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TO EVALUATE THE EFFICACY OF DEXMEDETOMIDINE IN SPINAL ANAESTHESIA

Anaesthesiology

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ABSTRACT

Background And Objectives: lower abdominal and lower limb surgeries may be performed under regional or general anaesthesia but SAB is the preferred route of anaesthesia. Several adjuvants such as opioids, α-agonist have been used with local anaesthetics to prolong the duration of spinal anaesthesia. Dexmedetomidine (α-2 receptor agonist) has now become the frequently used drug due to its sedative, anxiolytic, hypnotic, analgesic properties and minimal respiratory depression. In view of this, the present study was conducted to evaluate the effect of I.V. Dexmedetomidine on sensory, motor, haemodynamic parameters, analgesia and sedation during SAB. **Methodology:** 100 patients posted for lower limb and lower abdominal surgeries were allocated into two groups of 50 each. Group I received IV dexmedetomidine 0.3µg/kg bolus over 10 minutes prior to SAB with 15mg of 0.5% bupivacaine and followed by a maintenance dose of 0.3µg/kg/hr. Group II received SAB with 15mg of 0.5% bupivacaine. All the patients were evaluated for baseline and intraoperative hemodynamic parameters, sensory and motor blockade onset, peak level, overall post-operative analgesia and sedation assessment, side effects and complications if any. **Results:** demographic data and baseline haemodynamic parameters were comparable. Intra-operative heart rate was significantly decreased in group I from 30-60 minutes. Intra-operative MAP was significantly decreased in group I from 60minutes. Onset of sensory block was 75.3±8.0 seconds in group I compared with 127.6±13.2 seconds in group II. The sensory block level was comparable in both the groups. Onset of motor block was 2.97±0.6 minutes in group I as compared to 2.92±0.4 minutes. The duration of total analgesia in group I was 20.6.1±9.9 minutes as compared to 138.1±7.2 minutes in group II. The intra-operative mean Ramsay sedation score was higher in group I than group II. Additional analgesia was required in patients of group II while none of the patients required additional sedation in both the groups. The incidence of post op shivering, PONV, bradycardia and hypotension showed no differences among both the groups. **Conclusion:** The study result show that administration of I.V. dexmedetomidine during SAB hastens the onset of sensory block. It also prolonged the duration of analgesia. **Aims And Objectives:** To evaluate the efficacy of dexmedetomidine in spinal anaesthesia.

KEYWORDS

Dexmedetomidine, Intravenous, Sub-arachnoid block, Supplementation.

INTRODUCTION :

The choice of anesthetic technique is determined by surgical and patient's considerations. Various techniques used for the same, includes local anesthesia, general anesthesia, and regional anesthesia. Lower limb and lower abdominal surgeries may be performed under regional or general anesthesia but a sub-arachnoid block is preferred route of anesthesia as it has advantages over general anesthesia 1 Nils Lofgren produced lignocaine in 1943 and introduced in 1949. For decades, it had been the local anesthetic of choice for spinal anaesthesia2.

Subarachnoid block (SAB) has been recently the most preferred method for providing anesthesia for lower limb and lower abdominal surgery because of its cost effectiveness(3), early recovery with lesser complications as compared to general anesthesia like a sore throat etc4.

In the recent years, Intrathecal adjuvants have been widely used for the purpose of prolonging the duration of the block, better success rate, patient satisfaction with early recovery%.(5)

Dexmedetomidine were found to prolong the duration of sensory and motor block when given intrathecally(6). It was also found to prolong spinal anesthesia when administered as an oral pre-medication and when given by the intravenous route(7,8).

Sedation and anxiolysis are produced by binding to α-2 receptors in the locus coerleus, which decreases the release of norepinephrine and hinders sympathetic activity, thus causing bradycardia and hypotension(9).

MATERIAL AND METHOD

After obtaining approval from the institutional ethical committee, the present study was conducted in 100 patients, admitted in MMIMSR, Mullana scheduled to undergo elective lower limb and lower abdominal surgeries under spinal anesthesia.

Inclusion Criteria

- Both sexes
- ASA GRADE I and GRADE II
- Age Group 20-55 years

Exclusion Criteria

- Patient denial.
- Disease & deformity of the spine.
- Known sensitivity to drugs.
- Patient with raised intracranial pressure.
- Patient with pre-existing neurological disorders.
- Any sign of infection at the puncture site.
- Psychiatric patients.

METHODOLOGY

Pre-anesthetic check-up was done a day before surgery. Detailed history, physical examination, heart rate, blood pressure, routine investigations (Hb, BT, CT, LFT, RFT, CXR-PA view, ECG), fasting blood sugar or any other special investigation depending upon the disease process were recorded in all cases pre-operatively. An informed written consent of patients was taken.

During the pre-anesthetic check-up, patients were explained about the procedure of sub-arachnoid block and the drugs being used.

All the patients were kept NPO overnight & pre-medicated with Tab Alprex (0.25 mg) and Tab Ranitidine (150 mg) at bedtime prior to the day of surgery.

ALLOTMENT OF GROUPS

The patients were indiscriminately divided into two groups of 50 each. Group I (n=50)- (DEXMEDETOMIDINE group) had received 0.3mcg/kg of dexmedetomidine diluted to 20ml of normal saline infused over 10 min as I.V. bolus prior to SAB with 15mg of bupivacaine(0.5%). It was followed by maintenance dose of dexmedetomidine at the rate of 0.3mcg/kg/hr.

Group II (n=50)- (CONTROL group) had received SAB with 15mg of bupivacaine(0.5%).

Preoperative

I.V. line was secured with 18G cannula and patients were preloaded with 15ml/kg/hr of RL.

Intraoperative Period

All the patients were connected to ECG, pulse oximeter, NIBP monitor

and all the baseline parameters were noted. Group I had received 0.3 mcg/kg of Dexmedetomidine diluted to 20 ml of NS and infused over 10 minutes as a bolus prior to SAB while group II had received only SAB with bupivacaine.

Under all aseptic precautions, SAB was given to all the patients with Quincke's needle in the lateral position at L3-L4 level using midline approach. After that, patients in Group I were started on a maintenance dose of dexmedetomidine @ 0.3 mcg/kg/hr and the same rate of I.V. NS in Group II patients.

MONITORING

Intra-operatively, Heart rate, Blood pressure, and SpO2 were recorded every 5 minutes for the first operative period and then every 15 minutes throughout the surgery.

OBSERVATIONS:-

- The mean onset of sensory block in patients of group I was 75.3±8.0 seconds and in patients of group II was 127.6±13.2 seconds. The comparison of p-value among both the groups was found to be statistically significant (p-value =0.000), thereby concluding that there was a faster onset of sensory blockade with the addition of intravenous dexmedetomidine in the present study.
- Peak sensory level achieved.
- In group I, 38 patients (76%) had T4 level, 11 patients (22%) had T6 level and 1 patient (1%) had T8 level. In group II, 30 patients (60%) had T4 level, 20 patients (40%) had T6 level. When the peak sensory level of both the groups were compared the results were non-significant (p value>0.08).
- Comparison of the mean onset of motor blockade.
- The mean onset of motor block in patients of group I was 2.97±0.6 minutes and in patients of group II was 2.92±0.4 minutes. The comparison of p-value among both the groups was not significant (p=0.464).
- The mean duration of complete analgesia (when the first analgesic is required) was 206.1±9.9 minutes in group I patients and 138.1±7.2 minutes in group II patients. When compared statistically, the difference was highly significant with p-value of 0.000. It was observed that patients in group I took a long time for rescue analgesia as compared to those in group II.
- Mean sedation score.
- The mean sedation score was 3.7±0.6 in group I and 2.4±0.6 in group II. The comparison of p-value among both the groups was highly significant with p-value of 0.000.
- None of the patients in group I required additional analgesia while 10 patients (20%) in group II required additional analgesia. The comparison of p-value among both the groups was highly significant with p-value of 0.001.
- comparison of intraoperative additional requirement of additional sedation. None of the patients in both the groups required additional sedation.
- Post op shivering occurred in 4 patients (8%) of group I and in 8 patients (16%) of group II. The comparison of p-value among both the groups was not significant (p =0.35).
- None of the patients in both the groups had nausea and vomiting postoperatively.
- Bradycardia occurred in 3 patients (6%) in group I and in 2 patients (4%) in group II. The p-value of both the groups was comparable (p=1.000).
- Hypotension occurred in 5 patients (10%) in group I and in 3 patients (6%) in group II. The comparison of the p-value among both the groups was not significant (p=0.712).

RESULTS:

Following observations were tabulated.

- The demographic profile (age, age-wise distribution, gender-wise distribution, weight, weight wise distribution, ASA grade) was comparable in both the groups.
- Baseline hemodynamic parameters (HR, SBP, DBP, MAP, and SPO2) were comparable in both the groups.
- Intra-operative hemodynamic parameters: Heart rate was significantly decreased in dexmedetomidine group from 30-60 minutes, mean arterial pressure was significantly decreased in dexmedetomidine group from 60 minutes after surgery and mean oxygen saturation in both the groups was 98-100% and comparable in both the groups.
- The mean time for onset of sensory blockade in dexmedetomidine group was 75.3±8.0 seconds and in control group was 127.6±13.2 seconds. The hastening of the onset of sensory blockade in dexmedetomidine group was statistically significant with p-value of 0.000.
- In group I, 38 patients (76%) have T4 level, 11 patients (22%) have T6 level and 1 patient (1%) has T8 level. In group II, 30 patients (60%) have T4 level, 20 patients (40%) have T6 level. The peak sensory level of both the groups was comparable.
- The mean time for onset of the motor blockade was 2.97±0.6 and 2.92±0.4 minutes in group I and group II respectively.
- The mean duration of analgesia in dexmedetomidine group was 206.1 ±9.9 minutes and in control group was 138.1 ±7.2 minutes. The prolongation in the duration of analgesia in dexmedetomidine group was statistically significant (p<0.).
- The sedation score (Ramsay) was higher in group I (dexmedetomidine) as compared to group II (control).
- Additional analgesia was required for 10 patients in control group and additional sedation.
- Side effects: shivering was observed in 4(8%) patients, bradycardia in 3(6%) patients, hypotension in 5(10%) patients in dexmedetomidine group, Whereas in control group 8(16%) patients had shivering, 2(4%) had bradycardia, 3(6%) patients had hypotension while no patients in both the groups had nausea or vomiting.

CONCLUSION

From our present study, it was concluded that supplementation of spinal anesthesia with a low dose of intravenous dexmedetomidine 0.3µg/kg as a loading dose in first 10 minutes followed by maintenance dose of 0.3µg/kg/hr until end of surgery had the following advantages.

- It hastened the onset of sensory blockade.
- It prolonged the duration of analgesia.
- It produced sedation in which patients were asleep and easily arousable.
- It was hemodynamically stable.
- It was not associated with side effects like pruritus and respiratory depression and hence can be an attractive alternative for opioids for prolonging spinal analgesia.

However, study with larger samples is required to confirm the above findings.

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