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COMPARISON OF BLOCK CHARACTERISTICS OF SUBARACHNOID HYPERBARIC BUPIVACAINE WITH AND WITHOUT CLONIDINE IN LOWER LIMB SURGERIES

Anaesthesiology

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ABSTRACT

Introduction: Many studies are there using adjuvants such as Neostigmine, clonidine and opioids with bupivacaine in subarachnoid block for comparing efficacy and block characteristics. However, literature is divided regarding efficacy of these intrathecal adjuvants. Furthermore, these adjuvants have their own side effects. Hence, search for better adjuvant to bupivacaine goes on.

Aim: The aim of the present study was to evaluate the effect of intrathecal clonidine as adjuvant to bupivacaine in the subarachnoid block for lower limb surgeries.

Materials and Methods: It was a double blinded randomized controlled study in which sixty patients posted for lower limb surgeries were divided into two groups of thirty each. Group C – Received intrathecal hyperbaric bupivacaine (2.5 ml) +75 µg clonidine (0.5 ml). Group S – Received intrathecal hyperbaric bupivacaine (2.5 ml) +0.5 ml normal saline. Sensory and motor block characteristics, duration of postoperative analgesia, hemodynamic alterations and side effects were recorded and analyzed.

Result: Onset of sensory block was achieved earlier and duration of sensory & motor block was significantly prolonged in Group C compared to Group S ($P < 0.001$).Time for first dose of rescue analgesic was delayed in Group C (342.33 ± 88.12 min) in comparison to Group S (191± 22.94 min) which was statistically significant ($P < 0.001$). There was a fall in mean arterial pressure in clonidine group from 35 mins till the end of surgery ($p<0.005$).

Conclusion: We recommend the use of intrathecal clonidine 75 µg as adjuvant to bupivacaine with a caution to take care of hemodynamic compromise, if any.

KEYWORDS

Analgesia, bupivacaine, clonidine, intrathecal

INTRODUCTION

Spinal anaesthesia has edge over general anaesthesia such as decreased intraoperative blood loss, reduced incidence of deep venous thrombosis, self controlled airway and less polypharmacy.[1] The prolongation of duration of subarachnoid bupivacaine have been tried by the use of adjuvants like neostigmine, clonidine, dexmedetomidine and opioids[2,3,4] but with associated side effects. Intrathecal neostigmine used in spinal anaesthesia is associated with nausea and vomiting [2] , dexmedetomidine with bradycardia and hypotension [3] and opioids with pruritus, nausea, vomiting, urinary retention and delayed respiratory depression[4,5], So questioned by many others. Recently Clonidine an α 2- agonist as adjuvant to intrathecal bupivacaine has been used by many workers like Khezri et al,[6] Bajwa et al.,[7] Chhabra et al.,[8] and Sharan et al.[9] and has been claimed to be a better alternative for prolongation of block, especially analgesia ,but still with evidence of hypotension and bradycardia.[10] So, in this study clonidine has been evaluated as adjuvant to bupivacaine in terms of block characteristics in patients undergoing lower limb surgeries in this locality in double blind randomised controlled technique.

MATERIALS AND METHODS

This study was performed in the department of Anesthesiology and Critical Care in Nalanda Medical College & Hospital, Patna during the period June 2017 to June 2019 after obtaining informed consent from all patients. Sixty (60) ASA Gd- Ⅰ & - Ⅱ patients scheduled for lower limb surgeries were selected for this study. The study population was randomly divided into two groups ,Gp S (saline group) & Gp C (clonidine group), thirty (n=30) in each.

Pre anesthetic preparation:

NPO protocol was followed, 18 G i.v cannula inserted and fluid (Ringer lactate) supplemented to fulfil the loss.Vitals were recorded at PAC, before intrathecal injection and every 5 minutes thereafter till the completion of surgery.

Drugs used were bupivacaine (0.5%) heavy 2.5 ml(12.5) with normal saline (0.5 ml)in Gp (S) and with clonidine 0.5 ml(75 µg) in Gp (C).Under all aseptic precautions in sitting position, lumbar puncture was performed in L3 –L4 subarachnoid space and free flow of CSF observed.The intended drug combination was injected intrathecally. Immediately after the injection of the drug, the patient was turned supine and administered oxygen at the rate of 4 lts/min via nasal prong. Sensory and motor block characteristics along with postoperative analgesic duration were monitored . Side effects / complications if any, were noted and dealt accordingly. The data obtained were statistically analysed, inferred, discussed, summarised and concluded.

OBSERVATION

Observations are tabled as below:-. Table-1

	Group S	GROUP C	P Value
Onset of sensory block (mins)	2.82 ± 0.664	1.41±0.50	< 0.001
Maximum sensory block (mins)	7.4 ± 1.101	5.9 ± 0.802	< 0.001
Regression of sensory block by two segment (mins)	79.46 ± 10.16	136.33 ± 10.90	< 0.001
Duration of motor block (mins)	166.16 ± 20.94	279 ± 24.68	< 0.001
Time of 1st dose of post operative rescue analgesia (mins)	191 ± 22.94	342.33 ± 88.12	< 0.001

Table-1 Comparision of onset of sensory block, maximum sensory block time, two segment regression of sensory block time, duration of motor block and time of 1st dose of rescue analgesia.

Both groups were comparable with respect to their demographic profile, baseline hemodynamic parameters and duration of surgery Onset of sensory block was achieved earlier in group C (1.41± 0.50 min) than group S (2.82 ± 0.664 min). Regression of sensory block by two segment was delayed to 136.33+10.90 min in group C as compared to 79.46+10.16 min for group S ,which was highly significant ($p<0.0001$). Duration of motor block in group C was 279 ± 24.68 min and in group S was 166.16 ± 20.94 min; ($p<0.0001$). Time for first dose of rescue analgesic was delayed in Group C (342.33 ± 88.12) compared to Group S (191 ± 22.94 min) which was statistically significant ($P < 0.001$). The mean arterial pressure showed a statistically significant lower mean arterial pressure in the clonidine group from 35 minutes after drug administration till the end of surgery. [$P <0.005$ from 35 min to end of surgery].

DISCUSSION

Clonidine is a selective partial agonist for α 2- adrenoreceptors producing hyperpolarisation of nerve fibres. It is known to increase both sensory and motor block of local anaesthetics[11] .The analgesic

effect following its intrathecal administration is mediated spinally through activation of postsynaptic α 2- receptors in substantia gelatinosa of spinal cord [12,13]. Our finding of reduced onset of block,alongwith greater duration of analgesia is in confirmation with the findings of some other workers like Ruchee et al14,Bhattacharjee et al 15,Gurpreet et al 16,Deepti et al and Singh et al 18. Onset of sensory block in Gp C is in accordance to study of Ruchee et al[14].However, greater onset of time in her study may be due to lesser dose of clonidine used. The lesser time taken for maximum sensory block attained in clonidine group in comparision to the study of Bhattacharjee et al [15] and Gurpreet et al[16] may be due to lesser dose of clonidine and bupivacaine used by them. The longer two segment regression time in our study in comparision to Bhattacharjee et al[15] may be due to lower dose of bupivacaine used by him. Duration of motor block was significantly increased in clonidine group in our study which is in agreement with the study of Deepti et al[17]and Ruchee et al [14].and may be due to may be due to hyperplarisation produced by clonidine. However , lesser motor block duration in their study may be due to lesser dose of bupivacaine and clonidine . The higher interval of first postoperative analgesic requirement in our study in comparision to singh et al [18] may be due to higher dose of bupivacaine used.

SUMMARY

We compared intrathecal bupivacaine + clonidine (75 µg) with bupivacaine+ normal saline in equal volume of 3 ml in thirty (n=30) cases each.We found that clonidine addition to intrathecal bupivacaine significantly fastens sensory block onset, prolongs duration of sensory and motor blockade,increases duration of request for 1st postoperative rescue analgesic dose and hemodynamic disturbances were insignificant upto30 minutes post injection time, significant fall in clonidine group thereafter.

CONCLUSION

From this study, we recommend use of clonidine (75 µg) with bupivacaine heavy (12.5 mg) with a caution to take care of hemodynamic compromise, if any.

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Conflicts of interest- There are no conflicts of interest.

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