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Research Paper

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A Comparative Study of Efficacy and Post-Operative Analgesia of Clonidine as an Adjuvant to Brachial Block (Axillary Approach)

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ABSTRACT

INTRODUCTION- The addition of clonidine to local anesthetic solutions improves peripheral nerve blocks by reducing the onset time, improving the efficacy of the block during surgery and extending postoperative analgesia. With this background, we undertook this study to determine the analgesic efficiency of clonidine in two different doses(0.5 µg/kg and 1 µg/kg) in axillary brachial plexus block. AIMS AND OBJECTIVES- 1) To compare onset and duration of sensory and motor block. 2) Sedation score3) Vital parameters4) Duration of post-operative analgesia and complications. MATERIAL AND METHOD- The present study was conducted in 60 patients undergoing upper limb surgeries(both elective and emergency) having ASA grade-1 and 2 physical status. The patients were randomly allocated into 3 groups A,B and C each having 20 patients. Base line vitals like HR, BP, ECG, Spo2 were noted. Sensory block was assessed by pin prick method.motor block was assessed by Hallmen scale. Sedation score by Chenik –sedation score. SUMMARY AND CONCLUSION- Our study suggests that a small dose of clonidine produced late sensory and motor onset with enhancement of the quality of the peripheral block from local anesthetics and limits it's α-2 side effect to sedation. The addition of clonidine produces longer analgesia. Thus we recommend clonidine in 1 µg/kg dose as an adjuvant in axillary brachial plexus block for prolongation of post operative analgesia.

INTRODUCTION

"For all the happiness mankind can give is not pleasure, but rest from pain". John Dryden.

With the passage of time our world is growing more and more congested, so are increased incidences of accidents. A price one has to pay for civilization and modernization and hence number of surgeries are increasing for crush injuries due to vehicular accidents, heavy machinery. Such patients are not prepared for general anaesthesia. Many a times patient's condition is miserable i.e. associated head injury, patient in shock with full stomach etc. these kind of patients require urgent surgery in unprepared conditions.

Brachial plexus block was first performed by Halsted in1884. It provides the pleasant experience for the patient. The axillary approach of the brachial plexus block has many advantages over other approaches viz landmarks for axillary block is constant and easily found, anatomical position of nerves is within small fascial compartment, no possibility of pneumothorax, no phrenic nerve block or subarachnoid injection, no paresthesia or pain inflicted during injection and when bilateral block is desired.

The concept of postoperative analgesia has gained importance in recent times. The aim is to have a technique which is minimally invasive, causes minimal alteration in routine activities, decreases perioperative complications, provides postoperative analgesia and is economically acceptable.

Clonidine is a α2 selective adrenergic agonist with some α1 agonist property. The addition of clonidine to local anesthetic solutions improved peripheral nerve blocks by reducing the onset time, improving the efficacy of the block during surgery and extending postoperative analgesia.

With this background, we undertook this study to determine the analgesic efficiency of clonidine in two different doses [0.5 µg/kg and 1 µg/kg] in axillary brachial plexus block.

AIMS OF STUDY

The aim of the study is to compare the analgesic efficacy of clonidine 0.5µg/kg and 1µg/kg in axillary brachial plexus block.

The aims of the study were to observe;

1) Sensory block - onset time and total duration
2) Motor block - onset time and total duration
3) Sedation score
4) Vital Parameters like - Pulse
   Blood Pressure
   Respiratory Rate
   SpO2
5) Duration of Post-operative analgesia and Complications

MATERIAL AND METHOD

The present study was conducted in selected 60 patients undergoing upper limb surgeries (both elective and emergency) having ASA grade I and II physical status.

The patients were randomly allocated into three groups each having 20 patients.

GROUP A- Inj. Lignocaine 2% 10 cc + Inj. Bupivacaine 0.5% 20 cc (100 mg)+ Inj. Clonidine 0.5% µg/kg

GROUP B- Inj. Lignocaine 2% 10 cc + Inj. Bupivacaine 0.5% 20 cc(100 mg) + Inj. Clonidine 1% µg/kg

GROUP C- Inj. Lignocaine 2% 10 cc + Inj. Bupivacaine 0.5% 20 cc (100 mg)

PRE REQUISITES

Pre anaesthetic assessment:

All patients underwent a thorough pre anaesthetic check up which included history taking, general and physical examination. Investigations were checked. Visual analogue scale was shown to the patients and the procedure of post operative pain management was explained in detail. Informed written consent was taken from patient and his/her close relative.

Exclusion Criteria:

1) Patients with kwown hypersensitivity to local anaesthetic drugs.
2) Bleeding disorders.
3) Uncontrolled Diabetes mellitus, Renal and Liver diseases.
4) Circulatory instability.
5) Pregnant women.
6) Patients with epilepsy and peptic disease

Preparation:

All patients were kept nil by mouth for 6 hours. An intravenous line was secured with an intravenous cannula. Pulse oximeter, non invasive blood pressure cuff and ECG electrodes were applied. Initial pulse, blood pressure, SpO2 and respiratory rate were recorded.

Equipments:

1) An autoclave tray consisting of instruments used for painting and drapping

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2) Instruments No.
Disposable 23 G 1.5" needle - 2
Disposable 10 cc syringe - 4
Disposable 1 cc syringe for Clinidine - 1

Technique:
Supine position was given to the patient with arm abducted and elbow flexed at 90 degree and externally rotated at shoulder joint leaving the arm lying across the patient's head. After painting with betadine and spirit and drapping of axillary region, first axillary artery pulsation was palpated as high as possible in axillary region. A 23 G 1.5" needle was inserted perpendicular to skin and parallel to the axillary artery just above it, so that it lies in the axillary sheath as confirmed by pulsations, transmitted through the needle. Another needle is inserted in axillary sheath below the artery, position confirmed in same way as above. After negative aspiration test for blood, half of the drug given through one needle and remaining through the other needle.

Then firm pressure was placed over sheath below the point of injection and solution was encouraged towards the axilla. Tourniquet was applied in arm. Evaluation was carried out after 5 minutes of completion of injection and the time of onset was noted for both sensory and motor block. Sensory block was assessed by pin prick method and motor block was assessed according to Hallmen scale for upper extremeties.

EVALUATION:
(I)Sensory Block:
SCALE 1- Normal sensation of pinprick.
SCALE 2- Pinprick felt as sharp pointed but weaker compared with same area in the upper limb
SCALE 3- Pinprick recognized as touch with blunt object.
SCALE 4- No perception of pinprick

II) Motor Block: Hallmen Scale
SCALE
1- Normal muscle function.
2- Slight weakness in function
3- Very weak muscular function.
4- Complete loss of muscle action.

III) Sedation: Chenik-sedation score
SCORE RESPONSE
1 Awake
2 Sleeping comfortably but easily arousable
3 Deep sleep but arousable
4 Deep sleep but not arousable

IV) status of the tongue was checked for the assessment of dryness of mouth. after asking the patient to protrude the tongue.It was graded as dry or moist.
V) Side effects: Nausea, Vomiting , Bradycardia, Hypotension, Respiratory Depression, Sedation, Dryness of mouth

POST OPERATIVE MONITORING:
Post operatively patients were observed for temperature , pulse rate, blood pressure, respiratory rate, spO2 and visual analogue score (VAS) scale every 3 hourly for 12 hours and then 6 hourly interval upto 24hrs.

Time of regression of analgesia to pin prick was considered as duration of anaesthesia .Supplemental analgesia was administrated in the form of Inj. Diclofenac sodium 75 mg IV when VAS was >5 and it was considered as the duration of post operative analgesia . Duration, intensity and number of episodes of nausea, vomiting, bradycardia, hypotension and respiratory depression were assessed. For comparison of three groups, the student T- test was used.

TABLE -1
ONSET OF SENSORY BLOCKADE IN SECONDS

Time in seconds	Group A	Group B	Group C
151-180	4(20%)	-	13(65%)
181-210	12(60%)	7(35%)	7(35%)
211-240	3(15%)	10(50%)	-
241-270	1(5%)	2(10%)	-
271-300	-	1(5%)	-
Minimum time	170	190	155
Maximum time	250	280	210
Mean time	197.8	225.8	179.8
SD	20.23	22.14	17.01

Group A Vs Group C P = <0.001 Group B Vs Group C P = <0.001
Group A Vs Group B P = <0.001

TABLE -2
ONSET OF MOTOR BLOCKADE IN SECONDS

Time in seconds	Group A	Group B	Group C
181-210	1(5%)	-	7(35%)
211-240	6(30%)	-	12(60%)
241-270	10(50%)	7(35%)	1(5%)
271-300	2(10%)	7(35%)	-
301-330	1(5%)	6(30%)	-
331-360	-	-	-
Minimum time	205	250	190
Maximum time	320	330	270
Mean time	257.3	288	222.3
SD	26.63	24.3	20.03

Group A Vs Group C P = <0.001
Group B Vs Group C P = <0.001
Group A Vs Group B P = <0.001

TABLE -3
DURATION OF POST OPERATIVE ANALGESIA IN MINUTES

Time in minutes	Group A	Group B	Group C
201-250	1(5%)	-	17(85%)
251-300	2(10%)	2(10%)	3(15%)
301-350	13(65%)	2(10%)	-
351-400	4(20%)	14(80%)	-
401-450	-	1(5%)	-
451-500	-	1(5%)	-
Minimum time	250	290	210
Maximum time	400	460	280
Mean time	335	370	235.5
SD	33.32	39.95	18.84

Group A Vs Group C P = <0.001
Group B Vs Group C P = <0.001
Group A Vs Group B P = <0.001

SUMMARY AND CONCLUSION
In the present study of 60 patients ASA grade I and II, patients posted for upper limb surgeries selected randomly from our hospital. These patients were undertaken to evaluate and compare the analgesic efficacy and common side effects of clonidine along with bupivacaine and lignocaine admixture via axillary brachial plexus block.

GROUP A- Inj. Lignocaine 2% 10 cc + Inj. Bupivacaine 0.5% 20 cc (100 mg)+ Inj. Clonidine 0.5% µg/kg

GROUP B- Inj. Lignocaine 2% 10 cc + Inj. Bupivacaine 0.5% 20 cc(100 mg) + Inj. Clonidine 1% µg/kg

GROUP C- Inj. Lignocaine 2% 10 cc + Inj. Bupivacaine 0.5% 20 cc (100 mg)

The patients were monitored in the intraoperative for pulse, BP, SpO2, RR and onset of sensory and motor blockade. Any side

effects like bradycardia, hypotension, nausea, vomiting, headache, dryness of mouth, respiratory depression and sedation was documented.

In the post operative period patients were monitored also for post operative analgesia and side effects.

The age and weight were comparable in each groups. Clonidine 0.5µg/kg and 1 µg/kg delays the onset of sensory blockade by 197.8(+/-20.2)sec and 225.8(+/-22.1)sec. respectively when compared to control group 179.8(+/- 17.01)sec. Similarly onset of motor blockade was also delayed by addition of clonidine . 257.3(+/-26.6)sec in Group A, 288 (+/-24.3)sec in Group B and 222.3(+/-20.03)sec in Group C.

Study revealed that there was statistically significant ($P<0.05$) decrease in mean pulse rate intraoperatively from 30 min upto 2 hours.

There was fall in blood pressure in three groups. But it was slightly greater in clonidine group ($P<0.001$). However it was not associated with excessive haemodynamic changes.

There was no significant changes in oxygen saturation and respiratory rate in any groups.

More patients in groupB (clonidine 1µg/kg) were sleeply but arousable compared to group A and C. Thus clonidine produces slight sedation.

Duration of post operative analgesia was very much prolonged in group B:370(+/-39.95)min and group A:335(+/-33.32)min compared to group C: 235.5(+/-18.84)min. There was highly significant difference ($P<0.001$) observed.

Our study suggests that a small dose of clonidine produced erly sensory and motor onset with enhancement of the quality of the peripheral block from local anesthetics and limits its α2 side effect to sedation. The addition of clonidine produces longer analgesia. Thus we recommend clonidine in 1 µg/kg dose as an adjuvant in Axillary brachial plexus block for prolongation of post operative analgesia.

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