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Anesthesiology

KEY WORDS: Parascalene Block,bupivacaine,dexamethasone.

A COMPARATIVE EVALUATION OF EFFICACY OF BUPIVACAINE 0.25% AND BUPIVACAINE 0.25% WITH DEXAMETHASONE IN PARASCALENE BLOCK FOR UPPER LIMB SURGERIES

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ABSTRACT

AIM: To compare the efficacy of Bupivacaine 0.25% and Bupivacaine 0.25% with dexamethasone in parascalene block for upperlimb surgeries.

MATERIALS AND METHODS : Patients undergoing upperlimb surgeries under Parascalene block by 22G nervelocator were randomly allocated into two groups of Group B who receives 30ml of Bupivacaine 0.25% and Group BD who receives 28 ml of Bupivacaine 0.25% with 8 mg of dexamethasone .The duration of analgesia is compared as the primary outcome.other parameters like time of onset of sensory and motor blockade,post operative VAS scores were compared as the secondary outcome.

RESULTS : The mean duration of analgesia is significantly prolonged in Group BD with mean time of 595.43 min compared to Group B where it was 311.40 min.The mean onset of sensory block was significantly shortened in Group BD with mean onset time of 4.67 min compared to Group B where it was 7.67 min. The post operative VAS score was significantly lesser in Group BD where it was 3.55 compared to Group B where it was 4.09.

CONCLUSION : Addition of 8 mg of Dexamethasone to 0.25% Bupivacaine 28 ml for parascalene block,quickens the onset of Sensory and motor blockade and prolongs the duration of analgesia with improving the quality of post operative analgesia.

INTRODUCTION

To compare the efficacy of 0.25% bupivacaine and 0.25% bupivacaine with dexamethasone using parascalene block for upperlimb surgeries

Nerve locators are now widely seen as useful aids in nerve blocks as it avoids paraesthesia, decreases the chance of nerve injury and gives high success rate.

So the present study is a comparative evaluation of efficacy of Bupivacaine 0.25% and Bupivacaine 0.25% with dexamethasone in parascalene block for upper limb surgeries using nerve locators. Among various techniques for brachial plexus block , parascalene block developed by Vongvises and Panijajamond in 1979 is used.[43].

ADVANTAGES OF PARASCALENE BLOCK :

1) Parascalene block is lower level than the level of interscalene block,therefore avoids the complications like phrenic nerve block,vagus nerve and recurrent laryngeal nerve block.
2) It is also not close to pleura as in supraclavicular block and avoids pneumothorax.

Prolonging surgical anesthesia and analgesia is of significant interest in regional anesthesia; in order to increase the duration of local anesthetic action and improve the quality of peripheral nerve blocks, adjuvant medications are added. The addition of a glucocorticoid, specifically dexamethasone, has been shown to have high quality outcome. Dexamethasone reduces stimulus transmission in unmyelinated c- fibres known to carry nociceptive information by inhibiting the activity of the potassium channels on these fibres which decrease the pain.

Dexamethasone causes a degree of vasoconstriction to the tissues and local anesthetic will have a slower uptake and absorption thus, prolonging its duration of action.

Dexamethasone exhibits a potent anti-inflammatory effect and inhibits the release of inflammatory mediators like interleukins and cytokines; it promotes the release of anti-inflammatory mediators leading to decreased postoperative pain. Investigation continues as to the exact science and mechanism of action of dexamethasone and its prolongation of analgesia when used as an adjunct to local anesthetic in peripheral nerve block.

MATERIALS AND METHODS

The study was carried out in the orthopedic surgery theatre,Government General Hospital,Chennai after obtaining institutional approval by ethical committee.

A prospective randomized controlled study conducted on 60 patients undergoing upper limb surgeries under parascalene brachial plexus block

INCLUSION CRITERIA :

Age18-65yrs,ASA1&2,systolic Bp 100- 139mmHg, diastolic Bp 60- 89mmHg with valid informed consent by patients.

EXCLUSION CRITERIA :

ASA III & IV, **allergic to local anesthetics,Sepsis,abnormal coagulation profile,local infection**

STUDY DURATION : 6 Months.

TWO GROUPS :

GROUP B – 30 ml of 0.25% Bupivacaine

GROUP BD – 28 ml of 0.25% Bupivacaine with 8 mg of dexamethasone

Premedication with inj Ranitidine 50 mg im 45 min before procedure. inj. Midazolam 0.05mg/kg body weight given IV 10 min before the procedure. Drug solutions are prepared.

IV line secured and monitors were connected to patients. Pulse rate,NIBP,ECG,SPO2,RR are monitored.

Patient is placed in the supine position with the head turned to opposite side. The arm to be blocked is adducted to the side of the patient. The patient was asked to lift the head slightly to bring the clavicular head of sternocleidomastoid muscle into prominence.Cricoid cartilage was palpated and a straight horizontal line was drawn up to posterior border of sternocleidomastoid muscle,from that point a vertical line is drawn up to midpoint of clavicle.The junction of upper two third and lower one third of this vertical line is the point of insertion. The nerve stimulator frequency was set at 1 Hz and the intensity of the stimulating current was initially set to deliver 2 mA. The insulated needle was inserted through the skin wheal in a perpendicular plane to skin until a distal motor response was elicited. The position of the needle was considered acceptable when an output current ≤0.5 mA still elicited a distal motor response. After eliciting negative aspiration of blood, the study medication was injected slowly ruling out intravascular injection intermittently.

Sensory block is evaluated by PIN PRICK method with a 23 gauge needle. The onset time was defined as the time between injection and complete loss of pin prick sensation .The time when complete sensory blockade achieved were noted.

Sensory block was graded according to the following scale: 0 = no block (normal sensation), 1 = partial block (decreased sensation), 2 = complete block (no sensation).

Motor block was assessed by BROMAGE THREE POINT SCORE.

0= normal motor function with full flexion and extension of elbow, wrist and fingers

1= decreased motor strength with ability to move fingers and/or wrist only,

2= complete motor blockade with inability to move fingers

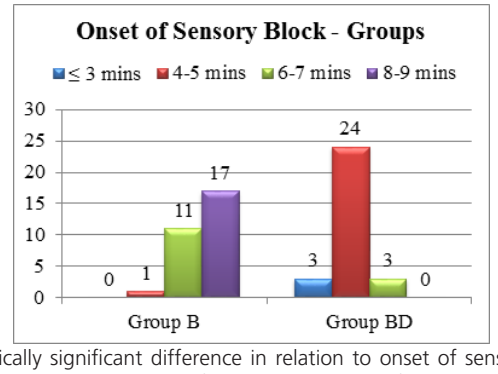
During the procedure, anaesthesia was considered satisfactory if the patient did not complain of any pain or discomfort and if no additive analgesia was necessary.Duration of analgesia is taken as the time taken from the onset of complete sensory block to time of first rescue analgesia.

Complications like postoperative Nausea and vomiting, pneumothorax ,convulsions,arrhythmias, CSF puncture and managed accordingly.

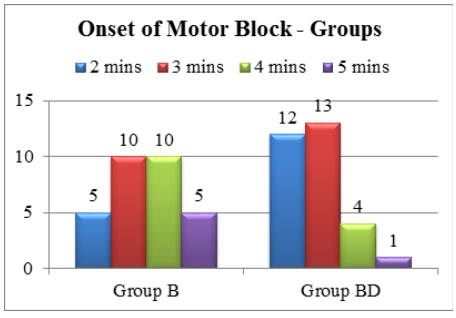
Post operative monitoring was done for all vital parameters like BP,PR,ECG,NIBP,RR every half an hour for 4 hrs and then every 4 hrs for 24 hrs.

Post operative pain scoring was done using VAS pain scoring.It was noted according to 0-10 visual analogue score (VAS) for pain at every half an hour for first 4 hours and then 4 hourly till 24 hours. When the patients began to experience the worst pain VAS >4 rescue analgesic Inj.Diclofenac 1-1.5mg/kg given.Inadequate or patchy block, was supplemented with general anaesthesia.Side effects and complications were treated.

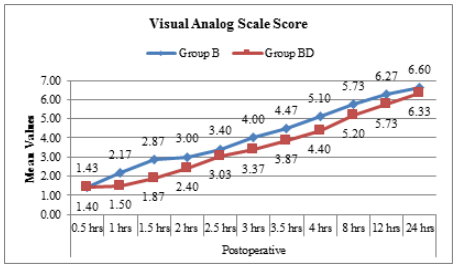
Continuous variables was analysed with the unpaired t test and ANOVA single factor test. Categorical variables was analysed with the Chi-Square Test and Fisher Exact Test.Statistical significance was taken as P<0.05. The data was analysed using SPSS version 16 and Microsoft Excel 2007.



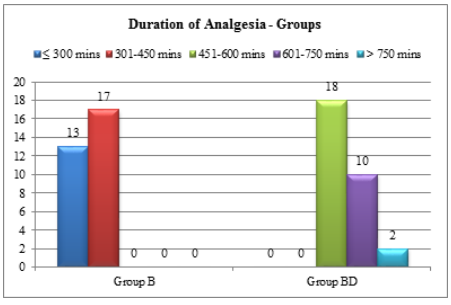
statistically significant difference in relation to onset of sensory block time between group B (mean=7.67, SD=1.09) and group BD (mean=4.60, SD=0.89) with a p value of <0.05 as per unpaired t test



Statistically significant difference in relation to onset of motor block time between group B (mean =3.50, SD=0.97) and group BD (mean=2.80, SD=0.81) with a p value of <0.05 as per unpd t test.



statistically significant difference in relation to VAS scores between group B (mean=4.09, SD=0.63) and group BD (mean=3.55, SD=0.75) with a p value of <0.05 as per unpaired t test



Statistically significant difference in relation to duration of analgesia between group B (mean=311.40, SD=38.71) and group BD (mean=595.53, SD=71.62) with a p value of <0.05 as per unpaired t

DISCUSSION

Onset of sensory blockade was quicker in patients with dexamethasone added as an adjuvant to bupivacaine. The mean onset of sensory blockade was 4.67 minutes in Group BD compared to Group B where it was about 7.67 minutes and significant difference <0.0001.This is in accordance with SHRESTHA ET AL IN 2003 where he reported addition of dexamethasone hastens onset of blockade.this is due to synergistic action of dexamethasone to local anesthetic.

Onset of motor blockade was quicker in patients with dexamethasone added as an aduvant to bupivacaine.the mean onset of motor blockade was 2.80 min in Group BD compared to Group B where it was 3.50 min with significant difference 0.0036.so dexamethasone hastens onset of motor blockade.

The fact that onset of motor blockade occurs prior to onset of sensory blockade satisfies theory proposed by WINNIE and RAMAMOORTHY that local anesthetic first blocks peripheral motor fibres followed by block of central sensory fibres.

Duration of analgesia is significantly prolonged in patient where dexamethasone is added as an aduvant.The mean duration of analgesia was about 595.43 min in Group BD compared to Group B where it was about 311.40 min with significant difference <0.0001.This is in accordance with VIERA et al in 2010 where he proved duration of analgesia is significantly prolonged in patients where dexamethasone was used as an adjuvant to local anesthetic in interscalene plexus blockade.

POSTOPERATIVE VAS SCORES :

Postoperative VAS scores was significantly lower in patients where dexamethasone was added as an adjuvant.The mean VAS score was about 3.55 in Group BD compared to Group B where it was about 4.09 with a significant difference of 0.0037.This is in accordance with SHRESTHA et al in 2003 who reported post operative analgesia was better with patients where dexamethasone was added as an aduvant to local anesthetic in supraclavicular blockade.

COMPLICATIONS :

patients in Group B complained of postoperative nausea and vomiting compared to patients in Group BD where none reported.

Patients in both groups did not report anyr complications like pneumothorax,convulsion,arrhythmias, CSF puncture.

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CONCLUSION

In Parascalene block,addition of 8 mg of Dexamethasone to 28 ml of 0.25% Bupivacaine quickens the onset of Sensory and motor blockade and prolongs the duration of analgesia.It also improves the quality of post operative analgesia and avoids ,postoperative nausea and vomiting.. Hence Dexamethasone can be considered a safe additive to local anesthetic in brachial plexus block

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