Origi	inal Rese	Volume - 10 Issue - 11 November - 2020 PRINT ISSN No. 2249 - 555X DOI : 10.36106/ijar
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Dr. Preet	hi HN	Assistant professor, Department of Anesthesiology, Adichunchanagiri Institute of Medical Sciences BG Nagara Mandya Karnataka India

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Dr. Santhosh NV	Junior Resident, Department of Anesthesiology, Adichunchanagiri Institute of Medical Sciences, BG Nagara, Mandya, Karnataka, India.
Dr. Ravishankar BM*	Consultant Anesthesiologist, Health and Family welfare Department, Hassan, Karnataka, India.*Corresponding Author

(ABSTRACT) INTRODUCTION: Absorption of local anaesthetics is determined by site of injection, dosage and addition of a vasoconstrictor. Absorption is faster in regions of higher vascularity and also in some regions eg. Absorption of drug after inter-costal block is faster than after brachial plexus block. Higher dosage tends to be absorbed faster. Addition of vasoconstrictor does not prolong the duration of action of bupivacaine significantly but decrease its absorption. METHODOLOGY: Baseline heart rate, non Invasive blood pressure, spo2, respiratory rate was recorded every minute for 5 minute, then every 5 minutes till 1 hour of surgery, then every 15 minutes till patients complain of pain. RESULTS: Heart rate variability noticed and compared between the two groups in our study revealed a significant difference in the mean heart rate between Group BC30 and Group BC60 at 1,10,15,20,25 and 30 minute respectively. Otherwise the mean HR of the Groups are comparable at other time intervals. CONCLUSION: However, there was not statistical difference in the incidence of bradycardia noted between the two groups.

KEYWORDS : Hemodynamic Changes, Lower Limb Orthopaedic Surgeries, Clonidine

INTRODUCTION:

The cardiovascular effects of neuraxial blocks are similar in some ways to the combined use of intravenous α 1-and β -adrenergic blockers: decreased heart rate and arterial blood pressure. The sympathectomy that accompanies the techniques depends on the height of the block, with the sympathectomy typically described as extending for two to six dermatomes above the sensory level with spinal anaesthesia and at the same level with epidural anaesthesia.¹ This sympathectomy causes venous and arterial vasodilatation, but because of the large amount of blood in the venous system (approximately 75% of the total volume of blood), the venodilation effect predominates vascular smooth muscle on the arterial side of the circulation retains a considerable degree of autonomous tone.²

The heart rate during a high neuraxial block typically decreases as a result of blockade of the cardioaccelerator fibers which arisises from T1 to T4. The heart rate may decrease because of a fall in right atrial filling, which decreases outflow from intrinsic chronotropic stretch receptors located in the right atrium and great veins.³

Bupivacaine hydrochloride is an amide type of local anaesthetic drug, which was synthesized by Ekenstan in 1957 and used clinically in 1963. The base is not very soluble but the hydrochloride readily dissolves in water.

Absorption of local anaesthetics is determined by site of injection, dosage and addition of a vasoconstrictor. Absorption is faster in regions of higher vascularity and also in some regions eg. Absorption of drug after inter-costal block is faster than after brachial plexus block. Higher dosage tends to be absorbed faster. Addition of vasoconstrictor does not prolong the duration of action of bupivacaine significantly but decrease its absorption.⁴

Clonidine is a partial agonist at α -adrenoceptros both within the central nervous system and in the periphery. It is more specific for α 2-adrenoceptors than for α 1-adrenoceptros. The ratio of affinities at these sites of approximately 200:1.

Within the central nervous system α 2-adrenoceptors are located both presynaptically on terminals of neurons which release a variety of transmitters-nonepinephrine, epinephrine, serotonin and acetylcholine, and postsynaptically on nor-adrenergic neurons. It is likely that clonidine acts at all central α 2-receptors, stimulation of which is associated with decreased neuronal excitability and inhibitions of membrane-bound adenylate cyclase.⁵ High concentrations of clonidine may stimulate central α 1adrenoceptros enhancing neuronal excitability. Stimulation of peripheral presynaptic α 2-adrenoceptors on post ganglionic noradrenergic or cholinergic neurons by clonidine contributes to reduce saliva flow, reduced intestinal motor activity and gastric acid secretion, and bradycardia.⁶

Endocrine and metabolic effects apparently mediated by α 2adrenoceptor stimulation are, increased Thyroid Stimulating Hormone and Human growth hormone secretion, decreased ACTH and ADH secretion, and inhibition of glucose-stimulated insulin release. Clonidine inhibits insulin secretion from the pancreatic β cell possibly via α 2A receptor.

Methodology:

The study population were randomly divided into 2 groups with 30 patients in each group. Group BC30- will receive hyperbaric bupivacaine 0.5% of 3 ml(15mg) and clonidine 30mcg and 0.2 ml NS.

Group BC60- will receive hyperbaric bupivacaine 0.5% of 3 ml(15mg) and clonidine 60mcg.

Under Aseptic precaution with patient in lateral position 25 gaugequinke spinal needle was introduced into L3-L4 space after confirming clear flow of CSF 3 ml of test drug was injected Intrathecaly.

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Group BC60- will receive hyperbaric bupivacaine 0.5% of 3 ml(15mg) and clonidine 60mcg

- Baseline heart rate, non Invasive blood pressure, spo₂, respiratory rate was recorded every minute for 5 minute, then every 5 minutes till 1 hour of surgery, then every 15 minutes till the end of surgery postoperatively every 30 minutes till patients complain of pain.
- Alteration in the hemodynamic parameters such as hypotension was treated with injection ephedrine in incremental doses of 3 mg iv bolus and bradycardia was treated with injection atropine 0.6 mg iv bolus.

Inclusion Criteria

- ASA-I and Π grade patients.
- Elective procedures
- Age between 20 and 60 years.
- · Patient's willingness for study and written consents

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Exclusion Criteria

- ASA grade IIIand above with other co_morbid conditions of cvs, cns,hepato-renal, metabolic.
- Age<20 and >60 years.
- History of known drug hypersensitivity to local anaesthetics.
- Blood coagulation disorders.
- Unwilling patients.
- Spinal deformities, raised intracranial tension.
- Local sepsis

RESULTS:

Figure1: Heart rate



The Mean Heart rate at various interval .The mean heart rate at 1,5,10,15,20,25,30 minutes in group BC60 was reduced when compared to groupBC30 which was statistically significant (P<0.05).



The Mean systolic blood pressure at various interval .The mean systolic blood pressure at 5,10,15,20,25,30,45,60 and 75 minutes was reduced in both the groups when compared basal level but the reduction in mean systolic blood pressure in groupBC60 was more when compared to groupBC30 which was statistically significant (P<0.001).



The Mean diastolic blood pressure at various interval .The mean diastolic blood pressure at 10,15,30,45,60 and 75 minutes was reduced in both the groups when compared to basal level but the reduction in mean diastolic blood pressure in groupBC60 was more when compared to groupBC30 which was statistically significant (P<0.05)



The Mean arterial pressure at various interval .The mean arterial pressure at 10,15,20,30,45,60 and 75 minutes was reduced in both the groups when compared to basal level but the reduction in mean arterial blood pressure in groupBC60 was more when compared to groupBC30 which was statistically significant (P<0.05).

DISCUSSION:

Heart rate variability noticed and compared between the two groups in our study revealed a significant difference in the mean heart rate between Group BC30 and Group BC60 at 1,10,15,20,25 and 30 minute respectively. Otherwise the mean HR of the Groups are comparable at other time intervals. However, there was not statistical difference in the incidence of bradycardia noted between the two groups.

Blood pressure variability studied and compared between the groups, The mean arterial pressure at 10,15,20,30,45,60 and 75 minutes was reduced in both the groups when compared to basal level but the reduction in mean arterial blood pressure in groupBC60 was more when compared to groupBC30 which is statistically significant(P<0.05).

Similarly in the study conducted by Anil Thakur and et al, there was a significant fall in blood pressure occurred at 15-240 minutes after spinal injection in bupivacaine 11 mg -clonidine15 mcg group and bupivacaine11mg-clonidine30 mcg group than in bupivacaine 11mg Group , which concurs with our study.

Dr K P Polaiah M D et al in their observed that the hypotension noted in bupivacaine 15 mg-clonidine 30 mcg Group when compared to bupivacaine 15 mg group but not significant which differs from our study where there is a fall in blood pressure in clonidine groups.⁷

Ruche arora et al, in their study observed the relative stable haemodynamics in all the Groups with adequate preloading and optimum intraoperative volume replacement which differs from our study in which there is a significant fall in mean arterial pressure in both Groups.

In our study we did not observe any incidence of respiratory depression during study period. This finding concurs with Ruchearora et al, study.⁸

We observed that there is no significant difference in sedation among the Groups which concurs with the studies of Dr Prabha, Dr Shrayavathi et al, Anil Thakur and et al.whereas AmithThagi et al, observed that there is significant sedation in bupivacaine 12.5 mg clonidine 1 μ g/kg Group when compared to bupivacaine 12.5mg Group which differs from our study.⁹

We found that 3(10%) patients in both the group experienced nausea and vomiting in both the groups and was not statistically significantwhich concurs with Amith Thagi et al.

Dr Shrayavathi et al observed that the incidence of nausea and vomiting was more in bupivacaine 6mg -clonidine 30 mcg Group as compared to bupivacaine 6mg -clonidine 15 mcg group and bupivacaine 6 mg Group, which differs our study.¹⁰

We observed that 2 (6.6%) patients in groupBC30 and 7 (23.3%) patients in groupBC60 had hypotension and they were treated with Mephentermine 6 mg IV. This was not statistically significant. Similarly in the study conducted by Ruche arora et al³⁵, hypotension occurred in three patients in bupivacaine 12.5 mg-clonidine 30 mcg, which was statistically significant as compared to bupivacaine 12.5 mg-clonidine 15 mcg Group and bupivacaine 12.5 mg Group, which is similar to our study.

Anil Thakur and et al in their study observed that there was no significant difference in hypotension between groups bupivacaine 11 mg -clonidine15 mcg group, whereas it was significant between groups bupivacaine 11 mg and bupivacaine 11 mg -clonidine 30 mcg and groups bupivacaine 11 mg-clonidine 15 mcg and bupivacaine 11 mg -clonidine 30 mcg. So increasing doses of clonidine causes hypotension, which is similar to our study.

We observed that Bradycardia was observed in 2 (6.6%) patients in groupBC30 and treated with Injection Atropine 0.6 mg IV and none in

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groupBC60 and was not statistically significant, whereas, Anil Thakur and et al in their study observed that two patients each in groups in bupivacaine 11mg group, bupivacaine 11 mg -clonidine15 mcg groupand bupivacaine11mg-clonidine30 mcg group had bradycardia which differs from our study, but AmithThyagi et al in their study observed that there was no significant bradycardia noted in the study among the groups which concurs with our study.

CONCLUSION:

Blood pressure variability studied and compared between the groups, The mean arterial pressure at 10,15,20,30,45,60 and 75 minutes was reduced in both the groups when compared to basal level but the reduction in mean arterial blood pressure in groupBC60 was more when compared to groupBC30 which is statistically significant(P<0.05).

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