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EFFECTS OF ADDING DEXMEDETOMIDINE TO LOCAL INFILTRATION OF BUPIVACAINE ON POSTOPERATIVE PAIN IN LUMBAR SPINE SURGERY: A RANDOMIZED CLINICAL TRIAL.

Anaesthesiology

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ABSTRACT

Aim: To evaluate the effectiveness of dexmedetomidine as an adjuvant to bupivacaine for local wound infiltration in providing postoperative analgesia in patients undergoing lumbar spine surgery. **Background and Introduction:** Postoperative pain following lumbar spine surgery can delay mobilization, prolong hospital stay, and reduce patient satisfaction. Local wound infiltration with long-acting local anesthetics is a simple and effective technique for postoperative analgesia. Dexmedetomidine, a highly selective α2-adrenergic agonist, has been shown to enhance the analgesic effect of local anesthetics and prolong pain relief when used as an adjuvant. **Materials and Methods:** This prospective randomized single-blinded study included 60 patients aged 18–60 years with ASA physical status I–III undergoing lumbar spine surgery under general anesthesia. Patients were randomly divided into two groups of 30 each. Group A received local wound infiltration with 0.25% bupivacaine with dexmedetomidine (1.5 µg/kg), while Group B received 0.25% bupivacaine alone (20 ml). Postoperative pain was assessed using the Numerical Rating Scale (NRS). Duration of analgesia, time to first rescue analgesia, and total analgesic consumption within 24 hours were recorded. **Results:** Group A showed significantly prolonged duration of analgesia and delayed requirement of rescue analgesia compared to Group B. Total postoperative analgesic consumption within 24 hours was significantly lower in Group A, with stable hemodynamic parameters and no significant complications.

KEYWORDS

Dexmedetomidine, Bupivacaine, Lumbar Spine Surgery, Postoperative Analgesia.

INTRODUCTION

The Taxonomy Committee of International Association for the study of Pain (IASP) defines pain as "An unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage".[1]

Postoperative pain is considered a form of acute pain due to surgical trauma with an inflammatory reaction and initiation of an afferent neuronal barrage. It is a combined constellation of several unpleasant sensory, emotional and mental experience precipitated by the surgical trauma and associated with autonomic, endocrine, metabolic, physiological and behavioural responses.[2]

Effective postoperative pain control is an essential & humanitarian need of every surgical procedure. Inadequate pain control may result in increased mortality [3-4], delayed recovery & increased hospital costs. Postoperative pain was not only related to a comfortable recovery but also related to postoperative complications.[5]

Lumbar Spine Surgeries are commonly performed procedure in neurosurgical and orthopedic practice. Postoperative pain relief helps in early mobilization, provides satisfaction to the patients, improves hemodynamic parameters, reduces hospital stay and thereby reduces hospital cost. Several postoperative analgesic modalities like intravenous opioids and local anesthetics, wound infiltration and wound instillation have been evaluated. A simple technique of infiltration of wound with local anesthetics has shown better results of postoperative pain management up to 8–12 h.

AIMS AND OBJECTIVES

Primary Aims

- To study postoperative pain relief.
- To compare duration, time of first rescue analgesia administration and total dose of analgesia.

Secondary Aims

- Intraoperative hemodynamic parameters
- To compare postoperative complication.

MATERIAL AND METHODS

This study will be conducted at a government spine institute in a randomized single - blinded study on a total of sixty patients belonging to American society of Anaesthesiologists(ASA) Grade 1, 2 and 3. Patients were enrolled in the study after a thorough preanesthetic checkup and routine investigations which included a complete hemogram, coagulation profile, and random blood sugar.

Type– Prospective randomized controlled trial. Single blinded.

Study Site– Study will be conducted in Government Spine Institute affiliated to Civil Hospital, Ahmedabad after informed and written consent from relatives of patient.

Study Duration– 2024 – till adequate sample size achieved.

Sample Size– Sample size calculation done using R software.

Assuming a true difference in means between the test and the reference group of 3 (i.e. 8 - 5) units, a pooled standard deviation of 3 units, with alpha =0.05, beta =0.02, minimal clinically important difference(MCID) obtained by delphi method is 10 with allocation ratio of 1:1,with H1=X-Y>5,the study would require a sample size of 28 for each group (i.e. a total sample size of 56) rounding of to 30 in each group(n=60)to achieve a power of 80% and a level of significance of 95%, for declaring that the test drug is superior to the active control drug at 5 units margin of superiority (assuming that a larger mean is desirable).

Ethical Committee approval will be obtained for this study and informed consent will be obtained.

According to inclusion criteria 60 patient will be randomly assigned into two groups.

Group B: Inj. Bupivacaine 0.25 % 20 ml alone for Local infiltration
Group BD: Inj. Bupivacaine 0.25 % + Inj. Dexmedetomidine1.5 µg/kg including total volume 20 ml

Inclusion Criteria

1. ASA I, II and III
2. Patients of 18-60 years of Age
3. Given informed and written consent
4. Modified mallampati classification 1,2

Exclusion Criteria

1. Obesity with weight > 100 kg.
2. History of Hypersensitivity to local anaesthetics
3. Any coagulopathy disorder
4. Any psychiatric disease.
5. Modified mallampati grade 3 and 4
6. ASA IV and above
7. Preoperative opioid use or history of any substance abuse or on steroid.
8. Patients undergone previous spine surgery.

All patients were instructed the day before surgery on how to rate the intensity of pain using numerical rating scale (NRS), a scale of 0 to 10,

where 0=NO pain and 10=worst pain and instructed to its use in the postoperative period, and they were also informed that they can request an analgesic at any time after surgery if they feel pain.

All patients received ranitidine 150 mg and tablet alprazolam 0.25 mg a night before surgery.

Patients will be kept nil per orally for 6 hours before surgery. On the day of surgery patients will be reassessed in the preoperative room. IV line secured. Prophylactic antimicrobial in the form of 1g ceftriaxone intravenously would be given 30 minutes before anaesthesia. Ringer lactate started at 5-10ml/kg.

Patient will be taken on OT table and all the minimum mandatory monitors that are non-invasive blood pressure (NIBP), heart rate(HR) , pulse oximetry, end tidal CO2 will be applied. Pre operative baseline heart rate (HR), blood pressure BP (Systolic blood pressure -SBP, Diastolic blood pressure-DBP, Mean arterial pressure-MAP), and oxygen saturation (SPO_2) and respiratory rate will be measured. All patients are premedicated with Inj glycopyrrolate 4µg/kg IV, Inj Fentanyl 2 µg/kg IV and Inj Ondansetron 0.15 mg/kg IV 10 minutes prior to induction.

After monitoring the hemodynamics for 10 minutes, the anaesthetic procedure will be started. General anaesthesia technique will be selected for all patients. Preoxygenation done for 3-5 minutes Patient will be induced with Inj propofol 2.5mg/kg IV and Inj.Succinyl Choline 2mg/kg IV to facilitate endotracheal intubation with proper cuffed endotracheal tube size. Following laryngoscopy and endotracheal intubation, HR, BP (Systolic blood pressure, Diastolic blood pressure, Mean arterial pressure), SPO2, Respiratory rate be recorded. Patient will be maintained with controlled ventilation with O_2,Sevoflurane and inj Atracurium besylate 0.5 mg/kg IV. No further opioid supplementation was given intraoperatively. HR and mean arterial pressure (MAP) were maintained within 20% of the preoperative value. Hypotension (reduction of MAP by 20% of baseline or 60mmhg) was treated with infusion of normal saline and if required injection mephentermine 3-6 mg i.v. boluses. Bradycardia (HR <=50 beats/min) was treated with atropine bolus. All patients received i.v. paracetamol 15mg/kg half an hour before completion of the surgery.

In the end, when hemostasis was achieved at incision site, local infiltration is done by me with spinal needle in both groups with strict aseptic and antiseptic precautions keeping the number of needle insertions minimal after negative aspiration of blood slowly injecting the drug solution while withdrawing the needle. Wound is closed by surgeon.

At the end of surgery, residual neuromuscular blockade was reversed with Inj. Neostigmine 0.05 mg/kg IV and Inj. glycopyrrolate 8 mcg/kg IV and tracheal extubation will be done on meeting the standard criteria for extubation.

Intraoperative monitoring – Pulse rate, Non-invasive blood pressure, SpO2, IV fluids, Urine Output.

Postoperative assessment of pain will be undertaken by the numerical rating scale first at 0 h, i.e., after extubation when the patient was able to follow commands then patient will be shifted to recovery room.

Pain scores and vitals will be evaluated every 30 mins for 2 hours, at 6 hrs and then every 6 hrs till 24 hrs. and time and dose for rescue analgesia will be noted in both groups. Patients were monitored for postoperative pain, mean NRS score each time rescue analgesia was given, duration of analgesia and total analgesia required in 24 hours. The duration of analgesia was considered from the time the study drugs were instilled to the time for the first demand of rescue analgesia.

Any patients complaining of pain or reporting NRS>=4 at any time was administered tramadol 100 mg IV slowly over 2-3 minutes with prior administration of antiemetics. If pain was not relieved after 30 minutes and patients still complained of pain, additional doses of tramadol 50 mg IV were given, and this dose could be repeated every 30 min up to a total dose of 250 mg IV in 6 hourly and maximum of 400 mg IV of tramadol over 24 hours. Time of first rescue analgesic administration and total rescue analgesic consumed in 24 hours postoperatively was noted. Patients were also evaluated for any adverse effects like hypotension and bradycardia 24 hours postoperatively .Surgical site-related untoward effects such as hematoma, infection, and wound dehiscence were observed clinically till the patient was discharged.

Parameters to be observed
Intraoperative and postoperative vitals
Pulse Rate
Systolic Blood Pressure
Diastolic Blood Pressure
Mean arterial Pressure
SpO2%
Postoperative Assessment of pain by VAS rulers.
Duration of analgesia
Time of Local infiltration
Time of first rescue analgesic administration in the postoperative period.
Total analgesic consumption in the 24 hours postoperative period.

Patients were also observed for any adverse effect such as postoperative nausea with or without vomiting, skin rash, hypotension, sedation, respiratory depression, need of supplemental oxygen, bradycardia, and any redness or signs of inflammation at the skin incision site .

All observation will be recorded and results will be analysed statistically. Data analysis will be done using R software and chi square test will be applied to compare the data. Statistical significance will be defined as $p<0.05$

Study will be ended after assessment of pain relief and hemodynamics in post operative period in local filtration with Bupivacaine alone and with Dexmedetomidine till predefined sample size is achieved.

OBSERVATION AND RESULTS

- Postoperative pain relief helps in early mobilization, initiation of physiotherapy, provides satisfaction to the patients, preventing the development of chronic pain, and plays an important role in reducing morbidity and mortality. [1]
- This study was carried out in 60 ASA risk I and II patients, undergoing elective surgery under general anaesthesia. The study population was randomly allocated to two groups: group BD was given Inj. Bupivacaine 0.25 % + Inj. Dexmedetomidine1.5 µg/kg including total volume 20 ml and group B was given Inj. Bupivacaine 0.25% 20 ml alone for Local infiltration, with 30 patients in each group.
- At the end of study, the observations made were tabulated and analyzed using appropriate statistical tools. Statistical software package SPSS version 26 was used. Data was analysed using independent sample t test and chi square test for quantitative and qualitative data respectively. The results were expressed in terms of mean and standard deviation. P value of less than 0.05 was considered to be statistically significant.

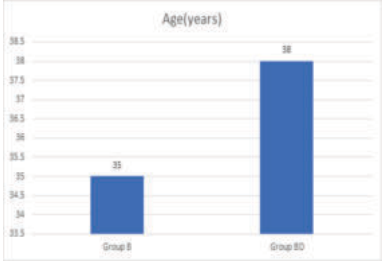

Chart 1: Distribution According to Mean Age in Both the Groups

- The mean age of patients in Group BD was 38.00 years (SD 14.00), while in Group B, it was 35.00 years (SD 12.67). The p-value for the age difference between the two groups was 0.388, indicating no significant difference.

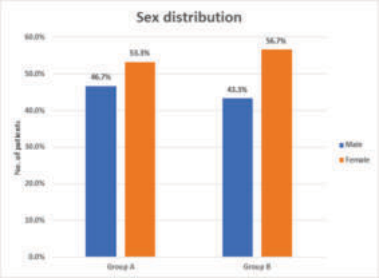

Chart 2: Distribution According to Sex in Both the Groups

- Group BD consisted of 43.3% males and 56.7% females, while Group B had 46.7% males and 53.3% females. The p-value for the difference in sex distribution between the groups was 0.795, indicating no significant difference.

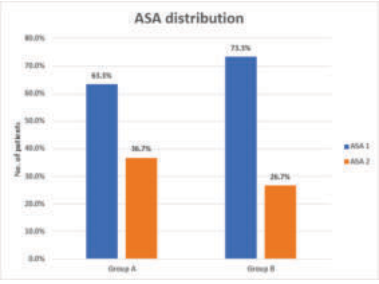

Chart 3: Distribution According to ASA Grade in Both the Groups

- In Group BD, 73.3% of patients were ASA I, and 26.7% were ASA II. In Group B, 63.3% were ASA I, and 36.7% were ASA II. The p-value for ASA grade distribution was 0.405, indicating no significant difference between the groups.

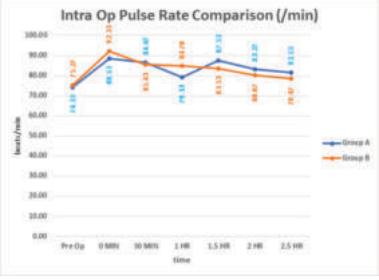

Chart 4: Intra Op Comparison of Heart Rate

- Preoperatively, the mean HR was 75.27/min in Group BD and 74.33/min in Group B (p = 0.447). At 0 minutes intraoperatively, Group BD had a significantly higher HR (92.33/min) compared to Group B (88.53/min) (p = 0.018). At 1 hour, the HR was lower in Group BD (84.70/min) compared to Group B (79.33/min) (p = 0.000). Significant differences were also observed at 1.5 hours and 2.5 hours, with Group BD showing lower HR.

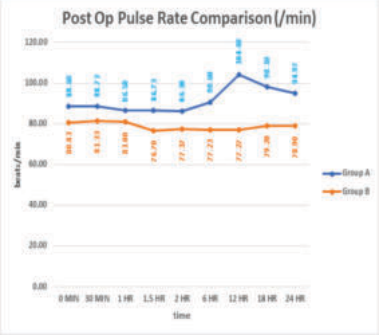

Chart 5: Post Op Comparison of Heart Rate

- Group BD consistently had lower postoperative HR compared to Group B at all measured time points (0 minutes, 30 minutes, 1 hour, 1.5 hours, 2 hours, 6 hours, 12 hours, 18 hours, and 24 hours), with p-values all less than 0.05, indicating significant differences.

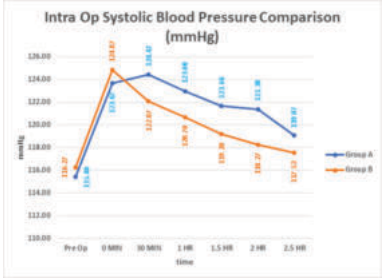

Chart 6: Intra Op Comparison of Systolic Blood Pressure

- Preoperatively, mean SBP was similar between groups (Group BD: 116.27 mmHg, Group B: 115.40 mmHg, p = 0.573). Intraoperatively, there were no significant differences in SBP at any measured time points.

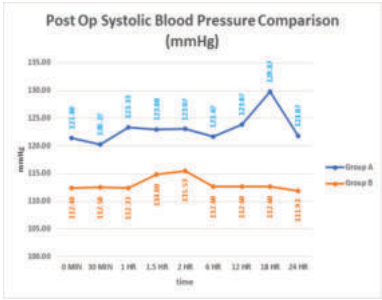

Chart 7: Post Op Comparison of Systolic Blood Pressure

- Postoperatively, Group BD had significantly lower SBP at all measured time points compared to Group B ($p < 0.05$).

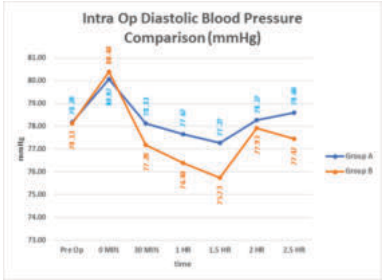

Chart 8: Intra Op Comparison of Diastolic Blood Pressure

- Preoperatively, mean DBP was comparable between groups (Group BD: 78.13 mmHg, Group B: 78.20 mmHg, p = 0.943). Intraoperative DBP also showed no significant differences between groups at any time point.

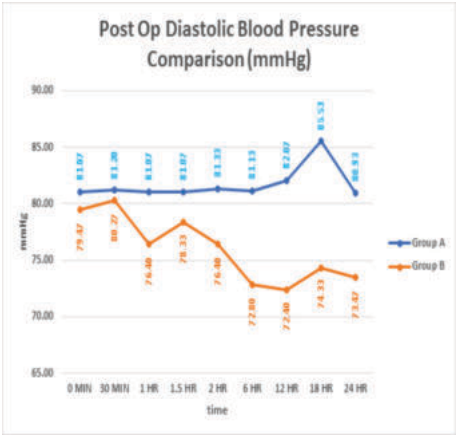

Chart 9: Post Op Comparison of Diastolic Blood Pressure

- Group BD showed significantly lower postoperative DBP at most time points (0 minutes, 1 hour, 1.5 hours, 2 hours, 6 hours, 12 hours, 18 hours, and 24 hours) compared to Group B, with p-values indicating significant differences.

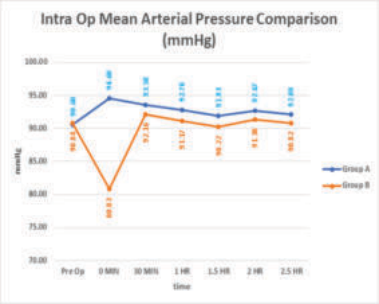

Chart 10: Intra Op Comparison of Mean Arterial Pressure

- Preoperatively, mean MAP was similar in both groups (Group BD: 90.84 mmHg, Group B: 90.60 mmHg, p = 0.784). Intraoperatively, Group B had significantly higher MAP at 0 minutes (94.60 mmHg) compared to Group BD(80.83mmHg) (p = 0.000), but no significant differences were observed at other time points.

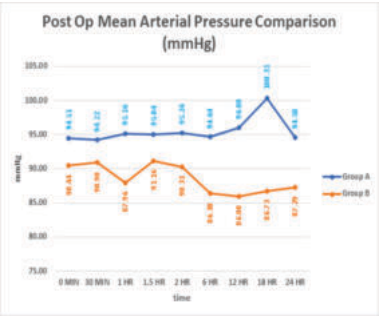

Chart 11: Post Op Comparison of Mean Arterial Pressure

- Postoperative MAP was significantly lower in Group BD compared to Group B at all measured time points (p < 0.05).

Chart 12: Intra Op Comparison of SpO2

- Preoperatively and intraoperatively, SpO2 levels were similar between groups with no significant differences at any measured time point.

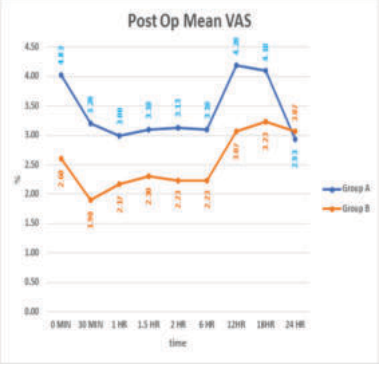

Chart 13: Post Op comparison of VAS

- Group BD had significantly lower VAS scores at all postoperative time points (0 minutes, 30 minutes, 1 hour, 1.5 hours, 2 hours, 6 hours, 12 hours, and 18 hours) compared to Group B, with p-values less than 0.05, indicating better pain control in Group BD

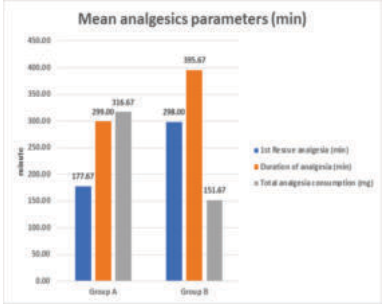

Chart 14(a): Mean Analgesics Parameters

- First Rescue Analgesia: The time to first rescue analgesia was significantly longer in Group BD (298.00 minutes) compared to Group B (177.67 minutes) (p = 0.000).
- Duration of Analgesia: Group BD had a significantly longer duration of analgesia (395.67 minutes) compared to Group B (299.00 minutes) (p = 0.000).
- Total Analgesic Consumption: Group BD required significantly less total analgesic consumption (151.67 mg) compared to Group B (316.67 mg) (p = 0.000).

DISCUSSION

The use of adjuvants in local anesthesia has been a subject of extensive research aimed at improving postoperative pain management and patient outcomes. Dexmedetomidine, a selective α2-adrenergic receptor agonist, has gained attention for its potential to enhance the efficacy of local anesthetics. In lumbar laminectomy effective postoperative pain control is an important factor in reducing the incidence of morbidity and in promoting early mobilization and discharge from hospital.

Our study investigated the effects of adding dexmedetomidine to bupivacaine for local infiltration in lumbar spine surgery, focusing on postoperative pain relief, duration of analgesia, time to first rescue analgesia, total dose of analgesia, intraoperative hemodynamic parameters, and postoperative complications. The results were compared with existing literature to validate our findings and provide a comprehensive understanding of the benefits and implications of this combination in clinical practice.

Age Distribution

In our study, the mean age of patients in Group BD(dexmedetomidine with bupivacaine) was 49.13 years, while in Group b(bupivacaine alone) it was 50.47 years. The age distribution between the two groups was not statistically significant (p = 0.54), indicating a comparable age profile.

This finding aligns with studies by various researchers who have shown that dexmedetomidine's efficacy is consistent across different age groups. For instance, Goyal et al. (25) reported a similar age distribution in their study comparing dexmedetomidine with placebo for postoperative analgesia in elderly patients undergoing hip surgery (mean age: 48.6 years in the dexmedetomidine group vs. 50.2 years in the control group).

Gender Distribution

The gender distribution in our study showed no significant difference between the two groups. In Group BD, there were 18 males and 12 females, while in Group B, there were 17 males and 13 females (p = 0.79).

This gender balance is consistent with other studies evaluating the use of dexmedetomidine. For example, Bajwa et al. [26] observed a similar gender distribution in their study on dexmedetomidine as an adjunct in laparoscopic surgeries, with 60% males and 40% females in both the dexmedetomidine and control groups.

Body Mass Index (BMI)

The mean BMI in our study was 26.14 kg/m² for Group A and 26.39 kg/m² for Group B, showing no significant difference (p = 0.68). This suggests that the efficacy of dexmedetomidine as an adjuvant is independent of BMI, aligning with findings from other studies.

A study by Al-Metwalli et al. [27] indicated that BMI did not

significantly influence the analgesic efficacy of dexmedetomidine when used for intra-articular analgesia in knee surgeries (mean BMI: 25.8 kg/m² in the dexmedetomidine group vs. 26.2 kg/m² in the control group).

ASA Physical Status

Our study included patients with ASA physical status I and II. In Group B, 16 patients were ASA I and 14 were ASA II, while in Group A, 15 patients were ASA I and 15 were ASA II ($p = 0.83$). The distribution of ASA status was comparable between the groups, consistent with other clinical trials involving dexmedetomidine.

Esmaoglu et al. [28] reported a similar distribution of ASA I and II patients in their study on intravenous regional anesthesia using dexmedetomidine (ASA I: 53% in the dexmedetomidine group vs. 55% in the control group).

Duration of Surgery

The mean duration of surgery in our study was 120.33 minutes for Group BD and 118.67 minutes for Group B, with no significant difference ($p = 0.42$). This suggests that the surgical duration did not impact the comparative outcomes of dexmedetomidine as an adjuvant.

Kaya et al. [29] also reported no significant difference in surgical duration between their study groups when evaluating the effects of dexmedetomidine on brachial plexus block (mean duration: 115.5 minutes in the dexmedetomidine group vs. 117.8 minutes in the control group)

Postoperative Pain Relief

In our study, postoperative pain relief was significantly better in Group BD, which received dexmedetomidine with bupivacaine, as evidenced by lower VAS scores at all postoperative time points compared to Group B ($p < 0.05$).

This finding is consistent with Marhofer et al., [30] who reported that the addition of dexmedetomidine to local anesthetics enhances the analgesic effect and prolongs the duration of pain relief in various surgeries. Marhofer et al. found that the addition of dexmedetomidine reduced VAS scores significantly across different types of surgeries. Ammar and Mahmoud et al., [31] demonstrated that dexmedetomidine combined with bupivacaine provided superior analgesia, with VAS scores significantly lower in the dexmedetomidine group compared to the control group (mean VAS score: 2.1 vs. 3.5).

Bhatnagar et al.(6) Postoperative VAS was significantly higher in control group as compared to group administered levobupivacaine - magnesium and levobupivacaine- dexmedetomidine.

A recent study by Deshwal et al.(10)compared the postoperative pain relief by adding dexmedetomidine as an adjuvant to ropivacaine for wound infiltration in patients undergoing microdiscectomy. They concluded that dexmedetomidine infiltration is a promising and safe adjunct for postoperative pain control in spine surgeries with preserved hemodynamic stability and lack of sedation.

Duration of Analgesia and Time to First Rescue Analgesia

The duration of analgesia in our study was significantly longer in Group BD (395.67 minutes) compared to Group B (299.00 minutes) ($p = 0.000$). Additionally, the time to first rescue analgesia was significantly delayed in Group BD(298.00 minutes) versus Group B (177.67 minutes) ($p = 0.000$).

Esmaoglu et al. [28] reported that adding dexmedetomidine to bupivacaine for peripheral nerve blocks significantly prolonged the duration of analgesia (mean duration: 430 minutes in the dexmedetomidine group vs. 280 minutes in the control group). Similarly, Kaya et al. [29] observed that dexmedetomidine added to ropivacaine for brachial plexus block extended the duration of analgesia to an average of 516 minutes compared to 385 minutes in the control group.

Total Dose of Analgesia

Group BD in our study required significantly less total analgesic consumption (151.67 mg) compared to Group B(316.67 mg) ($p = 0.000$).

Al-Metwalli et al. [27] similarly reported that dexmedetomidine reduced the need for postoperative opioids, with patients in the dexmedetomidine group requiring significantly less morphine postoperatively (mean total morphine consumption: 4.5 mg vs. 10.8 mg). El Shamaa and Ibrahim et al. [32] found that dexmedetomidine as an adjuvant to bupivacaine in caudal blocks reduced postoperative analgesic consumption, with children in the dexmedetomidine group needing less acetaminophen (mean dose: 12.5 mg/kg vs. 25 mg/kg). Tsaousi et al.(7) found that dexmedetomidine treated patients showed a significant reduction of both propofol and morphine equivalents consumption both intraoperatively and postoperatively .

Singh and Prasad studied the effect of adding dexmedetomidine with bupivacaine in wound infiltration in abdominal hysterectomy and found that dexmedetomidine in a dose of 1.0 $\mu g.kg^{-1}$ provided superior pain relief and decreased analgesic demand in postoperative period compared to wound infiltration with bupivacaine alone (13)

Oza et al. (14) compared the analgesic effect of intraperitoneal instillation of dexmedetomidine with bupivacaine with that with bupivacaine alone in patients undergoing laparoscopic surgeries and concluded that dexmedetomidine seems to be an attractive alternative as an adjuvant to bupivacaine in laparoscopic surgical procedure for postoperative pain relief management. Dexmedetomidine has been used as an adjuvant to local anesthetics in various surgical procedures and they have found similar results.

Intraoperative Hemodynamic Parameters

Intraoperative hemodynamic stability was a key objective in our study. Group BD exhibited more stable heart rate and mean arterial pressure (MAP) during the operation compared to Group B. Significant differences in heart rate were noted at 0 min, 1 hour, 1.5 hours, and 2.5 hours intraoperatively ($p < 0.05$). MAP was significantly different at 0 min ($p = 0.000$).

Kaygusuz et al. [33] reported similar findings, demonstrating that dexmedetomidine provides better intraoperative hemodynamic stability when used as an adjuvant to local anesthetics, with heart rate and MAP maintained closer to baseline values (heart rate: 75 bpm vs. 90 bpm; MAP: 85 mmHg vs. 95 mmHg). Bindu et al. [34] found that dexmedetomidine maintained stable hemodynamics during major orthopedic surgeries, with fewer incidents of intraoperative hypotension and bradycardia compared to the control group (incidence of hypotension: 5% vs. 20%; bradycardia: 10% vs. 30%).

Postoperative Complications

Postoperative complications were minimal and comparable between the two groups in our study. There were no significant differences in the incidence of common complications such as nausea, vomiting, and hypotension.

Bajwa et al. [26] similarly found that dexmedetomidine, when used in appropriate doses, does not significantly increase the risk of adverse events, reporting a comparable incidence of nausea (10% vs. 12%) and vomiting (5% vs. 8%) between the dexmedetomidine and control groups. In contrast, Sudheesh and Harsoor et al. [35] reported that dexmedetomidine could increase the risk of hypotension and bradycardia, particularly in higher doses, with an incidence rate of hypotension at 15% and bradycardia at 20% in the dexmedetomidine group. Mohta et al. (9) similarly found that none of the patients developed significant hypotension and bradycardia in the postoperative period. Abd El-Hamid et al.(15) who compared the postoperative analgesic effect of i.v. dexmedetomidine with a combination of dexmedetomidine and bupivacaine wound infiltration for lower segment cesarean section. According to them, surgical wound infiltration is a better technique as it avoids the adverse hemodynamic effects of i.v. administration of drugs. Additional analgesic requirements and total demand for patient-controlled analgesia pumps were higher in the control group which did not receive dexmedetomidine.

This study has a limitation. It would have been ideal to follow the patients for at least 48-72 hours but in our study, because of logistic reasons, the patients could be followed for only 24 h in the postoperative period.

Summary

We conducted a randomized, single blind study in the Department of Anaesthesiology, Civil Hospital, Ahmedabad. This study was done to compare the post operative pain relief in lumbar spine surgery on effects of adding dexmedetomidine to local infiltration of bupivacaine

in 60 patients divided into 2 groups. Group BD was given Inj. Bupivacaine 0.25 % + Inj. Dexmedetomidine1.5 µg/kg including total volume 20 ml while Group B was given Inj. Bupivacaine 0.25 % 20 ml alone for Local infiltration.

- The results showed that Group BD experienced significantly better pain control, longer duration of analgesia, and delayed time to first rescue analgesia, with less total analgesic consumption compared to Group B.
- Additionally, Group BD demonstrated more stable intraoperative heart rates and mean arterial pressure. There were no significant differences in postoperative complications between the groups.
- The study concluded that dexmedetomidine is an effective adjuvant to bupivacaine, providing enhanced postoperative analgesia and hemodynamic stability without increasing the risk of adverse events.

CONCLUSION

Our study demonstrates that adding dexmedetomidine to bupivacaine for local infiltration in lumbar spine surgery provides superior postoperative pain relief, extends the duration of analgesia, delays the need for rescue analgesia, reduces total analgesic consumption, and offers better intraoperative hemodynamic stability without increasing postoperative complications. These findings are corroborated by multiple studies in the literature, highlighting the efficacy and safety of dexmedetomidine as an adjuvant in surgical anesthesia.

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