

ORIGINAL

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INTUBATION; COMPARISON OF GLYCERYLTRINITRATE WITH PLAIN LIGNOCAINE IN ATTENUATING THE HYPERTENSIVE RESPONSE.



(Surg CDR) DR. IFTIKHAR HUSSIAN
Classified Anaesthetist
PNS Rahat Karachi

DR. KHALID ZAEEM
A.F.I.D. Rawalpindi

ABSTRACT... Back ground: Endo-tracheal intubation causes hypertensive stress response and increase in blood pressure and heart rate. This increase in systolic blood pressure causes myocardial ischemia and dysrhythmias in vulnerable patient¹. Different drugs are used intravenously to attenuate this hypertensive response during intubation. I compared glyceryltrinitrate with plain Lignocaine intravenous to obtund this hypertensive stress response. **Material and method.** In a randomized, double blind study, 60 patients were selected for this study and divided into two equal groups of I and II based on receiving intravenous glyceryltrinitate and plain lignocaine respectively. A bolus dose of Glyceryltrinitrate (Nitronal) 200 µg, 20 seconds before intubation. And then titration at a rate of 2 µgm/kg/minute was started. Group II was given plain lignocaine 1.5 mg/kg body weight. The comparative study was carried out to know the effectiveness of each drug to blunt the hypertensive stress response and Heart Rate Variability (HRV) during intubation. Blood pressure and heart rate variability (HRV) immediately after intubation was assessed. **Results:** Blood pressure fall was more marked in patient receiving Glyceryltrinitrate (Nitronal) then those of receiving plain Lignocaine, but heart rate variability (HRV) was greater in patient receiving Glyceryltrinitrate (Nitronal). **Conclusion:** Glyceryltrinitrate (Nitronal) is more effective than plain lignocaine in blunting the hypertensive stress response of intubation .

Key words: Hypertensive intubation reflex, Glyceryltrinitrate (Nitronal), Plain lignocane.

INTRODUCTION

There are three intra operative conditions, which provokes maximum stress response. These are;

- i. Intubation reflex
- ii. Aortic cross clamping during aortic aneurysm surgery
- iii. Coronary artery bypass surgery.

Laryngoscopy and intubation provokes the activities of sympathetic nervous system by the characteristics

haemodynamic response, and by increased catecholamine concentrations. The response of hypertensive and tachycardia can be partially suppressed by Glyceryltrinitrate (Nitronal) or lignocane plain 1.5 mg/kg. Moderate doses of fentanyl (5-10µ g/kg) have been shown to minimize the hypertensive response in intubation in both normal and hypertensive patients².

Topical anaesthesia by plain lignocaine can ameliorate this response, but it is rarely totally effective. As, it is the

laryngoscopy, rather than endotracheal intubation, which creates the stimulus. It is of little use to use topical anaesthesia after placement of the laryngoscopic blade. Similarly laryngeal extubation does not cause any haemodynamic response, provided the patients are not allowed to wake to the point of coughing on the tube.

Although, the changes in heart rate are less in patient receiving β -blockers. It has little effect on presser response. A continuous infusion of esmolol 100-300 $\mu\text{g}/\text{kg}$ intravenous blunts the increase in heart rate evoked by tracheal intubation³. This type of severe rise in blood pressure is particularly dangerous and may cause cerebral injury.

Glyceryltrinitrate (Nitronal) which is a potent venodilator and decreases the preload blunts the hypertensive response of intubation reflex. Similarly lignocaine which decreases automaticity and depresses conduction is also used for this purpose.

We conducted the comparative study of these two drugs for blunting this hypertensive intubation reflex.

METHOD AND MATERIAL

After approval of hospital ethical committee and informed consent I chose subjects, who presented at CMH Peshawar for various operative procedures. Sixty (60) patients of ASA I&II physical status of either sex are selected for this study. The age ranges between 18-35 years.

The exclusion criteria included subject, who had fever ($\text{Temp} > 99\text{F}$), Known hypertensive, diabetic, asthmatic and anaemic patients with $\text{Hb} < 10\text{g}/\text{dl}$. After formal consent, the double blind procedure was undertaken which involved one of our nursing assistant, who randomized the patients of operative list in two groups I and II.

The patients with odd number were placed into group I and those with even number were placed in group II. On the day of operation the patients had repeat medical

evaluation on operating table and anaesthesia was provided to patients as per standard required protocol. Patients of Group I were given glyceryltrinitrate and Group II were given plain lignocaine before intubation.

Table-I. Demographic data of Group I and II		
	GROUP I (n=30)	GROUP II (n =30)
Age(years)	18-35 mean 24(SD6)	18-35 mean 26 (SD 7)
Sex (Male: Female)	1	1
Weight	56(\pm 9.2)	58(\pm 8.1)
Types of operation		
General surgery	10	10
Gynaecology	30	30
ENT	10	10
Orthopaedic	10	10

ANAESTHESIA MONITORING AND DRUG ADMINISTRATION

Monitoring included ECG, Non invasive blood pressure right arm and pulse oximetry.

After making the patients to lie comfortably on table. A cannula was inserted in right forearm vein.

Base line pulse and systolic blood pressure was recorded in every patient.

No preoperative analgesia or sedation was given to patients in order to avoid influence on results.

INDUCTION AGENT

Thiopentone Na was given to all the patients in a dose of 6 mg/kg body weight. Hypnotic dose of thiopentone Na was given.

GROUP I

This group was given glyceryltrinitrate (Nitronal) 200 μg

as a bolus does, 30 seconds before intubation and titration was done at rate of 2 µg /kg/minute.

GROUP II

This group was given plain Lignocain 1.5 mg /kg body weight 90 seconds before intubation.

INTUBATION

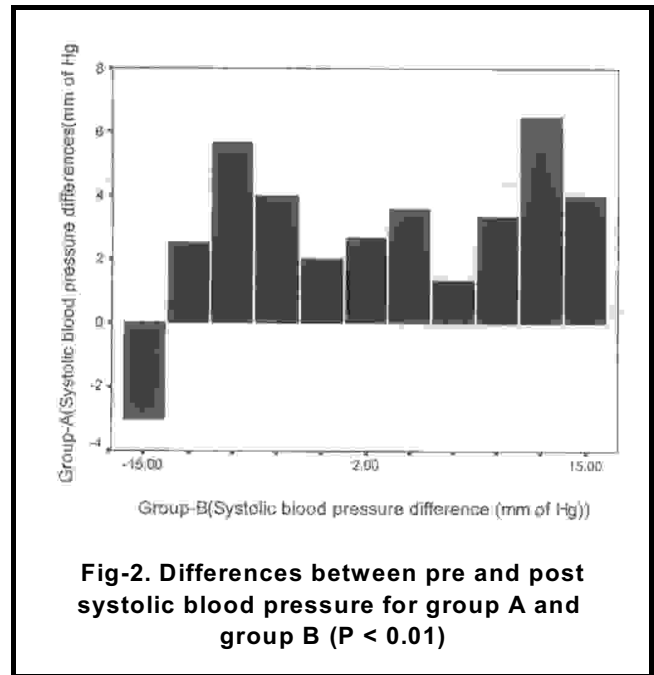
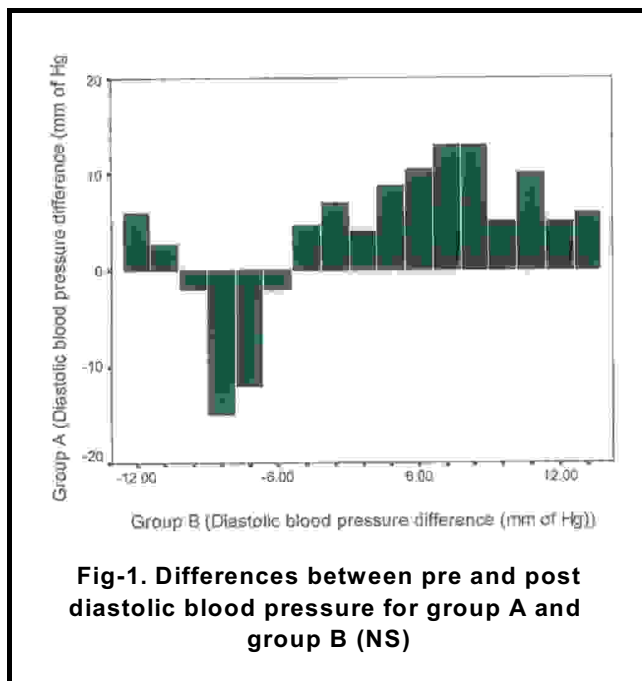
Intubation was done according to standard protocol. Those cases whose intubation was delayed were excluded from the study. Suxamethonium 2 mg /kg body weight was given to intubated patients.

Long acting relaxants were not used for intubation to avoid influence of inhalational agents on study.

RESULT

Data was collected under the following headings.

- 1) Fall or rise in systolic blood pressure. There was also a proportionate fall or rise in diastolic blood pressure.
- 2) The other parameter was change in heart rate.



GROUP I

Which received injection nitroglycerine, fall of blood pressure 15 mmHg (± 5) occurred after intubation in 24 (80%) patients. In 6 (20%) patients blood increased 10 mmHg (±5). In all patients of Group I, tachycardia 25-30(±10) occurred during intubation .

GROUP II

This group which received Lignocaine the blood pressure increased in 18 (60%)patients.

10 mmHG (± 8) during intiubation .

In 12 (40%) patients blood pressure decreased to 15mmHG (±10)during intiubation.

RESULTS

Glyceryltrinitrate was more effective in blunting the hypertensive stress response during intiubation, however tachycardia was more common than patients recovering Lignocaine.

DISCUSSION

A severe uncontrolled rise in blood pressure may occur immediately after laryngoscopy and intubation. This type of severe rise in blood pressure is particularly dangerous and may cause cerebrovascular injury, myocardial ischemia or infarction due to sympathetic stimulation⁴. The pressor response of similar magnitude is observed even in treated hypertensive patients. A number of drugs such as Glyceryltrinitrate (Nitronal), plain lignocaine or β -blockers are used immediately before intubation to attenuate this pressor response. Laryngeal extubation does not cause significant haemodynamic response if the patient is not allowed to wake to the point of coughing on the tube. The control of blood pressure is essential especially to avoid neurological complications. The intubation reflex is usually due to sympathoadrenal activation. Glyceryltrinitrate (Nitronal) is a vasodilator but predominantly it is a venodilator and in patients with low cardiac output and moderately elevated resistance seems to be the best choice⁵. Intranasal administration of Glyceryltrinitrate (Nitronal) was also shown to blunt the hypertensive response to endotracheal intubation. However, vasodilator therapy causes reflex tachycardia. β -blockers are given to control this tachycardia provided the patients are not in left ventricular failure⁶. Laryngoscopy and intubation increases the myocardial oxygen demand secondary to myocardial muscle to develop high tension associated with systolic hypertension creating a precarious relationship between oxygen demand and supply. Even endotracheal extubation and emergence can cause hypertensive response⁷. Therefore continuous intraoperative monitoring and vast array of anti hypertensive drugs are mandatory to control these perioperative surges in blood pressure⁸. Short duration of laryngoscopy (15 seconds or less) can minimize this response. Glyceryltrinitrate (Nitronal) and lignocaine can be used to attenuate this response. Both have different mechanisms of action. Lignocaine decreases automaticity and depresses conduction in reentry pathway. It also decreases the action potential⁹. Lignocaine can be given through trachea as well as intravenously. Laryngotracheal lignocaine administration just before placing the tube in

the trachea decreases the magnitude and duration of the blood pressure increase evoked by surgical stimulation. Likewise plain lignocaine 1.5 mg/kg intravenously, administered about 90 seconds before direct laryngoscopy or intubation can be efficacious to some patients. Continuous infusion of Glyceryltrinitrate (Nitronal) (0.25-0.2 μ gram/ kg /minute) has been used as prophylaxis against intra operative myocardial ischemia. However controlled studies have not confirmed it¹⁰. The incidence of Hypertension as produced by intubation of the trachea, however is less in the patients receiving a continuous intravenous infusion of Nitroglycerine as it was proved in our study¹¹. We choose Glyceryltrinitrate (Nitronal) for comparative studies because it relaxes vascular smooth muscles with venous dilatation predominantly over arterial dilatation. Preload reduction and accompanying decrease in ventricular end diastolic pressure reduces myocardial oxygen demand and increases endocardial perfusion. It decreases cardiac output but heart rate is minimally increased¹². Lignocaine in our study did not have better control of blood pressure as compared with Glyceryltrinitrate (Nitronal) however, heart rate increase was less. Glyceryltrinitrate (Nitronal), proved to be effective in controlling hypertensive response but heart rate increased more than Lignocaine.

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A MAN TRAVELS THE
WORLD OVER IN SEARCH OF
WHAT HE NEEDS AND
RETURNS HOME TO FIND IT.

George Moore. The Book Kerith