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Research Article

COMPARISON OF INTRATHECAL NALBUPHINE VERSUS CLONIDINE AS ADJUVANTS TO HYPERBARIC BUPIVACAINE IN LOWER ABDOMINAL AND LOWER LIMB SURGERIES

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A B S T R A C T

Background: Various studies in the past have established the role of clonidine and nalbuphine as an adjuvant to local anaesthetic, not many studies have compared the efficacy between them. **Aim:** The present study has been undertaken to compare intrathecal nalbuphine and clonidine as adjuvants to bupivacaine in lower abdominal and lower limb surgeries. **Methods:** In this prospective, double blinded, randomized, and comparative study, a total of sixty patients each of American Society of Anaesthesiologists physical status Classes I and II undergoing lower abdominal and lower limb surgeries under subarachanoid block were randomly divided into two groups. In group 'N' received 1.6mg of Nalbuphine and in group 'C' recieved 30 micrograms (0.2ml) with 3ml 0.5% hyperbaric bupivacaine diluted with normal saline to make a total volume of 3.5ml intrathecally. The onset time and duration of sensory and motor block, duration of block, duration of analgesia, postoperative analgesic requirement, sedation score, haemodynamic parameters and side effects were noted. **Results:** In our study we found that that the onset of sensory and complete motor block was faster in the Nalbuphine group as compared to the clonidine group. The total duration of sensory and motor block were significantly prolonged in the clonidine group. The duration of analgesia was longer in the patients who received clonidine. **Conclusion:** Intrathecal clonidine is associated with pronlonged motor blockade, less post operative analgesic requirement as compared to nalbuphine.

INTRODUCTION

The International Association for the study of pain defines pain as, "unpleasant, sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage".[1,2] Any surgical procedure will inevitably result in pain. One of the fundamental duties of an anaesthesiologist is to alleviate pain. Anaesthesiologist are in charge of developing new pain management treatments as well as translating evidence-based research into clinical practice. Anaesthesia in today's world is concerned not just with relieving pain during surgical procedures but also during the post-operative period. The relatively simple technique of spinal anaesthesia, combined with its rapid onset of action, allows the surgical incision to be made sooner, significantly reducing the total time of the surgical procedure. For lower abdominal and lower limb surgeries, subarachnoid blockade with local anaesthetics provides profound and intense analgesia. However, the major drawback of using only the local anaesthetic for spinal anaesthesia is its relatively short effective period of action, and thus regaining early intervention in the post-operative period with analgesics. To address this issue, several pharmacological drugs have been used as adjuvants with hyperbaric Bupivacaine. These drugs hasten the onset of neuraxial blockade, improve its quality and prolongs the duration of action. Although various studies in the past have established the role of clonidine and nalbuphine as an adjuvant to local anaesthetic, not many studies have compared the efficacy between them. Thus, the present study has been undertaken to compare intrathecal nalbuphine and clonidine as adjuvants to bupivacaine in lower abdominal and lower limb surgeries.

METHODS

Institute Ethics Committee Clearance was obtained before the start of study. This prospective, double-blinded, randomized interventional study was carried out in 60 patients belonging to ASA (American Society of Anaesthesiologists) grade I and grade II, aged between 15 to 60 years, including either gender, scheduled for elective lower abdominal and lower limb surgeries under spinal anaesthesia.

All patients underwent a thorough preanesthetic check-up, and the patients with ASA III and more, below the age of 18 years and above the age of 60 years, history of systemic disorders like Diabetes mellitus, Hypertension, Heart disease, renal and hepatic disease, history of bleeding or coagulation disorders, any neurological or psychiatric disorders, any contraindication for neuroaxial blockade, posted for emergency surgery, history of allergy to any drugs being used under study, with history of any drug or alcohol abuse were excluded from the study.

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After obtaining informed written consent from patients in their own understandable language, 60 patients planned for lower abdominal and lower limb surgeries were divided into 2 groups of 30 patients each. Group **N** and Group **C.** To ensure double blindness of the study, intrathecal drugs were prepared by another anaesthesiologist while the subarachnoid block was given by us. Perioperative data were recorded by a resident who was unaware of group allocation.

"Group N" (Study Group)

In this group, patients were given 3ml of Injection Hyperbaric Bupivacaine hydrochloride 0.5% with 1.6mg of Nalbuphine (preservative-free) diluted with normal saline to make a total volume of 3.5ml intrathecally.

"Group C" (Study Group)

In this group, the patient was given 3ml of Injection Hyperbaric Bupivacaine hydrochloride 0.5% with 30 micrograms (0.2ml) diluted with normal saline to make a total volume of 3.5ml intrathecally

A well designed proforma was used in the process

1. Part 1 : Pre anaesthetic check-up
2. Part 2 : Preoperative monitoring
3. Part 3 : Postoperative monitoring

Preoperative evaluation

All patients were thoroughly evaluated pre-operatively, one day prior to surgery. It comprised of detailed history (history of ischaemic heart disease, hypertension, bronchial asthma, allergy to any of the drugs used), general, physical and systemic examination. The necessary and relevant laboratory investigations like CBC, Urine routine, RFTs, RBS, CXR and ECG were done prior to surgery and proper written consent was confirmed.

All the patients were kept Nil per oral (NPO) for a period of at least 6 hours prior to surgery to avoid the risk of aspiration and other anaesthesia related complications.

In the pre-operative room, the patient's pulse rate, blood pressure, respiratory rate and oxygen saturation were noted, with the patient lying comfortably in supine position.

Pre-anaesthetic medication

The patients were brought into the operation theatre. After shifting the patient on the operating table, all the monitors such as NIBP, pulse oximeter and ECG were connected to the patients. Pre induction vital parameters such as pulse rate (PR), systolic blood pressure (SBP), diastolic blood pressure (DBP), mean arterial pressure (MAP), SPO2, respiratory rate and ECG were recorded.

A good and secure intravenous line was obtained using a 20 G IV cannula and preloading with the infusion of ringer lactate (RL) at the rate of 10-15 ml/kg was started slowly. The drug to be given was prepared and both the anaesthesiologist and the patient was kept blinded to the study drug.

Spinal Anaesthesia Technique

Spinal anaesthesia was given in the sitting position under all aseptic precautions. After painting and draping of the lumbar area, a 26G Quincke's spinal needle was introduced in the L_2-L_3 or L_3-L_4 inter-vertebral space. Free flow of CSF was confirmed and depending on the groups, respective drugs were injected intrathecally, i.e. Group N was given 3ml of Injection Hyperbaric Bupivacaine hydrochloride 0.5% with 1.6mg of Nalbuphine diluted with normal saline to make a total volume of 3.5ml and Group **C** was given 3ml of Injection Hyperbaric Bupivacaine hydrochloride 0.5% with 30 micrograms (0.2ml) diluted with normal saline to make a total volume of 3.5ml. Patient was placed in supine position immediately after injection and vital parameters were recorded. The position was adjusted to achieve adequate sensory blockade depending upon the surgery.

The following readings were noted for assessment of subarachnoid block

T_0-Time of subarachnoid block
T_1-Time of onset of sensory blockade (loss of pinprick sensation)
T_2-Time of onset of complete motor blockade (inability to move legs or feet)
T_3-Time of peak sensory block
T_4-Time to two segment regression of sensory blockade
T_5-Wearing off time of motor blockade (when patient starts to lift legs against gravity)
T_6-Total duration of sensory blockade
T_7-Time of rescue analgesia

Sensory block was tested by pinprick method in the midclavicular line till the block reaches the highest sensory level and then surgical incision was allowed.

Motor blockade was assessed using BROMAGE SCALE

Grade	Criteria
I	Free movement of legs and feet
II	Just able to flex knees with free movement of feet
III	Unable to flex knees, but with free movement of feet
IV	Unable to move legs or feet

In the intraoperative period, patients were closely monitored for PR, RR, SPO_2 and blood pressure for 5 minute and intervals till 10 minutes and then every 10 minutes till the end of surgery. Ringer Lactate solution will be used for IV infusion throughout.

The quality of postoperative analgesia was assessed with the help of the Visual Analogue Scale (VAS). It involves use of a 10cm line on a piece of white paper and it represents patient's opinion for the degree of pain. It was explained to all patients preoperatively that one end of the line i.e.,"0" marks "no pain" at all, while another end i.e., "10'' represents "worst pain'' she has ever felt. Patient rated the degree of pain by marking a mark on the scale. Thus, the pain score was obtained by measuring the distance from the "0'' end to the indicated mark.

VAS Score
0=No pain
0-3=Mild Pain
3-7=Moderate pain
>7=Maximum pain

Subsequent rescue analgesics (Injection Tramadol 50mg IV) were given if the patient had a score of 5 or more than 5. Duration of analgesia is measured from time of subarachnoid block till the patient demanded the first rescue analgesic.
Side effects such as nausea, vomiting, pruritis, hypotension, bradycardia, respiratory depression, etc. were noted.

The values of onset of the complete motor blockade – mean and standard deviation (SD) of Nalbuphine and Clonidine group were 7.97±3.29 minutes and 9.63±2.43minutes respectively in the reference study.[3] Entering these values in WINPEI software (version 11.65) at a significance level of 0.05 and power of 80%, the calculated sample size was 60 (30 in each group).

Continuous variables like Age, Height, Weight, Heart Rate, systolic and diastolic blood pressure and SPO_2 are expressed as Mean ± Standard Deviation and compared across the 2 groups using unpaired t-test. Categorical variables like the number of patients and percentage of patients are compared across the 2 groups using Pearson's Chi Square test for Independence of Attributes. The statistical software SPSS version 16 has been used for the analysis. An alpha level of 5% has been taken, i.e. if any p-value is less than 0.05 it has been considered as significant. Paired t-test is used to compare the two means.

RESULTS

Table No 1 Comparison of Time of onset of sensory block in both groups

Variables	GROUP"N" (Nalbuphine)	GROUP "C" (Clonidine)	P value
Time of onset of sensory block (minutes)	4.04±0.51	4.14±0.17	0.410

Demographic profile (age, weight, height, ASA physical status and type of surgery) was comparable among the three groups as shown in Table 1.

Table No 2 Comparison of Time of Injection to peak sensory block in both groups

Variables	GROUP"N" (Nalbuphine)	GROUP "C" (Clonidine)	P value
Time from injection to Peak sensory block (minutes)	7.14±0.58	8.66±0.65	0.00001*

The onset of sensory block and motor block was comparable in clonidine and nalbuphine group. The two-segment regression time was significantly prolonged ($p<0.001$), and was significantly longer in clonidine group (176.86±20.62 mins) than in nalbuphine group(122.6±21.3 mins). The duration of motor blockade significantly ($p<0.001$) longer in clonidine group (246.51±16.38 mins) than nalbuphine (205.6±5.32 mins) as shown in Table No 2.

Table No 3 Comparison of Time of onset of motor block in both groups

Variables	GROUP"N" (Nalbuphine)	GROUP "C" (Clonidine)	P value
Time of onset of motor block (minutes)	7.67±0.83	7.94 ±1.46	**0.476**

Time to first rescue analgesia was significantly ($p<0.001$) prolonged in clonidine group (266±14.5 mins) and nalbuphine (239.86±10.45 mins) as shown in Table no 3. Intraoperatively heart rate, blood pressure was comparable among both groups

Table No 4 Comparison of duration of motor block in both groups

Variables	GROUP"N" (Nalbuphine)	GROUP "C" (Clonidine)	P value
Duration of motor block (minutes)	152.5±7.52	202.33±15.19	0.00001*

Table No 5 Comparison of time taken for two segment regression in both groups

Variables	GROUP"N" (Nalbuphine)	GROUP "C" (Clonidine)	P value
Two segment regression	122.6±2.84	176.86±20.62	**0.00001***

Table No 6 Comparison of duration of sensory block in both groups

Variables	GROUP"N" (Nalbuphine)	GROUP "C" (Clonidine)	P value
Duration of sensory block	205.6±5.32	246.51±16.38	0.00001*

Table No 7 Time to rescue analgesia in both groups

Variables	GROUP"N" (Nalbuphine)	GROUP "C" (Clonidine)	P value
Time to rescue analgesia	239.86±10.45	266.63±14.45	0.00001*

Table No 8 Comparison of Visual Analogue Scale in both groups

VAS	GROUP"N" (Nalbuphine)	GROUP "C" (Clonidine)	P value
6 hours	3.46±0.50	0	-
12 hours	5.83±0.98	3.46±0.50	0.005*

DISCUSSION

Regional anaesthesia these days are more popular than general anaesthesia for lower abdominal and lower limb surgeries because of rapid onset of surgical anaesthesia with complete muscular relaxation during surgery. It is beneficial in patients in whom difficult airway is anticipated and in patients with comorbidities.

While selecting a local anaesthetic for spinal anaesthesia, factors that are taken into consideration are potency, onset, duration of action and side effects. Bupivacaine, a highly lipid-soluble amino acid is the most common anaesthetic agent used for subarachnoid block because of its easy availability, low cost and high potency. But bupivacaine when used is not capable of extending analgesic effect in post-op period because of its short duration of action.

The idea of using an adjuvant with a synergistic pharmacological action is to complement the action of local anaesthetic resulted in the significant number of research and clinical trials to find an ideal adjuvant.

An ideal adjuvant would enhance the overall quality of spinal anaesthesia and also enhance analgesia in the post-operative period. They help to reduce the dosage of local anaesthetic owing to its dose sparing effect thus decreasing the occurrence of adverse effects and also quickening the onset of neural blockade.

This approach of adding adjuvants to local anaesthetics have been accepted by anaesthesiologists world-wide.

Nalbuphine is a synthetic opioid that has agonistic action at κ receptor and antagonistic action at mu receptor. It inhibits the release of substance P, which is a neurotransmitter that mediates pain. In addition, it acts as a postsynaptic inhibitor of interneurons and ascending nocioceptive spinothalmic tract. Since it is highly lipid soluble it diffuses into systemic circulation fast unlike hydrophilic opioids like morphine, thereby producing a short duration of action. It is safe to use intrathecally unlike morphine which can cause delayed

respiratory depression due to its spread in CSF. The adequate dose of intrathecal nalbuphine has been debated ranging from 0.2-2.4mg.

Based on this, we have chosen a dose of 1.6mg nalbuphine.
Clonidine is the most commonly used α2 agonist in neuroaxial anaesthesia with well-established record of safety and efficacy. Clonidine is a partial α2 agonist with α1:α2 receptor affinity at a ratio of 200:1. It acts synergistically with local anaesthetics by opening potassium channels. Analgesic effect of clonidine is attributed to its blocking of C and A delta fibres. Spinal clonidine binds to post synaptic α2 receptors in substantia gelatinosa of spinal cord.

It also augments acetylcholine release due to its cholinergic activity which increases the amount of acetylcholine available for modulating pain at level of substantia gelatinosa.

The optimal dose of clonidine for intrathecal use remains unknown ranging from 15 mcgs to 150 mcgs with variable results. Various authors have studied different doses of intrathecal clonidine and it is concluded that 30 mcgs clonidine shows better prolongation of analgesia and motor blockade.
Based on these studies we chose 30 mcgs clonidine for our study.

The rationale for combining opioids with local anaesthetics intrathecally is that two different types of drugs eliminate pain by acting at two different sites. Local anaesthetics act at the nerve axonal level (by blocking voltage gated sodium channels) and opioids at the receptor level (substantia gelatinous to modulate the function of after entering pain carrying nerve fibres). Some of this intrathecal opioid gets absorbed into the systemic circulation and acts on the opioid receptors at the brain. Degree of this absorption depends on the lipophilicity of the drug.

In our study we compared and evaluated the effect of addition of Nalbuphine and Clonidine to hyperbaric 0.5% Bupivacaine intrathecally in patients undergoing lower abdominal surgeries. Total 60 patients of ASA status I and II, either male or female, with age between 18-60 years posted for elective surgeries of lower abdominal and lower limb under spinal anaesthesia were chosen for the study. After obtaining Institutional Ethics Committee approval and written consent from every case selected for the study, a randomized double blinded study was conducted with two groups of 30 patients each.

Patients of "Group N" received 3ml of Injection Hyperbaric Bupivacaine hydrochloride 0.5% with 1.6mg of Nalbuphine diluted with normal saline to make a total volume of 3.5ml and "Group C**"** received 3ml of Injection Hyperbaric Bupivacaine hydrochloride 0.5% with 30 micrograms (0.2ml) diluted with normal saline to make a total volume of 3.5ml intrathecally.

Monitoring of hemodynamic parameters like pulse rate, blood pressures, Spo2 and respiratory rate were done throughout the surgery. Sensory blockade onset was evaluated using ''pin prick method'' and onset of complete motor blockade was evaluated using Bromage scale with "Bromage IV" signifying complete motor block. Time taken for two segment regression of sensory block and total durations of motor and sensory block were documented. Pain was evaluated subjectively using VAS. Total duration of analgesia i, e time taken till rescue analgesia was given to patient was also noted.

Demographic Profile

The mean age in Nalbuphine group was (47.66±15.27years) whereas in Clonidine group was (49±17.13 years). The variations in terms of age of study subjects were statistically non relevant.

The gender wise distribution of cases showed that, out of total 60 cases, maximum number were males 34 (57%) and remaining 26 (43%) females. The mean weight of subjects in Nalbuphine group was (58.3±3.71 kg) and Clonidine group was (59.06±4.94 kg) as seen in Table No.3 and Figure No.3. The variations in terms of weight of study subjects were statistically non relevant ($p>0.05$).

The mean height of subjects in Nalbuphine group was (154.46±4.15cm) and in Clonidine group was (155.46±3.96cm). The variations in terms of height and weight were statistically non relevant ($p>0.05$).

Distribution Based on the Surgical Procedure

In the Nalbuphine group, maximum cases were abdominal surgeries (25 cases) followed by lower limb surgeries (5 cases).

In the Clonidine group, maximum cases were abdominal surgeries (22 cases) followed by lower limb surgeries (8 cases).

The level of peak sensory block was maintained during surgery depending upon the surgical procedure.

Block Characteristics

"Onset of sensory blockade" was considered as the time from intrathecal injection to the beginning of loss of pinprick sensation.

In Nalbuphine group, mean time of sensory block was (4.04±0.51 mins) and in Clonidine group it was (4.14±0.17mins) as seen Table No.1. As the p value was >0.05 it was statistically not significant.

In Nalbuphine group, mean time to peak sensory block was (7.14±0.58 mins) and in Clonidine group it was (8.66±0.65 mins) as seen Table No.2. As the p value was <0.05 it was statistically significant.

"Onset of complete motor block" was the time from intrathecal injection to "Bromage score IV" (inability to move knee and feet)

In the Nalbuphine group, mean value of total duration of motor blockade was (152.5±7.52 mins) and in Clonidine group it was (202.33±15.19 mins) as seen Table No.4. As the p value was <0.05 it was statistically significant.

In Nalbuphine group, the mean value of total duration of sensory block was (205.6 ±5.32 mins) whereas in Clonidine group, it was (246.51 ± 16.38 mins) as seen in Table 6. Statistical analysis revealed a highly relevant variation with p value < 0.001, with prolonged duration of sensory blockade in patients who received Clonidine.

Manornjan Bansal *et al* conducted a study in 2017 comparing 30mcgs clonidine and 2mg nalbuphine as adjuvants to 0.5% hyperbaric Bupivacaine 3.5ml in a total of 60 patients undergoing gynaecological procedures. They observed that faster onset of sensory block in nalbuphine group (7.24±3.26

mins) compared to clonidine group (8.09±1.06 mins). They noted that complete motor block was faster achieved in nalbuphine group (7.97±3.26 mins) compared to clonidine group (9.63±2.43mins).{3}

Rajan Kumar *et al* conducted a study in 2018 comparing 30 mcgs clonidine and 800mcgs nalbuphine as adjuvants to 12.5mg 0.5% hyperbaric Bupivacaine in 100 patients undergoing infraumblical surgeries and observed that clonidine (9.34±1.81mins) took slightly longer time to attain maximum sensory level compared to nalbuphine (9.22±1.77mins) but was statistically insignificant.{4}

In our study, the mean two segment sensory block regression time for patients who received Nalbuphine was (122.6 ± 2.84 mins) whereas in the patients who received Clonidine, it was (176.86 ± 20.62 mins) as seen in Table No.5. Statistical analysis with "unpaired t test" revealed a highly significant variation with p value <0.001 with slower regression of sensory level in the patients who received Clonidine.

Manroranjan Bansal *et al* in their study conducted in 2017 using 30mcgs clonidine and 2mg nalbuphine as adjuvants to 0.5% hyperbaric Bupivacaine 3.5ml in a total of 60 patients undergoing gynaecological procedures observed a quicker "two segment regression" in the patients who received nalbuphine (157.51±18.25mins) as compared to those that received clonidine (216.33±12.43mins).{3}

Chetty D K *et al* conducted a study in 2018, comparing 1.6mg nalbuphine and 30mcgs clonidine as adjuvant to hyperbaric bupivacaine 15mg in 90 patients undergoing abdominal hysterectomy. They noted that clonidine (166.5±23.3mins) prolongs two segment regression as compared to nalbuphine (121±21.4mins) and those receiving bupivacaine alone (94±24.4mins).{5}

In Nalbuphine group, the mean value of time to rescue analgesia was (239.86 ± 10.45mins) whereas in Clonidine group, it was (266.63 ± 14.45 mins) as seen in Table No.7. Statistical analysis revealed a highly relevant variation with "p value <0.001". The time to rescue analgesia was significantly prolonged in the patients who received Clonidine.

Trishale Jain et alin their study conducted in 2020 comparing 30mcgs clonidine and 2mg nalbuphine as adjuvants to 3.5ml of intrathecal 0.5% hyperbaric Bupivacaine in a total of 84 patients undergoing lower abdominal surgeries noticed mean duration of analgesia was longer in clonidine group (284.95±12.95mins) compared to nalbuphine group (211.52±15.92mins).[6]

Haemodynamic and Respiratory Parameters

Pulse rate, systolic blood pressure and diastolic blood pressures were comparable in both groups.

Sapate *et al* did a randomized double blinded in 2013 study effects of adding 0.5mg nalbuphine to 3ml bupivacaine for 40 patients undergoing lower abdominal surgeries noticed no clinically significant difference in hemodynamic parameters.{7} Respiratory rate, oxygen saturation was comparable in both groups.

Rajan Kumar *et al* conducted a study in 2018 comparing 30 mcgs clonidine and 800mcgs nalbuphine as adjuvants to 12.5mg 0.5% hyperbaric Bupivacaine in 100 patients undergoing infraumblical surgeries noted no clinically significant difference in respiratory rates and SpO2 in both groups.{4}

Adverse Effects

In the Nalbuphine group, hypotension was seen in 46%, nausea, vomiting, bradycardia, pruritis was seen in 13.5% each whereas out of 30 patients in the clonidine group, 56% showed hypotension and 19% showed bradycardia, vomiting was seen in 13%, nausea and pruritis in 6% each during the surgery.

There were no incidences of respiratory depression or bradycardia in both groups.

The low incidence of hypotension and bradycardia in the study groups of nalbuphine group corroborated the findings of previous studies. This shows that the opioids did not have any significant sympatholytic activity and rather enhanced the antinociception in the spinalcord.

Kumkum Gupta *et al* did a study in 2016 comparing 25 mcgs of fentanyl and 2 mg of nalbuphine as adjuvants to 3.5ml of 0.5% hyperbaric bupivacaine intrathecally in 68 patients divided into two equal groups undergoing lower limb orthopaedic surgeries. The incidence of hypotension, bradycardia as well as other adverse effects during intraoperative period was minimal in both groups. Pruritus was the only significant complaint in the Fentanyl group.{8}

Visual Analogue Scale

In our study, pain was subjectively assessed by using "Visual Analogue Scale" at 6 hourly intervals from the time of induction in both study groups as seen in Table No.8. Statistical analysis with "independent t test" showed a statistically significant variation in all time intervals. The scores were lower in the Clonidine group at all time intervals showing better postoperative analgesia in the Clonidine group.
Krishna Sagar *et al* conducted a study in 2020 to compare the post-operative analgesic effects of 0.8mg nalbuphine and 60mcgs clonidine as adjutants to 2.6ml 0.5% hyperbaric bupivacaine in 99 patients undergoing lower limb orthopaedic surgeries and noted that rescue analgesic consumption was more in the control group compared to other groups VAS in nalbuphine group and clonidine group was comparable, but the use of rescue analgesia was more in nalbuphine group{9}

Limitations of the Study

1. The study sample was small to extrapolate and draw further conclusive evidence.
2. Cost-effectiveness of the study was not performed
3. Only ASA I and II patients were included.
4. Patients with significant comorbidities were not included
5. The VAS score is a subjective pain perception score, hence the assessment is subject to inter-patient variations.

Observation and Conclusion: We observed that: 1)The time for onset of sensory and motor blockade were quicker in the Nalbuphine group as compared Clonidine.2)The duration of both sensory and motor block was prolonged in the Clonidine group. Duration of postoperative analgesia was also longer with clonidine as compared to Nalbuphine. 3)The VAS scores in the postoperative period were lower in the patients who received Clonidine. 4)Our study also revealed intra operative

hemodynamic and respiratory stability as well as minimal side effects in both the adjuvant groups.

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