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Research Article

Adjuvants to Spinal Anaesthesia –What is Better, Comparison Between Intrathecal Clonidine with Intratheal Buprenorphine

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Abstract: Post operative pain continue to be inadequate and not effectively managed because of fear of opoids causing development of respiratory depression and or addiction .Even though opoids are main stay in postoperative pain management. When opoids are used patient gets excellent post operative pain relief. Different drugs are used for post operative pain management. Here we have compared analgesic efficiency of buprenorphine and clonidine intrathecally for duration of anaesthesia and post operative pain relief and no. of rescue anaegesic and untoward effects. VAS score was used for assessment of pain relief in both groups. It was concluded from our study buprenorphine group has longer duration of postoperative analgesia more than 12 hours in 90% of patients and risk of respiratory depression was also not statistically significant. Hence we recommend that using intrathecal buprenorphine gives adequate duration of anaesthesia for prolonged surgeries and also gives excellent post operative pain relief which is important in clinical recovery of patients.
Keywords: Effective analgesia, Subarachnoid block, α2 agonist, Opioids.

INTRODUCTION

Spinal anaesthesia with Bupivacaine is well known procedure for gynecological surgery. If proper pain relief is provided, ambulation of patient in post op period is faster providing faster recovery of patient. Clonidine (1-2 µg/kg) intrathecal dose is shown to prolong action of Bupivacaine.

ά2 adrenergic agonist clonidine can cause-

1. hypotension which can significantly lower BP in some patients requiring administration of mephenteramine and or
2. Bradycardia also may require to give Inj. atropine for treatment.
3. Duration of analgesia (as defined by the time from intra thecal administration to first request for supplemental analgesia by patient) is 6-8 hour of analgesia ..

Buprenorphine partial antagonist receptor when added to Bupivacaine is known to increase duration of analgesia at least by 12-15 hours and it was not associated with any significant fall in B P or pulse rate.

It can be concluded that older method of providing analgesia for prolonged period which may help in decreasing time to recovery and discharge can be achieved easily by administration of intrathecal buprenorphine and helps in increasing duration of anaesthesia for prolonged surgeries.

AIM OF STUDY

- Effective post operative pain management continues to be inadequately treated because of fear of opioids which are main stay in post operative pain management because of development of respiratory depression and or addiction –
  - fear of addiction of opioids is unfounded when used for short period
  - Patient gets excellent post operative pain relief
- Patient's comfort and satisfaction
- Patients are satisfied if their therapy is tailored to their needs and side effects are titrated against efficacy.
- Decreased morbidity and Recovery time e.g. pulmonary functions are improved in a patient with pre-existing lung disease because of good cough reflex and painless chest physiotherapy.
- Patient with ischemic heart diseases control of pain helps in reducing chances of cardiac ischemia and shorter hospital stay.

- Use of buprenorphine as an adjuvant because it is highly liphophilic and produces excellent selective spinal analgesia. It is excellent and proved methods of providing analgesia with single shot spinal injection.
- Known Risk of respiratory depression associated with morphine is much less with buprenorphine because it is partial agonist.

Buprenorphine

It is a thebaine derivative (Naturally occurring opium alkaloid)

- Powerful agonist action at μ opioids receptors.
- Partial antagonist action
- Does not cause addiction or physical dependence
- Dose 0.3 to 0.6 mg/ IM or IV
- Intrathecal doses are smaller and has prolonged and profound analgesia because of its highly liphophilic nature. It remains attached to spinal opioid receptors for long duration and spreads into CSF to higher centers causing late respiratory depression, which is associated with morphine and is much less likely with buprenorphine [1].
- Adverse effects associated with buprenorphine like nausea and vomiting and constipation are less as compared with fully agonist morphine.

Clonidine

$\acute{\alpha}_2$ adrenergic agonist, has central brain stem action and peripheral action [2].

- Hypothalamic ά2 adrenoceptors are inhibitory and causes decrease in outflow from the vasomotor centers and sympathetic centers.
- This explains resultant decrease in peripheral vascular resistance heart rate, and blood pressure, cardiac out put.
- Action by transdermal application is better → gives consistent blood levels and less side effects [3].
- Mechanical treatment for sympathetically maintained pain.
- Mainly used for hypotensive anesthesia by iv route
- Extra dural analgesic action is because of post synaptic activation of descending inhibitory pathway that synapse into dorsal horn of spinal cord.[4]
- On withdrawal of drug concentration of catecholamine's increases suddenly and can cause rebound Hypertension. Therefore it should not be withdrawn abruptly after surgery
- Prolongs spinal anaesthesia when combined with local anaesthetic[4].

MATERIALS AND METHODS

60 patients A.S.A. grades I and II scheduled for gynecological and orthopedic surgery were selected. They were divided into 3 groups of 20 each. After PAC and required investigations obtained, demographic data of age wt obtained for each case. Patients were trained for 10 cm VAS score for pain at PAC. After adequate fasting ,vitals checked iv started with wide bore canula preloading with 4 ml /kg of RL solution given 15 minutes before SA Fluids were administered according to need of patient as dictated by blood loss and haemodynamic instability.

Spinal anesthesia with standard protocol was administered, patient received total 4 ml of intrathecal volume, and baseline observations were recorded on each patient - Pulse, B P , Resp. rate, O2 saturation.

All patients received IV Miadozolam 0.1 mg/kg body wt. as premedication- level of block achieved was assessed in each patient. Patient were monitored every 5 minutes for 15 minutes - Intraoperative and upto 6-8 hours on 1st day and on 2nd day for duration of analgesia or intensity of pain.

Clinically relevant bradycardia was defined as pulse rate < 50 per minute and was treated with 0.6 mg IV atropine.

Clinically relevant hypotension was decided by 20% decrease in systolic blood pressure from baseline values and was treated with mephenteramine 3 to 6 mg. IV

Respiratory rate was counted pre op. and intra op. every ½ hourly. O_2 saturation was registered continuously by pulse oximetry. Duration of anesthesia was measured at the time of interval from intrathecal administration to regression of sensory block below L1 level on dermatomal chart. Quality of Relaxation & field of surgery were recorded. Duration of analgesia was assessed using 10 point Vas as defined as time from intrathecal analgesia (0 – no pain, 10 – worst imaginable pain. Complete recovery from spinal anesthesia was demonstrated in all patient. Side effects such as nausea, vomitting, pruiritis were recorded. The results are expressed as mean ± SD.

Table-1: Selection of patient and grouping

Total No. of patient 60	Sex	Age avarage	Wt. avarage	ASA Grade 1&2
Group I Plain Sensorcaine	Female	50	50	12 ASA GRADE 8 ASA GRADE 2
Group II 3.5 ml of 0.5 %. Sensorcaine + 75 μg of clonidine	Female	48	47	13ASA GRADE 1 7ASA GRADE 2
Group III 3.5 ml of 0.5% Sensorcaine. + 150 μg buprenorphine	Female	51	50	12ASA GRADE 1 8ASA GRADE 2

Inclusion criteria

American Society of Anaesthesiologist (A.S.A.) grade I & II patients, aged 20-60yrs, undergoing gynecological surgery, and proper informed consent of patient of taken.

Exclusion criteria

Patient with severe systemic disease, patient using α adrenergic receptor antagonist for any reason, patient receiving ACE inhibitors /β blockers, Dysrrhythmias on ECG, morbidly obese patients, contraindication to subarachnoid block, general or epidural anaesthesia given in addition to subarachnoid block.

RESULTS

Total 60 patients were divided into 3 groups with plain sensorcaine, 75 mg of clonidine and 150 mg of buprenorphine use with sensorcaine. Drugs were studied for duration of subarachnoid block, effective analgesia, no of rescue analgesic and side effects associated with drugs.

Intraoperative level of block produced by both drugs was similar in all groups.

Duration of postoperative analgesia ie post operative pain relief which is important in post operative recovery of the patient was found to be 12 to 16 hours in buprenorphine group which was almost double than clonidine group which was up to 6 to 8 hour**s** [5].

Patient with clonidine has more incidences of hypotension and bradycardia requiring treatment with atropine and mephenteramine which can be dangerous in some old and critically ill patients (More than 50 % of patients) [6].

The VAS score at 6 and 10 hours was definitely lower from buprenorphine group as compared to group 1 and group 2.

Late respiratory depression was not statistically significant in buprenorphine.

Table-2: Comparison of pulse rate change during anaesthesia

	Pulse Rate average of 20 patients
group1	**72.6**
group 2	**66.8**
group 3	**76.1**

Table-3: Comparison of BPsystolicchanges during surgery

	Average BP
group1	**115**
group 2	**102**
group 3	**117**

Table -4: Duration of analgesia

	Duration of analgesia
Group1	4.07 hours
Group 2	5.125 hours
Group 3	11.65 hours

DISCUSSION

The results show definite prolongation of both sensory and motor blockade of spinal anesthesia in clonidine and buprenorphine group so that prolonged surgeries like orthopedics can be accomplished without difficulties of epidural anaesthesia.

Duration of analgesia ie period of postoperative pain relief provided by Buprenorphine was longer almost double almost 12 to 24 hours as compared to clonidine[7].

Side effects such as decrease in B P and pulse rate was more common in clonidine group which can be dangerous in some old and critical patients, whereas all patients in Buprenorphine were haemodynamically stable.

As it always feared of late respiratory depression with opioids mainly morphine was not statistically significant with buprenorphine as it can be understood from its higher lipophilicity and antagonist action. None of patient from buprenorphine required any respiratory assistance or oxygenation in post op. period.

Difference in Sedation provided by clonidine or buprenorphine intrathecally was almost comparable[8]. They did not require any additional analgesic in intra operative period whereas all patients from group I i.e. plain sensorcaine required pentazocine as an analgesic.

CONCLUSION

With these observations and results, it can be concluded that old methods of providing analgesia with intrathecal buprenorphine has more advantages as analgesia provided is more than 12 hours which is very important in post op. period and it is without risk of respiratory depression.

The results show definite prolongation of both sensory and motor blockade of spinal anesthesia in clonidine and norphine group. So that prolonged surgeries like orthopedics can be accomplished without difficulties of epidural anaesthesia.

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