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Effect of inhalational agent Sevoflurane and intravenous agent Thiopentone on intraocular pressure in paediatric patient in non ophthalmic surgeries: A comparative study in a tertiary care hospital

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Abstract:

Background: Intraocular pressure is affected by laryngoscopy and tracheal intubation. Besides this it is also affected by anaesthetic drugs directly or indirectly.

Objectives: To compare the intraocular pressure changes following induction with sevoflurane and thiopentone in pediatric patients.

Methodology: Seventy pediatric patients aged between 2 to 8 years with ASA grades 1 and 2 were chosen at random and splited into two groups of 35 each. Patients in group 1 i.e. group S were induced with inhalational induction agent sevoflurane and patients in group 2 i.e. group T were induced with intravenous induction agent thiopentone. After that intraocular pressure was measured using Schiotz tonometer after loss of eye reflex, 1 minute after PLMA placement and 3 minutes after PLMA placement.

Results: Comparing the IOP in both sevoflurane and thiopentone group at corresponding timing showed that there was no difference after induction and before PLMA placement as p value is > 0.05 – non significant value. At 1 minute after PLMA placement p value is < 0.001. At 3 minute after PLMA placement p value is < 0.001 which indicate that there was highly significant changes in IOP in both the groups at 1 minute and 3 minutes after PLMA

placement. The increase in IOP is more in thiopentone group as compared to sevoflurane group.

Conclusion: Our study concluded that inhalational agent sevoflurane can be preferred agent in small children with supraglottic device for airway ma nagement in non ophthalmic surgeries.

Key words: Intraocular pressure, sevoflurane, thiopentone, tonometer

INTRODUCTION

Intraocular pressure is defined as the pressure exerted by contents of eye against its containing wall.[1] It is mainly determined by coupling of production and drainage of aqueous humor mainly through trabecular meshwork located in anterior chamber angle. Tonometer is the device and tonometry is the method used to measure intraocular pressure. The normal intraocular pressure is 10- 21mmHg.[2]

During general anaesthesia elevation of intraocular pressure of shorter or longer duration may be due to multiplicity of factors acting from outside the globe eg. extraocular muscle contraction and pressure response to laryngoscopy and intubation.[2,3] During laryngoscopy and tracheal intubation intraocular pressure increases of the order of 10-20 mm Hg which is possibly dependent on cardiovascular sympathetic responses to tracheal intubation. In LMA (Laryngeal Mask Airway) placement there is no laryngoscopy and tracheal stimulation as seen in endotracheal intubation. Hence LMA does not increase the blood pressure and intraocular pressure to high level, that makes LMA useful in patients with hypertension, myocardial ischaemia and for patients undergoing ophthalmic surgery with raised intraocular pressure.[4]Besides laryngoscopy and tracheal intubation, various anaesthetic drugs may affect the intraocular pressure directly through action on central diencephalic control centres, through facilitation or inhibition of aqueous production and drainage, through relaxation or contraction of extraocular and orbicularis oculi muscle or indirectly through their effect on the cardiovascular or respiratory system.[2] Out of many factors, IOP (intraocular pressure) is directly affected mainly by changes in systemic arterial pressure.[5]

IOP measurements are difficult to obtain in children. Determination made on alert non-cooperative child overestimate IOP due to rise in central venous pressure, extraocular muscle contraction and change in choroidal blood volume. General anaesthesia allows repeated determination of intraocular pressure on quite child. Anaesthesia may influence intraocular pressure depending on the type of inhalational anaesthetic agent like sevoflurane and

intravenous anaesthetic agent thiopentone which are commonly used induction agents in children that are known to influence hemodynamics and intraocular pressure.[6]

MATERIALS AND METHODS

Study design and study centre: The present prospective, randomised and double blind study was conducted in the Department of Anaesthesiology and Critical Care, Pt. B. D. Sharma, PGIMS, Rohtak.

Study period: February 2019 to March 2020

Study subjects

Inclusion criteria: Children aged between 2-8 years of either sex, belonging to American Society of Anaesthesiologists (ASA) physical status I or II scheduled for elective surgery requiring general anaesthesia and airway management with proseal laryngeal mask airway were enrolled in the study.

Exclusion Criteria:Patients with history of eye infection/injury,previous eye surgery,uveitis, CNS diseases, allergy to study drugs, difficult airway and refusal to participate in present study were excluded from study.

Sample size calculation:

The sample size calculated for each group is 35 (n=35). The total sample size for 2 groups is 70 (N=70).

Clinical Examination

After taking the detailed clinical history from parents/guardian, all the children were subjected to complete general physical as well as systemic examination during the preoperative visit a day prior to surgery. Routine investigations like hemoglobin (Hb), bleeding time (BT), clotting time (CT) and complete urine examination was carried out in all the patients. Any other relevant investigation like blood urea, serum creatinine, serum electrolytes, chest X-ray and ECG was done as and when required. The purpose and protocol

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of the study was explained to all the parents/guardian and informed written consent to participate in study was obtained.

Preparation of Patient

All the patients enrolled in the study was advised fasting for 6 hours for solids and 2 hours for clear liquids prior to the scheduled time of surgery. All the patients were pre-medicated with syrup phenargan in dosage of 0.5-1 $mgkg^{-1}$, 2 hours prior to the surgery. After arrival in the operation theatre routine monitoring comprising of electrocardiography (ECG), pulse oximetry (SPO_2), non-invasive blood pressure (NIBP) was established. Baseline readings of all vital parameters was recorded at before induction (T_0). Intravenous line was secured with appropriate sized canula. Ringer lactate was used as maintenance fluid.

Group allocation and randomisation

Patients were than be randomly allocated using sealed envelope containing code numbers to either of the two groups using 2 different induction agents:-

Group T (n=30) received inj. Thiopentone5$mgkg^{-1}$

Group S (n=30) received graded concentration of inhalational agent Sevoflurane

Anaesthesia Technique

Preoxygenation was done with 100% O_2 for three minutes. Injection glycopyrrolate in a dose of 0.005 $mgkg^{-1}$ was administered. Analgesia was provided with intravenous fentanyl 2μgkg^{-1}. Induction of anaesthesia was achieved with intravenous thiopentone 5 $mgkg^{-1}$ (Group T) or graded concentration of inhaled sevoflurane (Group S) in 100% oxygen via face mask. Clinical assessment for induction of anaesthesia was done by the loss of eyelash reflex. After that IOP was measured.

Schiotz tonometer was used to measure intraocular pressure in right eye after induction (T_1) while maintaining airway with bag and mask ventilation. Then, muscle relaxant inj. Atracurium in a dose of 0.5$mgkg^{-1}$ was administered to the patient and intermittent positive pressure ventilation (IPPV) was followed for next 2 minutes. PLMA of appropriate size was used to secure the airway. Intraocular pressure was measured at 1 minute(T_2) and 3 minutes(T_3) after PLMA placement. Mean arterial blood pressure and heart rate was recorded after induction(T_1), at 1 minute(T_2) and 3 minutes after PLMA placement (T_3).After monitoring of all the parameters, surgery was commenced and maintenance of anaesthesia was done with sevoflurane, nitrous oxide and muscle relaxant. IPPV was continued. At the

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end of surgery neuromuscular blockade was antagonized with 0.05 $mgkg^{-1}$ of neostigmine methyl sulfate and 0.01 $mgkg^{-1}$ of glycopyrrolate . Then patient was extubated and shifted to recovery room for further management.

Following observations were recorded

1. **Demographic characteristics**

   Age, gender and weight of all the patients was recorded.

   Age in years, gender (male/female) and weight in kilograms was recorded.

2. **Time of loss of eye reflex**

It is time taken from administration of induction agent to loss of eye reflex. It was measured in seconds.

3. **Intraocular Pressure measurement**

IOP measurement was done using Schiotz tonometer in the right eye at following intervals:

- After induction (loss of eye reflex) (T_1) = mmHg
- 1 minute after PLMA placement (T_2) = mmHg
- 3 minutes after PLMA placement (T_3) = mmHg

4. **Haemodynamic parameters**

MAP, HR, $SpO_2$and $EtCO_2$ of all the patients was recorded at following intervals

- After induction and (loss of eye reflex) (T_1) =
- 1 minute after PLMA placement (T_2) =
- 3 minutes after PLMA placement (T_3) =

5. **Complications**

Any complication in form of hypotension and bradycardia due to the induction agents was recorded and managed accordingly.

STATISTICAL ANALYSIS

Statistical testing was conducted with the statistical package for social science system version SPSS 17.0. Continuous variables was presented as mean ±SD or median if the data was unevenly distributed. Categorical variables were expressed as frequencies and percentages. The comparison of continuous variables between the groups was performed using Student's t

test. Nominal categorical data between the groups was compared using Chi-square test or Fisher's exact test as appropriate. For all statistical tests, a p value less than 0.05 was taken to indicate a significant difference.

RESULTS- A total of 70 patients were included in the analysis.

OBSERVATION AND RESULTS

Table I- Showing distribution of Age

	Group Allocation		p Value
	Group S	**Group T**	
	Mean ± SD	**Mean ± SD**	
Age (yrs)	4.28 ± 2.15	4.36 ± 2.11	0.845

Group S= Sevoflurane, Group T= Thiopentone

Comparison of age in both groups:

Comparing the age in both sevoflurane and thiopentone group showed that there was no significant difference as p value is > 0.05 – non significant value.

Table II-Showing Sex distribution: Group S and Group T

Sex	Group Allocation				p Value
	Group S		Group T		
	Frequency	%	Frequency	%	
F	11	31.4%	8	22.9%	0.420
M	24	68.6%	27	77.1%	
Total	35	100%	35	100%	

There were 11 females and 24 males in Group S, whereas 8 females and 27 males were present in Group T. p value is >0.05 and non significant.

Table III- Showing distribution of weight

	Group Allocation		p Value
	Group S	**Group T**	
	Mean ± SD	**Mean ± SD**	
weight (kgs)	17.49 ± 6.64	18.77 ± 6.38	0.412

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Comparison of weight in both groups:
Comparing the weight in both sevoflurane and thiopentone group showed that there was no significant difference as p value is > 0.05 – non significant value.

Table IV- Showing distribution of ASA

ASA	Group Allocation				p Value
	Group S		Group T		
	Frequency	%	Frequency	%	
I	35	100.0%	35	100.0%	–
Total	35	100%	35	100%	

In both sevoflurane and thiopentone group, all the children were ASA I.

Table V- Showing baseline HR, SpO_2, SBP and DBP

	Group Allocation		p Value
	Group S	Group T	
	Mean ± SD	Mean ± SD	
HR (bpm)	120.74 ± 10.59	119.74 ± 13.05	0.783
SpO2 (%)	100.00 ± 0.00	100.00 ± 0.00	–
SBP	96.69 ± 6.37	98.09 ± 6.98	0.384
DBP	62.49 ± 4.12	63.49 ± 4.35	0.327

Comparison of baseline HR, SpO_2, SBP and DBP in both groups:
Comparing baseline HR, SpO_2, SBP and DBP showed that there was no significant difference as p value is >0.05- non significant value.

Table VI: Showing time of loss of eyelash reflex in both groups

	Group Allocation		p Value
	Group S	Group T	
	Mean ± SD	Mean ± SD	
Time of loss of eyelash reflex (sec)	47.91 ± 1.63	19.40 ± 1.24	<0.001

Comparison of time of loss of eyelash reflex in both groups:
Comparing the time of loss of eyelash reflex during induction with sevoflurane and thiopentone showed that there was significant difference during induction as p value is <0.001 – highly significant value. The loss of eyelash reflex is earlier in thiopentone group as compared to sevoflurane group.

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Table VII: Showing IOP at different timings

	Group Allocation		p Value
	Group S	Group T	
	Mean ± SD	Mean ± SD	
IOP During induction (mmHg)	11.76 ± 1.19	12.29 ± 1.31	0.083
IOP at 1 min after PLMA placement (mmHg)	13.15 ± 1.09	14.79 ± 1.35	<0.001
IOP at 3 min after PLMA placement (mmHg)	11.51 ± 1.15	12.71 ± 1.38	<0.001

Comparison of IOP in both groups:

Comparing the IOP in both sevoflurane and thiopentone group at corresponding timing showed that there was no difference after induction but before PLMA placement as p value is > 0.05 – non significant value.

At 1 minute after PLMA placement p value is < 0.001 – highly significant value.

At 3 minute after PLMA placement p value is > 0.001 – highly significant value.

The above parameters indicate that there was highly significant changes in IOP in both the groups at 1 minute and 3 minutes after PLMA placement. The increase in IOP is more in thiopentone group as compared to sevoflurane group.

Table VIII- showing changes in heart rate in both groups

	Group Allocation		p Value
	Group S	Group T	
	Mean ± SD	Mean ± SD	
HR Before induction (bpm)	119.60 ± 11.90	119.94 ± 13.03	0.909
HR During induction (bpm)	121.31 ± 11.19	121.63 ± 13.38	0.915
HR at 1 min after PLMA placement (bpm)	128.94 ± 11.19	131.83 ± 13.27	0.329
HR at 3 min after PLMA placement (bpm)	124.23 ± 10.95	126.26 ± 13.31	0.489

Comparison of heart rate in both groups:

Comparing the HR in both sevoflurane and thiopentone group at corresponding timing showed that there was no difference before induction as p value is > 0.05 – non significant value.
After induction and before insertion p value is > 0.05 – non significant value.
At 1 minute after PLMA placement p value is > 0.05 – non significant value.
At 3 minutes after PLMA placement p value is > 0.05 – non significant value.
The above parameters indicate that there was no significant changes in heart rate in both the groups.

Table IX –Showing mean value of changes in mean arterial pressure

	Group Allocation		p Value
	Group S	Group T	
	Mean ± SD	Mean ± SD	
MAP Before induction (mmHg)	73.71 ± 4.38	74.77 ± 4.88	0.343
MAP During induction (mmHg)	74.37 ± 4.29	75.54 ± 4.99	0.296
MAP at 1 min after PLMA placement (mmHg)	73.06 ± 3.91	76.91 ± 5.43	0.001
MAP at 3 min after PLMA placement (mmHg)	71.69 ± 3.95	74.51 ± 4.90	0.010

Comparison of mean arterial pressure in both groups:
Comparing the MAP in both sevoflurane and thiopentone group at corresponding timing showed that there was no difference before induction as p value is > 0.05 – non significant value.
After induction and before insertion p value is > 0.05 – non significant value.

At 1 minute afterPLMA placement p value <0.05. Hence it is highly significant.

At 3 minutes after PLMA placement p value <0.05. Hence it is highly significant.

The above parameters indicate that there was significant rise in MAP in thiopentone group as compared to sevoflurane group at 1 and 3 minutes after PLMA placement.

Table X- showing changes in SpO_2 in both groups

	Group Allocation		p Value
	Group S	Group T	
	Mean ± SD	Mean ± SD	
SpO_2 Before induction (%)	100.00 ± 0.00	99.97 ± 0.17	0.321
SpO_2 During induction (%)	100.00 ± 0.00	99.97 ± 0.17	0.321
SpO_2 at 1 min after PLMA placement (%)	100.00 ± 0.00	99.97 ± 0.17	0.321

SpO_2 at 3 min after PLMA placement (%)	100.00 ± 0.00	99.97 ± 0.17	0.321

Comparison of SpO_2 in both groups:

Comparing the SpO_2 in both sevoflurane and thiopentone group at corresponding timing showed that there was no difference before induction as p value is > 0.05 – non significant value.

After induction and before insertion p value is > 0.05 – non significant value.

At 1 minute after PLMA placement p value is > 0.05 – non significant value.

At 3 minutesafter PLMA placement p value is > 0.05 – non significant value.

The above parameters indicate that there was no significant changes in SpO_2 in both the groups.

Table XI- showing changes in $EtCO_2$ in both groups

	Group Allocation		p Value
	Group S	Group T	
	Mean ± SD	Mean ± SD	
$EtCO_2$ Before induction (mmHg)	30.80 ± 1.43	30.89 ± 1.59	0.813
$EtCO_2$ During induction (mmHg)	31.80 ± 1.49	31.49 ± 1.63	0.404
$EtCO_2$ at 1 min after PLMA placement (mmHg)	32.06 ± 1.53	31.71 ± 1.23	0.305
$EtCO_2$ at 3 min after PLMA placement (mmHg)	31.09 ± 1.22	30.83 ± 1.20	0.378

Comparison of $EtCO_2$ in both groups:

Comparing the $EtCO_2$ in both sevoflurane and thiopentone group at corresponding timing showed that there was no difference before induction as p value is > 0.05 – non significant value.

After induction and before insertion p value is > 0.05 – non significant value.

At 1 minute after PLMA placement p value is > 0.05 – non significant value.

At 3 minutes after PLMA placement p value is > 0.05 – non significant value.

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The above parameters indicate that there was no significant changes in $EtCO_2$ in both the groups at each time interval.

Table XII- showing adverse reaction in both groups

Other adverse reaction	Group Allocation				P Value
	Group S		Group T		
	Frequency	%	Frequency	%	
No	35	100.0%	35	100.0%	–
Total	35	100%	35	100%	

Comparison of adverse reaction in both groups:
There were no adverse reaction during induction with sevoflurane and thiopentone.

DISCUSSION

The present study consists of 70 patients ASA I who were randomly grouped into two groups as sevoflurane (group S) and thiopentone (group T) group. There are 11 females and 24 males in group S and 8 females and 27 males in group T. All patients were anaesthetised as per the protocol. The parameters like heart rate, mean arterial pressure, SpO_2, $EtCO_2$ and IOP were measured before induction, after induction and before PLMA placement, at 1 and 3 minutes after PLMA placement. In the present study, comparison of IOP, loss of eyelash reflex, heart rate, mean arterial pressure, SpO_2, $EtCO_2$ and other adverse reactions in both the groups was done.

1. Calla et al[7] enrolled 50 patients of age group 14 years and above. Peker et al[8] enrolled 60 children aged between 1-10 years. Jahromi et al[9] enrolled 88 patients aged between 18 to 70 years. Termuhlen et al[10] enrolled 100 paediatric patients of mean age 4.5±2.68 years. Wang et al[11] enrolled 120 children of mean age 5.1±2.2 years in his study. Walt et al[12] enrolled 25 children who were undergoing examination under anaesthesia for glaucoma and Rajeev et al[13] enrolled 60 patients of less than 14 years of age. In our study we enrolled 70 children aged between 2-8 years. The mean age was 4.28±2.15 years in sevoflurane group and 4.36±2.11 in thiopentone group(p=0.845).
2. Calla et al enrolled patients of both sex. Peker et al included 24 females and 36 males. Jahromi et al included 41 males and 47 females. Termuhlen et al included 38 males

and 62 females. Wang et al included 69 females and 51 males. Wale et al included 14 males and 11 females. Rajeev et al included 31 males and 29 females. In our study we included 19 females and 51 males of which 11 females and 24 males are present in sevoflurane group and 8 females and 27 males are present in thiopentone group. There was no statistical difference between the sex ratio of both groups as p value > 0.05.

3. Patients weight was comparable and there was no significant difference in both the groups. Mean weight in group S was 17.49±6.64 kgs and 18.77±6.38 kgs in group T and p value is > 0.05. Peker et al included the mean weight of 24.8±6.0 kg in PLMA group. Jahromi et al included the mean weight of 63.39±8.07 kgs in propfol group and 66.32±1.28 kgs in thiopental group and p value is > 0.05. Walt et al included the weight in the range of 5.8-21.5 kgs. Rajeev et al included the mean weight of 24.80 in PLMA group and 26.93 in ETT group and p value is > 0.05. In our study patients weight was comparable and there was no significant difference in both the groups. Mean weight in group S was 17.49±6.64 kgs and 18.77±6.38 kgs in group T and p value is > 0.05.
4. There was no significant differences in baseline HR,SBP,DBP and SpO_2 in both the sevoflurane and thiopentone group. Similarly there was no statististical differences in baseline HR,SBP,DBP and SpO_2 between the groups in Peker et al study, Jahromi et al study and Rajeev et al study.
5. Calla et al and Jahromi et al secured the airway with ETT. Peker et al secured the airway with different SGAD which includes CLMA, ILMA, PLMA and CPLA. Termuhlen et al secured the airway with LMA. Sharma et al secured the airway with ETT and PLMA. In our study we secured the airway with PLMA.
6. Peker et al studied the effects of insertion parameters which includes number of insertion attempts, easiness of degree of insertion and duration of insertion on IOP, hemodynamic parameters like HR, MAP and $EtCO_2$. The effects of insertion parameters on IOP among the groups, no statistically significant correlation was detected with regard to the number of insertion attempts, easiness of degree of insertion, duration of insertion, leak pressure and IOP. The effects of insertion parameters on hemodynamic parameters were evaluated in the groups and it was found that HR was influenced by the number of insertion attempts and easiness of degree of insertion, especially 2 min after the insertion og SGAD, but this was not statistically significant. Moreover it was detected that MAP was affected by the number of insertion attempts and easiness of degree of insertion. The effect of

easiness of degree of insertion was found to be statistically significant (p=0.014). Furthermore, it was found that $EtCO_2$ was affected by the parameters of insertion, number of insertion attempts and easiness of degree of insertion in the measurements taken at the 2^{nd} and 5^{th} ninutes after the insertion of SGAD. $EtCO_2$ was significantly increased by the duration of insertion in the 2^{nd} minute measurement (p=0.017) and by the number of insertion attempts in the 5^{th} minute measurement (p=0.014). Calla et al, Jahromi et al, Termuhlen et al, Wang et al, Walt et al, Sharma et al and we did not included the insertion parameters.

7. Calla et al measured IOP at 1,2 and 3 minutes after administration of induction agent and before ETT insertion. Peker et al measured IOP after induction and before LMA insertion and 2 and 5 minutes after LMA insertion. Jahromi et al measured IOP before induction of anaesthesia and 3 minutes after ETT insertion. Termuhlen et al measured IOP before induction of anesthesia, after anesthesia induction and before LMA insertion, amid mechanical ventilation and after extubation. Walt et al measured IOP after instillation of lignocaine drops, every 2 minutes from 2 minutes after initial ketamine bolusuntil 10 minutes thereafter. At 15 minutes at which ketamine infusion was discontinued. Sharma et al measured IOP before induction, after induction and before ETT and PLMA insertion, 1.2 and 3 minutes after ETT and PLMA insertion. In our study we measured IOP during induction and before PLMA placement, 1 and 3 minutes after PLMA placement.
8. Calla et al included elective non ophthalmic surgeries. Peker et al included extraocular ophthalmic surgeries. Jahromi et al and Sharma et al included cataract surgery. Termuhlen et al included non ophthalmic surgeries like strabismus surgery, lacrimal duct surgery, chalazion excision, foreign body removal, ptosis surgery, orbit biopsy etc. Walt et al included children who were to be examined under anesthesia for glaucoma. In our study we included non intraocular surgeries.
9. Calla et al and Jahromi et al used Schiotz Tonometer for IOP measurement. Peker et al used Tono-Pen applanation tonometer for IOP measurement. Termuhlen et al, Wang et al and Walt et al used Perkin's applanation tonometer for IOP measurement. In our study we included Schiotz tonometer for IOP measurement.
10. Calla et al, Jahromi et al , Peker et al ,Rajeev et al did not mentioned about time of loss of eyelash reflex. In our study time of loss of eyelash reflex in sevofurane and thiopentone group was 47.91±1.63 & 19.40±1.24 respectively ($p<0.001$).

11. In our study the mean IOP during induction and before PLMA placement is 11.76±1.19 mmHg in group S and 12.29±1.31 mmHg in group T and p value is > 0.05. The mean IOP at 1 minute after PLMA placement is 13.15±1.09 mmHg in group S and 14.79±1.35mmHg in group T and p value is <0.001. The mean IOP at 3 minute after PLMA placement is 11.51±1.15mmHg in group S and 12.71±1.38 mmHg in group T and p value is < 0.001. There is increase in IOP at 1 minute after PLMA placement in both the groups but the increase is slightly more in thiopentone group. In sevoflurane group the IOP returns to the pre PLMA placement level at 3 minute after PLMA placement while in thiopentone group it slightly remains less than the pre PLMA placement level. Calla et al compared the effect of etomidate and thiopentone on intraocular pressure. He secured the airway with ETT. IOP decreased in etomidate group from 15.9±1.3 mmHg to 7.9±1.0 mmHg following induction and from 15.3±1.4mmHg to 10.0±1.8 mmHg in thiopentone group following induction and p value is < 0.001. Peker et al compared four different supraglottic airway devices in terms of intraocular pressure changes in children undergoing ophthalmic sugery. He induced the patient with decreasing concentration of sevoflurane (8%-2%). In group PLMA the mean IOP after induction and before PLMA placement is 12.3±2.9mmHg, 2 minutes after PLMA placement is 13.2±3.4mmHg and 5 minutes after PLMA placement is 12.4±2.9mmHg. Jahromi et al compared the influence of thiopental and propofol on IOP during induction of anaesthesia in intubated patients under cataract surgery. IOP before induction of anaesthesia in propofol group is 17.16±4.72mmHg and 15.93±6.17mmHg. IOP 3 minutes after induction in propofol group is 11.72±6.35mmHg and 15.62±5.63mmHg in thiopentone group and p value is 0.003. Termuhlen et al induced the patient with either sevoflurane or propofol and secured the airway with LMA. The mean IOP before induction is 7.4±2.89 mmHg and decreases to 5.6±3.04mmHg after induction and before PLMA placement (p value < 0.01) and increased to 7.2±2.51mmHg in deep anaesthesia during mechanical ventilation (p value<0.01). Sevoflurane and propofol significantly decrease the IOP in children. Rajeev et al compared the effect of PLMA insertion and tracheal intubation on IOP in paediatric patients undergoing cataract surgery. In PLMA group the mean IOP(mmHg) before insertion, 1,2 and 3 minutes after PLMA insertion are 13.30±2.92,15.08±2.85,14.41±2.64 and 13.71±2.54 respectively.In ETT group the mean IOP(mmHg) before insertion, 1,2 and 3 minutes after endotracheal intubation

are14.17±2.95,19.03±7.91,18.20±8.16 and 15.25±2.29 respectively. p value is significant at 1, 2 and 3 minutes after PLMA or tracheal intubation(p value<0.05)

12. In our study the mean HR(bpm) and mean MAP(mmHg) before induction, after induction and before PLMA placement , 1 minute and 3 minutes after PLMA placement in sevoflurane group is 119.60±11.90 and 73.71±4.38, 121.31±11.19 and 74.37±4.29,128.94±11.19 and 73.06±3.91, 124.23±10.95 and 71.69±3.95 respectively. The mean HR (bpm) and mean MAP (mmHg) before induction, after induction and before PLMA placement , 1 minute and 3 minutes after PLMA placement in thiopentone group is 119.94±13.03 &74.77±4.88,121.63±13.38 & 75.54±4.99,131.83±13.27 & 76.91±5.43 and 126.26±13.31 & 74.51±4.90 respectively. MAP changes are significant at 1 and 3 minutes after PLMA placement (p value<0.05). In Calla et al study systolic arterial pressure after induction in etomidate group decreased from 128±15.5 to 118±13.3mmHg while in thiopentone group decreased from 122±26.7 to 116±18.8mmHg. In Peker et al study in PLMA group, the HR and MAP before PLMA placement was 96.1±14.4 bpm and 73.8±16.3mmHg, 2 minutes after PLMA placement was 101.5±15.3bpm and 70.9±11.2mmHg and 5 minutes after PLMA placement was 99.0±17.4bpm and 68.5±14.6mmHg. in Rajeev et al study MAP before PLMA placement. 1 minute,2 minutes and 3 minutes after PLMA placement in PLMA group and ETT group are 90.90±8.142 & 90.13±6.257(p>0.05), 96.52±7.458 & 100.71±4.895(p<0.05), 92.97±7.928 & 98.03±4.694(p<0.05) and 90.73±6.762 & 96.93±5.278(p<0.05) respectively.
13. In our study IOP was not affected by $EtCO_2$ and SpO_2 as $EtCO_2$ level are maintained between 30-40 and SpO_2 was 100%(p>0.05). In Peker et al study $EtCO_2$ was maintained between 30-40(p>0.05). In Rajeev et al study $EtCO_2$ was wthin normal limit and SpO_2 was 100 %(p>0.05).

CONCLUSION

We concluded that the intraocular pressure initially raised following 1 minute after PLMA placement in both sevoflurane and thiopentone group but the increase is a little bit more in thiopentone group and the intraocular pressure returns to pre PLMA placement in sevoflurane group while in thiopentone group it does not touches the pre PLMA placement value at 3 minutes after PLMA placement. Hemodynamic stability, SpO_2 and $EtCO_2$levels was preserved during PLMA insertion in paediatric patients. Our study concluded that

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inhalational agent sevoflurane can be preferred induction agent in small children with supraglottic device for airway management in non ophthalmic surgeries.

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