

Comparison of Fentanyl and Lignocaine for Attenuation of Cardiovascular Stress Response to Laryngoscopy and Endotracheal Intubation



Medical Science

KEYWORDS :

Dr Rupal B. Shah	assistant professor of anaesthesia, V S GENERAL HOSPITAL, AHMEDAB
Dr Gargi M. Bhavsar	assistant professor of anaesthesia, V S GENERAL HOSPITAL, AHMEDABAD
Dr Happy R. Ghetia	2nd year anaesthesia resident, V S GENERAL HOSPITAL, AHMEDABAD
Dr Manisha V. Thakkar	2nd year anaesthesia resident, V S GENERAL HOSPITAL, AHMEDABAD
Dr Sumegh N. Prajapati	1st year anaesthesia resident, V S GENERAL HOSPITAL, AHMEDABAD

ABSTRACT

AIM To compare Fentanyl and Lignocaine for:

- *Effectiveness in attenuating the sympathetic response to laryngoscopy and intubation.*

• *Possible side-effects and complications in peri-operative period.*

MATERIAL AND METHODS 40 patients of ASA grade I and II aged 20-50 years were selected for elective surgery requiring general anaesthesia for endotracheal intubation.

They were divided into 2 groups

Group-1: Lignocaine hydrochloride group. Here patients received inj. Lignocaine hydrochloride 1.5 mg/ kg i.v. bolus 3 min prior to induction.

Group-2: Fentanyl citrate group. Here patients received injection Fentanyl citrate 2 mcg/kg i.v. bolus 3 min prior to induction.

All patients were pre-oxygenated with 100% O₂ for 3 min before induction. Induction was achieved with injection Thiopentone sodium 5 mg/kg i.v. and injection succinylcholine 2 mg/kg was given i.v. IPPV given with 100% O₂ and after adequate relaxation laryngoscopy and intubation was done. Anaesthesia was maintained with O₂(33%), N₂O(67%), Isoflurane(0.5-1.0%) and injection Vecuronium bromide. Peri-operative vitals and complications were recorded. Reversal was achieved with injection Neostigmine 0.05 mg/kg i.v. and injection glycopyrrolate 0.004 mg/kg i.v.

RESULTS AND SUMMARY Changes in mean pulse rate and MAP was significant after intubation and intraoperatively with mean pulse rate, MAP being higher in group-1 than group-2. Thus Fentanyl citrate provides better haemodynamic stability by increasing sedation, analgesia and depth of anaesthesia.

CONCLUSION Fentanyl citrate is safer and more effective in attenuation of haemodynamic response to laryngoscopy and intubation.

INTRODUCTION

The study is to find out a safe, comfortable and effective mean to attenuate stress and sympathetic response to laryngoscopy and intubation

AIMS

- To study effectiveness of intravenous bolus doses of inj. Lignocaine hydrochloride and inj. Fentanyl citrate in attenuating stress response to laryngoscopy and endotracheal intubation.
- To ascertain the effectiveness of Lignocaine hydrochloride and Fentanyl citrate in suppressing sympathetic response.

MATERIALS AND METHODS

Following approval from the institutional review board, this prospective double blind study was carried out on randomly selected 40 patients of ASA grade 1 and 2, aged 20 to 50 years, scheduled for elective surgery requiring general anaesthesia with endotracheal intubation.

Exclusion criteria

- Patients with history of known allergies to study drugs.
- Emergency surgeries
- Anticipated difficult intubation
- Patients with cardiovascular or respiratory disease with Paco₂>45 mm of hg.
- Patients on beta blockers or calcium channel blockers or sympatholytic drugs.
- Unwilling patients

Prestudy evaluation

Pre-anaesthetic evaluation of all patients consists of detailed history, clinical examination and routine investigations. Written and informed consent was taken. All patients were kept nil per orally 6 hours prior to surgery. Vital signs noted in preoperative room and considered as baseline values.

Premedication

In preoperative room, inj. Glycopyrrolate 0.004 mg/kg i.m. was given 45 min prior to induction. On entering operation theatre, IV line secured with 18G IV canula and pulse-oximeter, non invasive blood pressure(NIBP) and ECG monitor were applied. Heart rate, systolic BP (SBP), diastolic BP (DBP) and mean arterial pressure (MAP) were recorded and i.v. infusion of ringer lactate was started.

Study groups

Patients were divided into 2 groups. Each group consisted of 20 patients.

Group-1: Lignocaine hydrochloride group- here patients received inj. Lignocaine hydrochloride 1.5 mg/kg i.v. bolus 3 min prior to induction

Group-2: Fentanyl citrate group- here patients received inj. Fentanyl citrate 2 mcg/kg i.v. bolus 3 min prior to induction

Anaesthetic technique

All the patients were pre-oxygenated with 100% O₂ by mask for 3 min before induction. Precalculated doses of lignocaine and fentanyl were given i.v. slowly in group 1 and 2 respectively.

Induction was achieved with inj. Thiopentone sodium 5 mg/kg i.v.(2.5% solution) and inj. Succinyl chloride 2 mg/kg was given i.v.

IPPV was given with 100% O₂ and after adequate relaxation, laryngoscopy was done using standard Macintosh blade. Oral intubation was done with appropriate sized, disposable, high volume low pressure, portex cuffed endotracheal tube within 15 to 20 seconds(not more than 30 seconds). Intubation was done by the person who was unknown to the study.

All the patients were ventilated with bain's circuit and anaesthesia was maintained by O₂(33%), N₂O(67%), isofurane(0.5-1.0%) and inj. Vecuronium bromide.

At the end of surgery anaesthesia was reversed with inj. Neostigmine 0.05 mg/kg and inj. Glycopyrrolate 0.004 mg/kg i.v.

Monitoring

Intraoperative vitals are monitored using ECG, pulse-oximeter, NIBP and capnography. HR, SBP, DBP, and MAP were recorded in all patients – 45 min before induction,after premedication, after study drugs, after induction and after laryngoscopy and intubation for every 1 min upto 6 min after intubation. During this study period (from giving study drugs to 6 min after intubation) of 10 min no stimulus was given to patients. Thereafter, surgery was started.

Complications

An observation was made related to adverse effects of the drugs and anaesthesia related problems and attended appropriately.

Statistical analysis

Descriptive data of both groups were compared by unpaired “t” test. For all the tests “p” value of less than 0.05 was considered for statistical significance.

OBSERVATIONS AND RESULTS

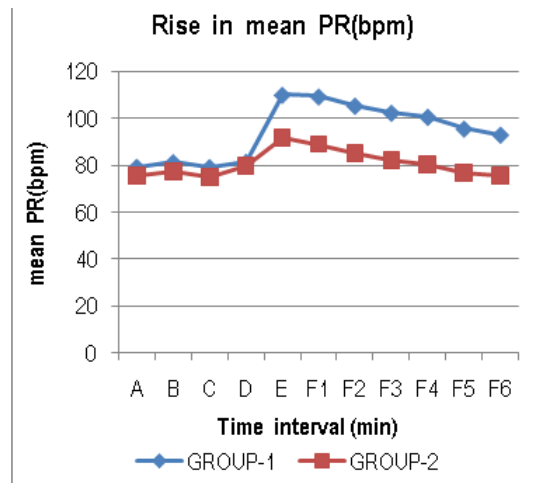
The study is for comparing efficacy of Lignocaine and Fentanyl in attenuating the sympathetic response to laryngoscopy and intubation.

Each group was consisting of 20 patients.

Table-1 Rise in mean pulse rate (beats/ min)

Recording interval	Group-1		Group-2	
	Beats per min	%	Beats per min	%
A	79.2± 8.73	-	75.7± 4.36	-
B	81.2± 8.23	2.5	77.7± 5.03	2.64
C	79.1± 7.84	-	75.2 ±4.37	-
D	81.3± 6.1	2.5	79.7± 4.31	5.0
E	110.1± 8.82	39.0	91.7± 6.6	21.1
F1	109.4± 8.91	38.1	89± 5.9	17.5
F2	105.4±9.18	33.08	85.3± 6.37	12.6
F3	102.4±8.29	29.2	82.45± 6.15	8.19
F4	100.65±8.0	27.0	80.75±6.38	6.67
F5	95.6±8.69	20.7	77±5.45	1.71
F6	93±7.88	17.4	75.8±4.87	0.13

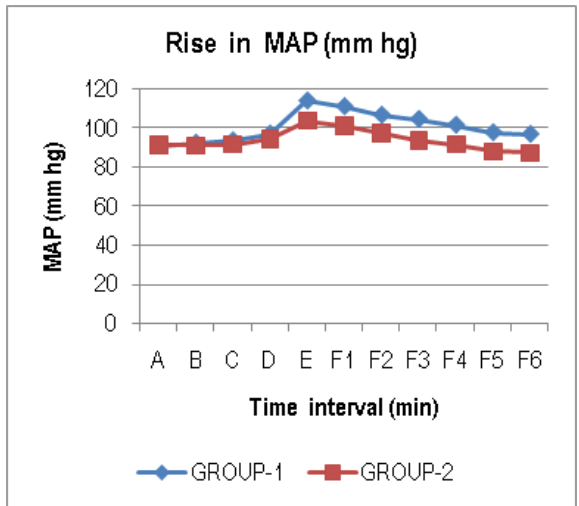
A – basal value B –after premedication C –after study drugs D-at induction E- at intubation F1 to F6 – every 1 min upto 6 min after intubation



No significant rise was seen in pulse rate after laryngoscopy and intubation in group-2 and it comes to the baseline within 5-6 min post-intubation.

Table-2 Rise in MAP (mm of hg)

Recording interval	Group-1		Group-2	
	mm of hg	%	mm of hg	%
A	90.65+ 4.79	-	91+ 4.87	-
B	92.1+ 4.35	1.6	90.65+ 5.86	-
C	93.3+ 4.56	2.92	91.25+ 8.28	0.27
D	96.85+ 3.45	6.84	94.25+ 7.18	3.57
E	113.85+ 4.65	25.6	103.5 +8.77	13.7
F1	110.95+ 5.62	22.4	101.15+ 8.26	11.2
F2	106.5+ 5.86	17.5	97+ 7.67	6.5
F3	104.35+ 6.03	15	93.5+ 8.04	2.74
F4	101.35+ 5.62	11.8	91.25+ 7.98	0.27
F5	97.5+ 5.78	7.6	87.75+ 6.59	-
F6	96.6+ 4.86	6.6	87+ 5.3	-



No significant rise in MAP was seen in group-2 after intubation and it comes to baseline within 4-5 min.

CONCLUSION

A comparative study of i.v. bolus doses of Lignocaine hydrochloride and Fentanyl citrate for attenuating haemodynamic response to laryngoscopy and endotracheal intubation was done. We conclude the following

The pulse rate and MAP rise was more in patients of Lignocaine group than Fentanyl group. Thus, Lignocaine hydrochloride 1.5 mg/kg used 3 min prior to induction, failed to attenuate the haemodynamic response.

Fentanyl citrate 2 mcg/kg used 3 min prior to induction, resulted in attenuation of haemodynamic response.

Fentanyl citrate stabilized heart rate and blood pressure during laryngoscopy and intubation. The haemodynamic stability lasts even after intubation.

Fentanyl citrate provides haemodynamic stability by increasing sedation, analgesia and depth of anaesthesia, thus blocking the reflex sympathoadrenal response to noxious stimulation of larynx. No RS, CVS or CNS depression was seen.

No adverse effects of Lignocaine or Fentanyl were found with the studied dosage.

Thus Fentanyl citrate is safe and effective in attenuation of haemodynamic response to laryngoscopy and intubation without significant side-effects.

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