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# Comparing the Anaesthetic Efficacy of 2% Lignocaine in Combination with 0.5% Bupivacaine Versus 0.5% Bupivacaine for Inferior Alveolar Nerve Block in Surgical Removal of Bilateral Impacted Mandibular Third Molar: A Prospective Study

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**Abstract:-**

**Aim: The aim of this study was to assess and compare the anaesthetic efficacy of 2% lignocaine in combination with 0.5% bupivacaine in 1:1 ratio versus 0.5% bupivacaine for inferior alveolar nerve block in surgical removal of bilateral impacted mandibular third molars.**

**Method: 15 patients (18 to 35 years)who meet the inclusive criteria were included in theintergroup comparison study.Based ontheanaesthetic modality used in this study two groups (A and B) were made. The Groups were given classical inferior alveolar nerve block injection for impaction surgery i.e., Group A were injected with a freshly prepared solution of 1 ml of 2% lignocaine hydrochloride (without adrenaline) admixed with 1ml of 0.5% bupivacaine on one side for surgical removal ofimpacted third molar whereas Group B included same 15 patients but this group candidates received 2 ml of 0.5% plain bupivacaine for surgicalremoval of impacted mandibular third molar oncontralateral side. A time interval of 3-4 weeks was given between the two procedures and the following parameters were evaluated the pain on injection, the onset of anaesthesia,the duration of anaesthesia and the hemodynamic parameters were evaluated.**

**Results: The mean time of onset of anaesthesia in group A and B was (1.466 ± 0.516) minutes and (6.533 ± 0.743) minutes respectively and the mean duration of anaesthesia was (254.87 ± 7.539) minutes and (314.93 ± 20.565) minutes in group A and B respectively.**

**Conclusion: An amalgamated solution of 2% lignocaine with 0.5% bupivacaine in 1:1 ratio is a better alternative anaesthetic agent as it provides minimal pain on injection, rapid onset, and longer duration of action with stable haemodynamic behaviour.**

***Keywords:-*** *Anaesthetics, Bupivacaine, Impaction, Inferior alveolar nerve block, Lignocaine.*

## I. INTRODUCTION

A tooth is calledimpacted,when itis either partially or fully uneruptedor is at a position against bone or soft tissue will result in its eruption unlikely to occur (1).The third molar impaction occurs in about 73% of the youthfulgrown-upsinEurope (2), and theireruptions occursbetween 17 years to 21years of age (3). A lotliterature evidencesuggests that the likelihood of female having a mandibular third molar impactions is higher when compared to males (4,5).The mandibular third molar impaction occurswhen there is no space or an inadequatespace available between anterior border of the ascending ramus of the mandible and distal part of the second mandibular molar tooth. Impacted teeth can remain as asymptomatic or they can be associated with various pathologies such apericoronitis, caries, cysts, tumours, and sometimes it can even cause root resorption of theadjoining tooth(6,7). Surgical removal of an impacted tooth is assumed to be a painful procedure by the patients and so for their concern pain management during the procedure is of at most importance. Pain isdefined as an unpleasant sensation unacceptable by individual and for its control many pharmacological as well non pharmacological methods are employed by the clinician. The pain control is achieved by injecting anaestheticdrugor agent locally. The most commonly used agents are lignocaine, articaine, bupivacaine, ropivacaine. (8,9,10).

Lignocaine is classified into an amide group and it is routinely used in dentistry.Its metabolism occurs in liver by microsomal oxidaseenzymes to monoethylglycine and its derivatives and it gets excreted from thebody through kidneys in which less than 10% of the drug is excreted in unchanged formwhile more than 80% of the drug is excreted as different metabolites. Lidocainebecamethe first marketed local amide anaesthetic in 1948 and most widely used inmany countries. Lidocaine is mostly used with vasoconstrictors which can cause hemodynamic alterationsduring the surgical extraction of molars, similar to other factors, such aspatient anxiety or stress levels. Although the safety of using a localanaesthetic together with a vasoconstrictor has been confirmed in theliterature, significant abnormalities have been recorded in bloodpressure and heart rate of the patients who had

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undergone surgical removal of extraction of thirdmolars. (11)

Bupivacaine (1- butyl - 2 ' , 6 '- pipecoloxylidide) was first synthesized by B afEkenstam (1957). This anaesthetic drug classified as an amide, long - acting anaesthetic agent. Bupivacaine has a longer duration of action as compared to lignocaine because ofprotein- binding capability and a high lipid solubility nature of drug.The onset of action of the drug varies between 1 to10 minutes and the duration of action lasts upto 2-9 hours with a half-lifeof approximately 2.7 hours. It has been documented that the potency of bupivacaine is nearly four times as compared to lignocaine when they are used in equal dosages. However it should be noted that bupivacaine isfour times more toxic than lignocaine (11,12).

Injection ofLignocaine with adrenaline is the most commonly used solution forachievinganaesthesia for impaction surgery. Adrenaline is added to local anaestheticsolution for vasoconstriction, to increase the duration of action of localanaestheticand to reduce the systemic absorption of local anaesthetic solution (10), adrenaline is contraindicated insystemic diseases like cardiovascular diseasesand uncontrolledhyperthyroidism(13,14).However,combining lignocaine and bupivacaine anaesthetic agent in one syringe offers the best effects: rapid onset of lidocaine and the prolonged duration of bupivacaine with stable hemodynamic profile (15,16,17).

Aim of this study is to assess and compare the anaestheticefficacy of 2% lignocaine with 0.5% bupivacaine versus 0.5%bupivacainein 1:1 ratio for inferior alveolar nerve block in surgical removal ofbilateral impacted mandibular third molars.

## II. METHODOLOGY

A total of 25 patients (18 to 35 years) were included in thisstudy after obtaininginformed writtenconsent andapprovalfromInstitutionalReview Board for an ethical clearance. Among 25 patients 10of them did not report back for surgical removal ofimpacted third molar on contralateral side. Finally, 15 patients were included inintergroup comparison (Group A and Group B).For study, split mouth clinical trial is planned as it avoids any inter-patientdiscrepancies which may arise during evaluation of the objectives parameters and provides an added advantage to study design i.e. no requirement of control as the patients acts as their own controls. Based ontheanaesthetic modality employed two groups (A and B) were made.TheGroups were given classical inferior alveolar nerve block injection for impaction surgery i.e., Group A patientswere injected with afresh prepared solution of 1 ml of 2% lignocaine hydrochloride (without adrenaline)admixed with 1ml of 0.5% bupivacaine on one side for surgical removal ofimpacted third molar while Group B included the same 15 patients and they wereadministered 2 ml of 0.5% plain bupivacaine for surgicalremoval of impacted mandibular third molar on contralateral side. Theprocedure for Group A andGroup B were donein an interval period of 3 to 4 weeks. All parameters were recorded before, during and after surgery. The patients were under postoperative observation for a period of half anhour and then discharged. All the 15 patients were givensamedose of medications for 3 days with appropriate postoperative instructions and patients were recalled for follow up on3rd, and 7thday postoperatively, sutures were removed on 7th post-operative day.

*A. Inclusion Criteria:*

- Patients aged between 18-35 years.
- Patients willing to participate in the studyand with informed writtenconsent.
- Patients with bilateral impacted mandibular third molars.

*B. Parameters assessed:*

- Time of onset of anaesthesia.
- Duration of anaesthesia.
- Pain score at the time of injection
- Hemodynamic parameters: Pulse Rate (PR), Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP), and Peripheral Oxygen Saturation in blood (SpO2) pre-operatively, intra-operatively and post-operatively.

## III. DATA ANALYSIS

Statistical analysis of the data was done using IBM SPSS Statistics version 26 software package (SPSS). Descriptive statistics including frequency, percentage, mean and standard deviation were calculated for demographic variables and various clinical parameters. Normality of the data was assessed using Shapiro-Wilk test, which revealed that the data significantly deviated from normal distribution. Therefore, further analysis was done using non- parametric tests. The mean rank differences between the 2 groups were compared using Mann -Whitney U test. The level of significance in the present study was kept at $p<0.05$.

## IV. RESULTS

A total of 15 participants who completed the study were included in the analysis. Out of the 15 subjects, 8 were females (53.3%) while 7 were males (46.7%). The mean age (±SD) of the participants was 27.07 years.

*A. Time of onset of anaesthesia*

The mean time of onset of anaesthesia in groups A and B was (1.466 ±0.516) minutes and (6.533 ± 0.743) minutes, respectively. Hence Group Ahas early onset of anaesthesia than Group B. The Mann- Whitney test wasused and the results were statistically significant with p value of 0.000* (p< 0.05%). [Refer table 1, fig. 1]

*B. Duration of anaesthesia*

The mean duration of anaesthesia was (254.87 ± 7.539) minutes or ( 4.247hours) and (314.93 ± 20.565) minutes or (5.248 hours) in groups A andB respectively , hence the duration of anaesthesia was found to be more forGroup B as compared to Group A and the results were statisticallysignificant with p value 0.000*( p < 0.05%) . [Refer table 2, fig. 2]

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*C. Pain on injection*

The pain score on injecting local anaesthesia ranged from 2 to 6 (15 patients) mean value is (4.33 ± 1.047) in group A. In Group B the pain score on injection ranged from 3 to 6 (15 patients) mean value is (4.73 ± 0.799) . [Refer table 3, fig.3]

*D. Haemodynamic Parameters*

Heart rate: The mean pre-operative heart rate was higher among group B (94.33 ± 12.338) compared to the subjects under group A (80.17 ± 3.035) with p value of 0.01* which is statistically significant (p<0.05*). During the surgical procedure the mean heart rate was found to be similar in both the groups. The mean heart rate of Group A (95.87 ± 2.900) and Group B (95.47 ± 11.351) and the mean difference between the two group was 0.40with p value of 0.288 (>0.05*) which is not statistically significant. Afterthe completion of surgical procedure i.e. post operatively the mean value ofgroup A was (94.93 ± 7.096) and Group B was (87.93 ± 5.365) with a meandifference of 7.00 and p value is 0.005* which is not statisticallysignificant. [Refer table 4, fig.4]

- Systolic blood pressure: The mean pre-operative systolic blood pressure was higher among Group B (128.466 ± 4.050) compared to the subjects under Group A (123.333 ± 9.875) with p value of 0.261* which is not statistically significant since p>0.05*. During the surgical procedure the mean systolic blood pressure was found to be higher in Group B (134.200±4.312) than Group A (128.533 ± 5.289) and the mean difference between the two group was 5.666 with p value of 0.007 (>0.05*) which is not statistically significant. After the completion of surgical procedure i. e post operativelythe mean value of Group B (136.133 ± 5.717) was higher than Group A(124.600 ± 8.483 ) with a mean difference of 11.285 and p value is 0.000* which is statistically highly significant. [Refer table 5, fig. 5]
- Diastolic blood pressure: The mean baseline for diastolic blood pressure was higher in GroupB (84.733 ± 4.992) than Group A (78.800±6.120) with mean difference tobe 5.933 with p value 0.006 (>0.05) which is not statistically significant. During the surgical procedure diastolic blood pressure was higher in GroupB (91.800 ± 5.544) than Group A (80.133 ± 8.01) with a mean difference of11.66 with p value .000 (<0.05) which is statistically highly significant.After the completion of surgical procedure, the mean value was found to be higher in Group B (95.933 ± 7.304) than Group A (76.533 ± 7.84) withmean difference of 19.40 with a p value of 0.000 (<0.05) which isstatistically highly significant. [Refer table 6, fig.6]
- Peripheral oxygen saturation in blood: The mean baseline for oxygen saturation was almost similar among the subjects under Group A (98.60 ± 1.765) when compared to subjects under Group B (98.40 ± 0.737) with mean difference 0.20 with p value of 0.123(>0.05) (Table 3) which is statistically insignificant. During the surgical procedure oxygen saturation was higher in Group B(98.87 ± 1.457) than Group A(96.60 ± 2.165) with mean difference of 2.27 with p value 0.001 (<0.05) which is statistically significant . Oxygen saturation remained almost similar between the two groups even after completion of the procedure with mean difference of 0.40 with p value 0.571 . [Refer table 7, fig7]

## V. DISCUSSION

Local anaesthesia is defined as a loss of sensation in a circumscribed area of the body caused by depression of excitation in nerve endings or an inhibition of the conduction process in peripheral nerves [10]. In dentistry the local anaesthetics are majorly sub divided into twogroups: Ester group which includes cocaine, benzocaine, procaine, chloroprocaineetc. and Amide group which includeslidocaine, bupivacaine, mepivacaine, articaine,prilocaine, etc. An ideal local anaesthetic solution on applicationprovides a complete sensory blockade with an adequate duration of action. The two most commonly used local anaesthetics are Bupivacaine and Lignocaine. Lignocaine has shortduration of action which is useful for minor procedures but forextensive minor surgical procedures as well as complicatedoral surgical procedures, a long acting local anaesthetic is required for which operating surgeon may prefer to perform the surgery under long-acting local anaesthetic.

The duration of anaesthesia for 2% lignocaine without adrenaline is about 5-10 minutes and 60-120 minutes for pulpal and soft tissue anaesthesia respectively [18]. It also has a rapid onset of action of about 2-3 minutes, whereas 0.5% bupivacaine has a much longer duration of action that is 90-180 minutes and 240- 540 minutes for pulpal and soft tissue anaesthesia respectively [11,19],however the duration of onset of bupivacaine is 6-10 minutes which is more as compared to plain lignocaine. [20,21].This large difference indurationof anaesthesia and onset of anaesthesia between these two drugs isimportant to the clinician.

These two amides are often used concurrently to obtain a benefit of more rapid onset of lignocaine and the prolonged duration of bupivacaine [20]. Many formulations include adrenaline, which acts as a vasoconstrictor hence it provides aclear surgical field during the procedure and alsoreduces the systemic absorption of the drug, therebyprolonging the duration of action and decreases systemic toxicity [10]. But in systemic conditions like cardiac disorders, hypertension, seizures, hyperthyroidism, etcthe use of adrenaline has been limited[10,13,14].Here the operator prefers to use an anaesthetic solution without adrenalinebut sometimes they administer multiple injections of anaesthetic solution to increase the duration of action but this can adversely increase the risk of local anaesthetic toxicity. Therefore, in such cases a mixture of lignocaine with bupivacaine is preferred because it provides a quicker and longer durationof anaesthesia, and at the same time, it can also be used effectively and safely in patients where adrenaline is contraindicated. In this study, we have used an amalgamated mixture of 2% plain lignocaine with 0.5% plain bupivacaine in 1:1 ratio to achieve a better anaesthetic effect and the results were compared with plain 0.5 % plain bupivacaine. Our study showed that both bupivacaine and lignocaine are completely miscible in nature, and have a better duration of action. These finding were also stated by othersimilar studies [20,21].

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The miscibility is explained by the pKa's of lignocaine (7.9 pKa) and bupivacaine (8.1 pKa) which are very similar and the fact that both the agents are classified under amide anaesthetic group. The physio-chemical characteristics such as lipid solubility, protein binding and pKa determines the anaesthetic property of agents. The anaesthetic agents which have a high affinity to lipids i.e., highly lipophilic property, due to this nature they easily penetrate nerve membrane, similarly anaesthetic agents which are highly protein bound will show a prolong duration of action as they remain attached at receptor site for a longer time. Thus, explaining the longer duration of action of bupivacaine as it is 90% protein bound when compared with lignocaine which has a 64% protein binding affinity[20,22,23]. It's documented that for amalgamated mixture ofbupivacaine and lignocaine (without adrenaline) the maximum recommended dose is 0.18 ml/kg (0.08 ml/lb) of body weight,which shouldn't exceed 12 ml i.e., 45 mg of bupivacaine and 120 mg of lignocaine[10].

In our study a total of 15 patients were included and split mouth design was employed for the surgical removal of bilaterally impacted mandibular third molar. thus, Group A and Group B were formed.

Group A - Patients received an amalgamated solution of 2% lignocaine (1-ml) with 0.5% bupivacaine(1-ml).

Group B - Patients received 2ml of 0.5% plain bupivacaine on the contralateral side.

The two surgeries were performed at an interval of 3-4 weeks. In this study all four types of impaction were included i.e Mesioangular, Distoangular, Horizontal and Vertical, so in this study among 30 impactions the most common type was Mesioangular (30%).

Our observation on Onset of Anaesthesia was early for Group A (1.466 ± 0.516) minutes as compared with group B (6.533 ± 0.743) minutes, and the results shows high statistical significance ($p<0.05$). The duration of action of anaesthesia was found to be more for Group B when compared with Group A and the results show statistical significance with a p value of 0.000*($p < 0.05\%$)

Oka S et al. (1997) performed asimilar study to investigate the effectiveness of lignocaine-bupivacaine mixed solution and compared it with lignocaine (1:200,000adrenaline) fordental anaesthesia. They concluded that duration of anaesthetic effect was significantly longer with ligno-bupivacaine mixture was used (70.0 ± 15.0min) than with lignocaine (1:200,000adrenaline) alone (45 ± 16.4 min). This result also coincides with our study. [24,25].

Akshay Mishra et al in (2018) conducted a randomized split-mouth double-blind clinical trial to find a suitable anaesthetic combination for prolong and complicatedminor oral surgical procedures. In this study Group A received 2% lignocaine with 1:200,000 adrenaline while in group B, amalgamated mixture of 2% lignocaine and 0.5% bupivacaine was used. They concluded that the amalgamated mixture of lignocaine and bupivacaine had equivocally rational onset and provided in-depth anaesthesia especially in complicated and protracted minor oral surgical procedures. Another variable which was found to be valuable between the two local anaesthetics groups (Group A and Group B) was Post operative heart rate [16]. Our results showed group A had higher post operative mean heart rate as compared to group B but the p value was 0.005, we believe a higher sample size should be employed to get a significant p value.

K. Balakrishnan et al (2014) reviewed the analgesic and anaesthetic abilities of the bupivacaine versus lignocainefor the surgical removal of impacted third molars. It has been found that both bupivacaine and lignocaine have their merits and demerits but it has been proven by the clinical trials that bupivacaine provides better and prolonged anaesthesiaduring minor surgicalprocedures. They concluded that bupivacaine can be regularly used as an anaesthetic agent, provided care should be taken regarding the dosage andcardio depressant property of the bupivacaine [18].

The above-mentioned study describes about the cardio depressant property of bupivacaine, but in our study as there was increased mean value of systolic blood pressure and diastolic blood pressure in group B. After the completion of surgical procedure i.e., post operatively the mean value systolic blood pressure of Group B (136.133+-5.717) was higher than Group A (124.600 +-8.483) with a mean difference of 11.285 and p value is 0.000* which is statistically highly significant. After the completion of surgical procedure, the mean value was found to be higher in Group B (95.933 ± 7.304) than Group A (76.533 ± 7.84) with mean difference of 19.40, p value of 0.000 (<0.05) which is statistically highly significant. We require further studies with large sample size to explain this peculiar result. Our results showed minimum variation in blood pressure and heart rate in group A, thus indicating that amalgamated solution with an equal volume i.e.,1-ml of 0.5% bupivacaine with 1-ml of 2% lignocaineis better.

When minor surgical procedures are of longer duration,the use ofamalgamated ligno-bupivacaine solution has a better effectiveness,this combination mixture has many advantages; one is that its time of onset is shorter and relatively less painful during administration by injection[20,25]also in our study we can see that the pain score during injecting local anaesthesia, ranged from 2 to 6 (15 patients) mean value is (4.33 ± 1.047) in group A ,while in group B the pain score on injection ranged from 3 to 6 (15 patients) mean value is (4.73 ± 0.799). The other advantages of this amalgamated solution are prolongedanaesthetic duration, good postoperative analgesic effect and in patients where adrenaline is contraindicated. Even though with the proven safety recordof amalgamated ligno-bupivacaine mixture, its efficacy still remains undocumented and unexploited in oral and maxillofacial surgical procedures. Thus, for a difficult minor oral surgical procedure we especially recommend the use of lignocaine-bupivacaine mixture as it has shown a beneficial and viable alternative to adrenalized lignocaine anaesthetic [18,21].

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## VI. CONCLUSION

We conclude that amalgamated solution of 2% lignocaine with 0.5%bupivacaine in 1:1 ratio is a better alternative anaesthetic agent as itprovides minimal pain on injection, rapid onset,longer duration of actionwith stable haemodynamic behaviour in patients undergoingprolonged oral surgical procedures with increased overall patients comfort andcooperation.This mixture has added advantages over conventional anaestheticsbut surprisingly its efficacy and effectiveness still remain unexploited andundocumented in oral and maxillofacial surgery.

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## TABLES

| | LA Groups | N | Mean | Std. Deviation | Mean rank | p value |
|---|---|---|---|---|---|---|
| Onset of Anaesthesia | Group A | 15 | 1.4667 | .51640 | 8.00 | 0.000* |
| | Group B | 15 | 6.5333 | .74322 | 23.00 | |

**Table 1: Distribution of mean value of onset of anaesthesia among two groups.**

**Mann – Whitney test**

* statistically highly significant

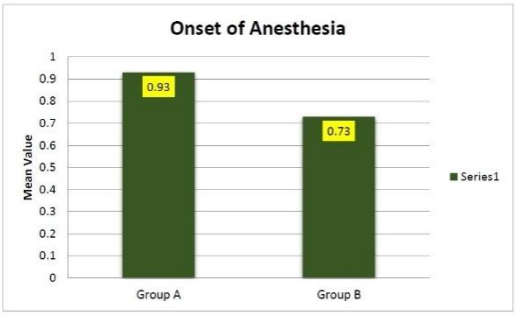


**Fig. 1. Mean value of onset of anaesthesia among two groups.**

| | LA Groups | N | Mean | Std. Deviation | Mean Rank | p value |
|---|---|---|---|---|---|---|
| Duration Of Anaesthesia | Group A | 15 | 254.87 | 7.539 | 8.00 | .000* |
| | Group B | 15 | 314.93 | 20.565 | 23.00 | |

**Table 2: Mean distribution of Duration of Anaesthesia (in minutes) among two groups**

**Mann – Whitney test**

***statistically highly significant**

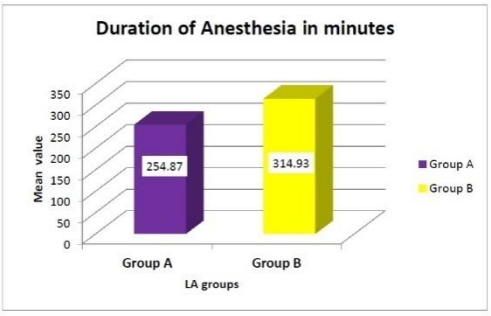


**Fig 2. Mean value of Duration of anaesthesia (in minutes) among two groups**

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| | LA Groups | N | Mean | Std. Deviation |
|---|---|---|---|---|
| Pain On Injection | Group A | 15 | 4.33 | 1.047 |
| | Group B | 15 | 4.73 | .799 |

**Table 3: Mean distribution of Pain on Injection among two groups**

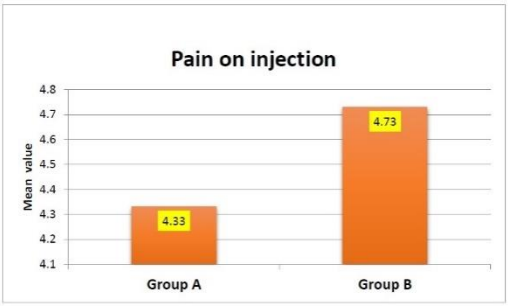


**Fig 3. Mean value of Pain on Injection among two groups**

| | LA Groups | N | Mean | Std. Deviation | Mean Rank | p value |
|---|---|---|---|---|---|---|
| Pre op heart rate | Group A | 15 | 80.07 | 3.035 | 10.27 | .01 |
| | Group B | 15 | 94.33 | 12.338 | 20.73 | |
| Intra op heart rate | Group A | 15 | 95.87 | 2.900 | 17.20 | .288 |
| | Group B | 15 | 95.47 | 11.351 | 13.80 | |
| Post op heart rate | Group A | 15 | 94.93 | 7.096 | 19.97 | .005 |
| | Group B | 15 | 87.93 | 5.365 | 11.03 | |

**Table 4: Mean value of Heart Rate (beats/min)among two groups**

**Mann – Whitney test**

***Pre op heart rate is statistically significant**

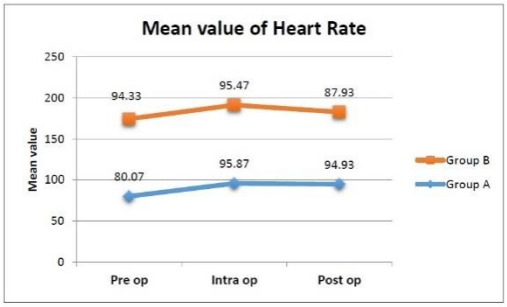


**Fig 4. Mean value of Heart Rate (beats/min) among two groups**

| | LA Groups | N | Mean | Std. Deviation | Mean Rank | P value |
|---|---|---|---|---|---|---|
| Pre Op Systolic BP | Group A | 15 | 123.333 | 9.87541 | 13.70 | .261 |
| | Group B | 15 | 128.466 | 4.05087 | 17.30 | |
| Intra Op Systolic BP | Group A | 15 | 128.533 | 5.28970 | 11.17 | |
| | Group B | 15 | 134.200 | 4.31277 | 19.83 | |
| Post Op Systolic BP | Group A | 15 | 124.600 | 8.48360 | 9.67 | .007 |
| | Group B | 15 | 136.133 | 5.71797 | 21.33 | .000 |

**Table 5: Distribution of Systolic Blood Pressure (mmHg) during pre operative ,intra operative and post operative periods among two groups.**

**Mann-Whitney Test**

***post op systolic blood pressure statistically highly significant**

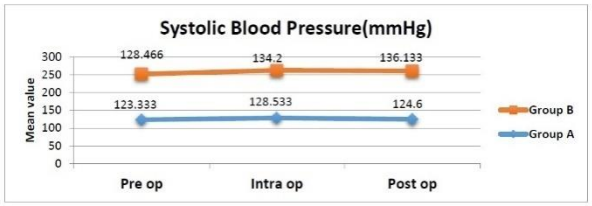


**Fig 5. Mean value of Systolic Blood Pressure(mmHg) during pre operative ,intra operative and post operative periods among two groups.**

| | LA Groups | N | Mean | Std. Deviation | Mean Rank | P value |
|---|---|---|---|---|---|---|
| Pre Op Diastolic BP | Group A | 15 | 78.800 | 6.12022 | 11.10 | .006 |
| | Group B | 15 | 84.733 | 4.99238 | 19.90 | |
| Intra Op Diastolic BP | Group A | 15 | 80.133 | 8.01665 | 9.40 | .000 |
| | Group B | 15 | 91.800 | 5.54462 | 21.60 | |
| Post Op Diastolic BP | Group A | 15 | 76.533 | 7.84553 | 8.50 | .000 |
| | Group B | 15 | 95.933 | 7.30427 | 22.50 | |

**Table 6: Distribution of Diastolic Blood Pressure (mmHg) during pre operative ,intra operative and post operative periods among two groups.**

**Mann-Whitney Test**

***p < 0.05: statistically significant**

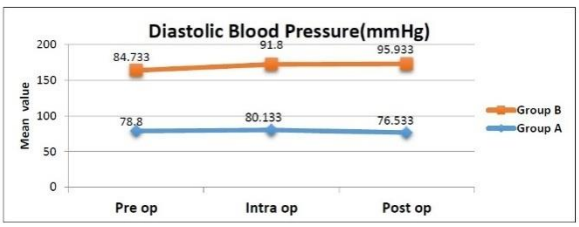


**Fig 6. Mean value of Diastolic Blood Pressure (mmHg) among two groups**

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| | LA Groups | N | Mean | Std. Deviation | Mean Rank | p value |
|---|---|---|---|---|---|---|
| Pre Op Spo2% | Group A | 15 | 98.60 | 1.765 | 17.80 | .123 |
| | Group B | 15 | 98.40 | .737 | 13.20 | |
| Intra Op Spo2 | Group A | 15 | 96.60 | 2.165 | 10.10 | .001 |
| | Group B | 15 | 98.87 | 1.457 | 20.90 | |
| Post Op Spo2 | Group A | 15 | 99.07 | 1.163 | 14.67 | .571 |
| | Group B | 15 | 99.47 | .516 | 16.33 | |

**Table 7 : Distribution of peripheral oxygen saturation in blood SpO2 among two groups**

**Mann-Whitney Test**

***p < 0.05: Intraoperative SpO2 is statistically significant**

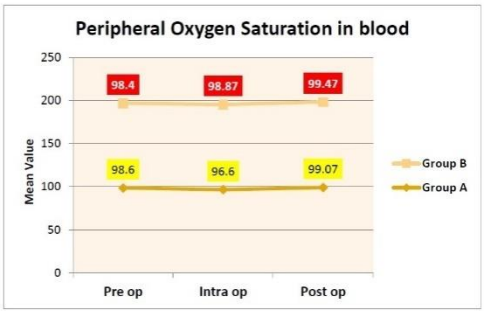


**Fig 7. Distribution of Mean Value of SpO2 among two groups**