

## Original Research

### Comparison of hemodynamic changes under the effect of two different local anaesthetic procedures

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#### ABSTRACT:

**Background:** Anesthesiologist has several approaches, including general anesthesia (GA) and regional anesthesia such as epidural; however, GA is the most commonly used technique. All these factors and many more have increased the incidence of juvenile and maturity onset diabetes on one hand and the use of hypoglycemics on the other. **Aim of the study:** To compare hemodynamic changes under the effect of two different local anaesthetic procedures. **Materials and methods:** The present study was conducted in the Department of Anesthesia of the Medical Institute. A total of 50 patients were enrolled in the study. Patients were randomly grouped into two groups, Group 1 (nerve block) and Group 2 (topical local anesthesia), with 25 patients in each group. Patients aged 18-60 years scheduled for surgical procedures under local anesthesia were included in the study. Hypertensives, patients undergoing emergency surgery, intracranial aneurysm surgery, those having significant cardiac, pulmonary, renal or hepatic disease, those having contraindication to beta blockers, or taking treatment that can affect hemodynamic parameters were excluded. **Results:** The mean age of subjects in Group 1 was 43.65 years and in Group 2 was 44.12 years. The mean weight of Group 1 was 70.35 kg and of Group 2 was 72.61 kg. The mean height of Group 1 was 169.65 cm and in Group 2 was 171.32 cm. **Conclusion:** Within the limitations of the present study, it can be concluded that topical local anesthesia and nerve block are very effective in maintaining the hemodynamic stability of the patients.

**Key words:** nerve block, local anesthesia, hemodynamic, anesthesia.

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#### INTRODUCTION:

Accordingly, our knowledge of anesthesia and the inappropriate choice of techniques can reduce the complications associated with surgery, and subsequently, the clinical prognosis of patients after surgery. <sup>1</sup> Anesthesiologist has several approaches, including general anesthesia (GA) and regional anesthesia such as epidural; however, GA is the most commonly used technique. <sup>2</sup> Increase in stress, decrease in physical activity, irregular food habits, consumption of nutritionally poor food have a detrimental effect on a person's health. All these factors and many more have increased the incidence of juvenile and maturity onset

diabetes on one hand and the use of hypoglycemics on the other. <sup>3</sup> Systemic complications during surgical treatments are caused by LA, and among these complications, the proportion of cases relating to the circulatory system is the largest. <sup>4,5</sup> Endogenous catecholamines secreted in vivo, caused by psychological stress, accompanied by the injection pain and the added exogenous adrenaline in the LA, which acts as a vasoconstrictor, are cited as the causes of these complications. <sup>6</sup> Hence, the present study was conducted to compare hemodynamic changes under the effect of two different local anaesthetic procedures.

**MATERIALS AND METHODS:**

The present study was conducted in the Department of Anesthesia of the Medical Institute. The ethical clearance for the study was approved from the ethical committee of the hospital. A total of 50 patients were enrolled in the study. Patients were randomly grouped into two groups, Group 1 (nerve block) and Group 2 (topical local anesthesia), with 25 patients in each group. Patients aged 18-60 years scheduled for surgical procedures under local anesthesia were included in the study. Hypertensives, patients undergoing emergency surgery, intracranial aneurysm surgery, those having significant cardiac, pulmonary, renal or hepatic disease, those having contraindication to beta blockers, or taking treatment that can affect hemodynamic parameters were excluded. In the operating room, standard monitors such as electrocardiograph, noninvasive blood pressure, and pulse oximeter were attached and the baseline heart rate (HR), systolic arterial pressure (SAP), diastolic arterial pressure (DAP), and MAP were noted. Heart rate and mean arterial pressure were recorded at regular intervals before and for 1 h after induction. Blood

samples were collected for cortisol and adrenocorticotrophic hormone analysis 5 min before induction and 5 and 60 min after procedure.

The statistical analysis of the data was done using SPSS version 11.0 for windows. Chi-square and Student’s t-test were used for checking the significance of the data. A p-value of 0.05 and lesser was defined to be statistical significant.

**RESULTS:**

Table 1 shows demographic parameters of the participants. The mean age of subjects in Group 1 was 43.65 years and in Group 2 was 44.12 years. The mean weight of Group 1 was 70.35 kg and of Group 2 was 72.61 kg. The mean height of Group 1 was 169.65 cm and in Group 2 was 171.32 cm. Table 2 shows mean arterial blood pressure changes for Group 1 and Group 2. We observed that mean blood pressure did not have significant increase from baseline to 60 minutes postoperatively in both the groups. The pattern of dip in blood pressure was very similar in both the groups. On comparing, the results were statistically non-significant.

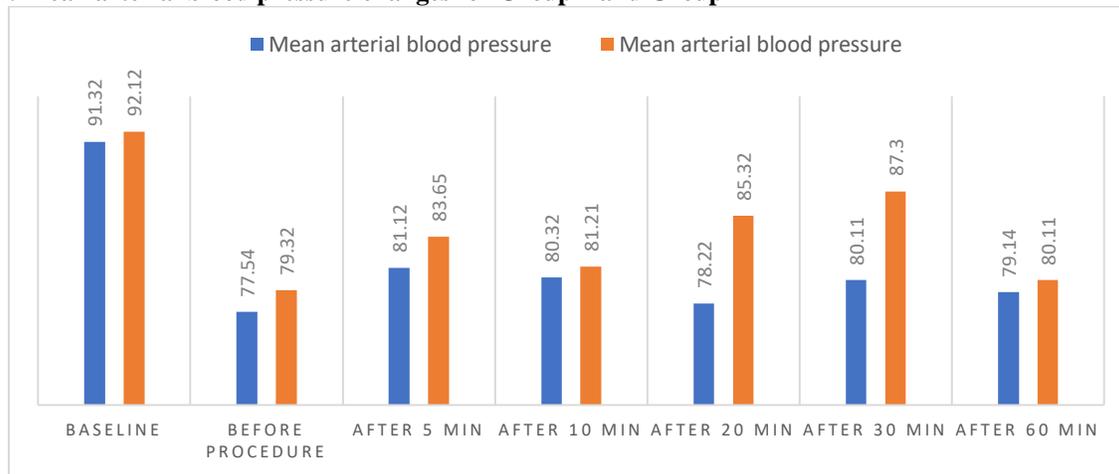
**Table 1: Demographic parameters of the participants**

Parameters	Group 1 (n=25)	Group 2 (n=25)
Age (years)	43.65	44.12
Weight (kg)	70.35	72.61
Height (cm)	169.65	171.32
Men/Women	14/11	15/10

**Table 2: Mean arterial blood pressure changes for Group 1 and Group 2**

Time	Mean arterial blood pressure	
	Group 1	Group 2
Baseline	91.32	92.12
Before procedure	77.54	79.32
After 5 min	81.12	83.65
After 10 min	80.32	81.21
After 20 min	78.22	85.32
After 30 min	80.11	87.3
After 60 min	79.14	80.11

**Fig 1: Mean arterial blood pressure changes for Group 1 and Group 2**



## DISCUSSION:

In the present study, we observed that Majedi MA et al compared the effects of thoracic EA with general anesthesia (GA) on hemodynamic changes and its complications in patients underwent laparoscopic colonoscopy. This clinical trial study was conducted on 80 patients undergoing laparoscopic cholecystectomy with EA or GA based on inclusion and exclusion criteria. The patients were randomly divided into two groups of 40 and changes in blood pressure, systolic blood pressure (SBP) and diastolic blood pressure (DBP), heart rate (HR), and arterial blood oxygen saturation were measured. The incidence of nausea, vomiting, chills, and itching in the two groups was recorded. The results showed that the mean of SBP and DBP, HR, and arterial blood oxygen saturation and the incidence of nausea and vomiting was statistically significant ( $P < 0.05$ ) between the two groups at 4, 6, and 12 h after anesthesia and it was higher in a group of GA. There was no significant difference in shivering and itching between the two groups ( $P > 0.05$ ). The results of this study indicated that thoracic EA in patients with laparoscopic cholecystectomy has significant effects on factors such as SBP and DBP and arterial blood oxygen saturation. Furthermore, EA has fewer complications than GA, and it is the preferable approach. Haddadi S et al compared topical method and retrobulbar block for pain intensity, patient's satisfaction, hemodynamic changes and intra and postoperative complications. In a single-blinded clinical trial, 114 patients scheduled for cataract surgery, aged 50 to 90 years with ASA physical status of I-III, were randomly assigned to two groups under monitored anesthesia care as topical anesthesia and retrobulbar block. After the injection of intravenous sedation, which was the combination of midazolam 0.5-1 mg with fentanyl 0.5-1  $\mu$ g/kg, patients received retro bulbar block or topical anesthesia. In this study, no significant association was found between age, gender, education and physical condition of patients in both topical and retro bulbar block groups. Comparison of pain based on VAS, satisfaction based on ISAS score and MAP in the studied periods had no significant differences between the two groups of patients undergoing cataract surgery. However, significant differences were found between the two groups regarding heart rate, systolic and diastolic blood pressure and arterial oxygen saturation percentage after 20-30 minutes of the operation. In conclusion, both methods, topical and retro bulbar block had similar impression in cataract surgery regarding analgesia and patient satisfaction. However, in non-complicated cataract surgeries with short duration, topical anesthesia may be the preferable method, because of non-invasiveness, appropriate analgesia, patient satisfaction and hemodynamic stability.<sup>7,8</sup>

Kaur P et al investigated and compared the response of lignocaine with and without epinephrine to evaluate hemodynamic and metabolic response in normotensive and type II controlled diabetic patients. A total of 50 patients (25 healthy and 25 controlled type II diabetics) undergoing multiple tooth extractions (age group of 20–80 years) were included in this prospective, randomised, clinical study. On their first visit, the patients were given 2% lignocaine HCl with 1:200,000 epinephrine, and 2% lignocaine HCl was given on the second visit, to carry out tooth extractions. Blood pressure (BP), pulse rate, oxygen saturation, and blood glucose estimations were done at definite intervals (before, immediately after, and 20 min after the administration of LA) on both the visits. The increase in blood glucose concentration following the administration of 2% lignocaine HCl with 1:200,000 epinephrine was statistically significant in controlled diabetic patients. Statistically significant variability in diastolic BP (DBP) was also noted in controlled diabetic patients. Both systolic BP and DBPs were statistically significantly elevated after the administration of 2% lignocaine HCl. They concluded that 2% lignocaine HCl with 1:200,000 epinephrine in type II diabetics and 2% lignocaine HCl should be used with caution in normotensive as well as type II controlled diabetic patients. Ezmek B et al compared hemodynamic effects of three different local anesthetics without vasoconstrictors during tooth extraction in hypertensive patients. Sixty-five mandibular molars and premolars were extracted in 60 hypertensive patients (29 females and 31 males; mean age:  $66.95 \pm 10.87$  years; range: 38 to 86 years old). Inferior alveolar and buccal nerve blocks were performed with 2% lidocaine hydrochloride (HCl), 2% prilocaine HCl or 3% mepivacaine HCl without vasoconstrictor. Hemodynamic parameters namely systolic blood pressure (SBP), diastolic blood pressure (DBP), mean arterial pressure (MAP), heart rate (HR), saturation rate (SR), rate pressure product (RPP) and pressure rate quotient (PRQ) were investigated before and at different intervals after anesthetic injection. The hemodynamic effects of the three agents were similar to each other, although some significance was observed for DBP, MAP, RPP and PRQ values in the lidocaine, prilocaine and mepivacaine groups. They concluded that Lidocaine, prilocaine and mepivacaine solutions without vasoconstrictor can be safely used in hypertensive patients. It is advisable that doctors select anesthetic solutions for hypertensive patients considering their cardiovascular effects in order to provide patient comfort and safety.<sup>9,10</sup>

## CONCLUSION:

Within the limitations of the present study, it can be concluded that topical local anesthesia and nerve block

are very effective in maintaining the hemodynamic stability of the patients.

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