15-0.3 mg/kg was administered half an hour before induction and then IV glycopyrrolate 4-6 μg/kg IV midazolam 0.05 mg/kg, IV pentazocine 0.5 mg/kg was given. Induction was done with IV thiopentone 5-6 mg/kg (2.5%) followed by 0.1 mg/kg rocuronium and airway inserted after 3 min of mask ventilation. Anesthesia maintained with M_2O and O_2 (67%; 33%) with halothane (0.5-1%) or Bain circuit on controlled ventilation supplemental vecuronium was administered inj necessary reversal done with IV neostigmine 0.05 mg/kg and 0.01 mg/kg glycopyrrolate, airway removed adequate reversal.

The same set of hemodynamic parameters such as pulse rate, systolic BP, diastolic BP, SpO_2, continuous ECG, and IOP were monitored in all patients.

CONCLUSION

After premedication with midazolam 0.05 mg/kg, IV pentazocine, 0.5 mg/kg. IV glycopyrrolate 4-6 μg/kg causes decrease in all the parameter in both the groups individually, but comparison between the two groups was not significant. Time taken for insertion of LMA was more as compared to endoTT, but the difference was not significant. After insertion of airway, heart rate, SBP, DBP, MAP, SpO_2, and intraocular tension were noted. It was observed that 9.17% increased in pulse rate over basal value in LMA group and 12.78% increased in TT group. The pulse rate in two groups was highly significant at 1 min and remained till 5 min. The SBP increased 3.05% above baseline in LMA group and 22.56% in TT group. There was highly significant difference between two groups at 0 min and remained till 5 min. Increase in DBP in LMA group was 2.23% over 19.34% increases in TT group. The difference was highly significant at 0 min and remains significant till 2 min. Mean arterial blood pressure was 2.31% increase in LMA group and 20.59% in TT group. The difference between two was significant at 0 min. The change, however, remains significant till 5 min. The increase in IOP in LMA group was 16.32% over basal value while in TT it was 52.62%. The difference is highly significant at 0 min and remains significant till 3rd min. There were no episodes of oxygen desaturation in any of the patients. The hemodynamic changes and the IOP changes in the LMA are less as compared to TT.

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