Efficacy of Dexamethasone as an Adjuvant with Lignocaine-Adrenaline and Bupivacaine for Supraclavicular Brachial Plexus Block Versus Lignocaine-Adrenaline with Bupivacaine only

Ajeet Jyotipurkar¹, Ranjeeta Aske²

INTRODUCTION

Increase in occupational activities has increased various injuries to the people. Increased trauma leads to increased surgeries and therefore perioperative pain management has got a crucial role. Now-a-days peripheral nerve blocks have become more advantageous than general anesthesia due to less hemodynamic and respiratory complications, simpler technique, less side effects, postoperative analgesia and early discharge from hospital. For upper limb surgeries below the shoulder joint under regional anesthesia, brachial plexus block is a safe and convenient method. And the supraclavicular approach has been practiced routinely for upper limb surgeries in our institution.

Bupivacaine is a long acting local anaesthetic homologous to mepivacaine, it has been used for all types of nerve blocks¹. Bupivacaine and lignocaine with adrenaline were selected for this study as other local anesthetics due to their longer duration of action.

Different adjuvants were used with local anesthetic to enhance the duration of postoperative analgesia and most of them have met with limited success.

Steroids have been used since many years as an adjuvant for local anesthetics, due to both anti-inflammatory and analgesic effects. Dexamethasone a long acting, high potency glucocorticoid with minimum mineralocorticoid effect, Anti-inflammatory effect with minimum gastrointestinal side effects, also prolongs duration of postoperative analgesia.

Recent studies showed that 8mg dexamethasone when added to local anesthetic injections prolongs the duration of peripheral nerve block analgesia. A previous study evaluated the effect of dexamethasone added to a mixture of lignocaine with adrenaline and bupivacaine in supraclavicular brachial block.

The aim of our study was to compare the effect with or without addition of dexamethasone 8 mg to lignocaine (2%) with adrenaline (1:200,000) and 0.5% bupivacaine (plain) for onset, duration of sensory and motor block and also to assess the duration of postoperative analgesia in supraclavicular brachial plexus block in patients undergoing surgeries below shoulder joint.

MATERIAL AND METHODS

After taking approval from ethical committee and written informed consent from patients, a Prospectively Randomized Comparative study conducted in the Department of Anaesthesiology, Gandhi Medical College, Bhopal. 50 randomly selected patients undergoing upper limb surgeries, 20-50 years, ASA grade 1 and 2 grouped in A and B 25 each.

ASA grade 3 and 4 patients with contraindications for regional anaesthesia (refusal, infection at site, coagulopathy, neuro or cardiac defects), allergy to local anaesthetic drugs,

¹PG Student, ²3rd Year RMO, ³Assistant Proffesor, Department of Anaesthesiology, Gandhi Medical College and Hamidia Hospital, Bhopal, India

Corresponding author: Dr. Ajeet Jyotipurkar, E Block 6, PG Resident Boys Hostel, Gandhi Medical College and Hamidia Hospital, Bhopal, India

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patients on antihypertensive and antidepressents etc are excluded from this study.

Group A: 15 ml of lignocaine-adrenaline + 15 ml of 0.5% Bupivacaine (P) and 2 ml of normal saline, injected to 25 patients.

Group B: 15 ml of lignocaine-adrenaline + 15 ml of 0.5% Bupivacaine (P) with 2ml of dexamethasone (8mg), injected to 25 patients.

Benefits and risks of local anesthetic were explained clearly to patients one day prior to surgery and advised to remain nil by mouth.

Patient was advised to lay on operation table in supine position and a brachial block was performed through supraclavicular approach under all aseptic precautions.

Technique: The patient lying supine, head rotated to opposite side, arms and shoulder adducted to the body. A local wheal is raised 1cm above the midpoint of clavicle just lateral to the pulsating subclavian artery or lateral to the outer border of scaleneus anterior.

Direction of needle – downwards, inwards and backwards

All the resuscitation equipment for general anaesthesia were kept ready in case of Supraclavicular nerve block complication and failure. Failure cases were excluded from the study.

Regular monitoring of patient for Blood Pressure, SpO2, ECG, Pulse rate, Respiratory rate was done and noted.

Visual Analogue Scale (VAS) score, used for assessing postoperative analgesia. Score 0-10 (0=no pain, 10 = worst pain).Patients with VAS score >4 were treated with intravenous analgesic. And time for first analgesic supplement requirement was noted.

Onset of sensory block was noted from the commencement of injection of drug until the loss of pinprick sensation. And onset of motor block was noted from commencement of injection of drug until the loss of finger movements.

Assessment of onset of sensory blockade was done at each minute after completion of drug in dermatomal areas till complete sensory blockade by the pin prick method.

Sensory block graded as:

Grade 0: Sharp pain
Grade 1: Analgesia, dull sensation

Grade 2: Anesthesia, no sensation

Onset of Motor block assessment was done at each minute till the complete motor blockade after drug injection. And modified Bromage scale used to determine motor blockade for upper extremities on a 3-point scale:

Grade 0: Normal motor function with full flexion and extension of elbow, wrist and fingers
Grade 1: Decreased motor strength with inability to move the fingers only
Grade 2: Complete motor block with inability to move fingers

Block failure was considered when the dermatomes supplied did not have analgesic effect even after 15 min of drug injection.

Heart rate, blood pressure, ECG and oxygen saturation monitored every 5 min after the block intraoperatively and every 15 min post-operatively,Blood loss was assessed and fluid was administered as per the loss. Duration of surgery and any complication were noted.

**STATISTICAL ANALYSIS**

Student’s t-test was used to compare two groups here.

Graph pad software was used to calculate P value.

P value <0.05 is considered statistically significant (SS).

**RESULTS**

A total of 50 Patients presented with upper limb injury requiring surgery for the same were involved in this study. The demographic data and surgical characteristics were comparable in both groups [Table 1].

Onset of sensory and motor blockade were comparable in both the groups (Table-2). There is no much change in onset of blockade among both the groups hence statistically insignificant.

Duration of sensory and motor blockade were comparable in both the groups (Table 3). There was significant increase in duration of both sensory and motor blockade in Group B when compared to Group A.

Time of requirement of 1st rescue analgesic in the postoperative period was assessed and noted. Injection of analgesic was received by patients who are VAS >4 and it was assessed at 0, 2, 6 and 12 hours. Analgesia required by about 48% patients in Group A, And was significantly decreased when compared in Group B (16%).

Duration of postoperative analgesia is a statistically significant factor (Figure 1) and was more in group B(644.8±10 minutes) when compared to Group A(225.4±18.78 minutes)

Incidence of postoperative nausea and vomiting was more in Group B(6%).

Incidence of postoperative nausea and vomiting when compared to Group A(225.4±18.78 minutes).

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Time in minutes</th>
<th>T value</th>
<th>P value</th>
<th>Significance</th>
</tr>
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<tbody>
<tr>
<td>Group A</td>
<td></td>
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<tr>
<td>Group B</td>
<td></td>
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<tr>
<td>Onset of sensory blockade (Mean±SD)</td>
<td>6.30 ± 7.02</td>
<td>6.84 ± 4.4</td>
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<td>0.7459</td>
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<tr>
<td>Onset of motor blockade (Mean±SD)</td>
<td>7.4 ± 3.0</td>
<td>7.7 ± 5.1</td>
<td>0.2535</td>
<td>0.8010</td>
</tr>
</tbody>
</table>

SD - Standard Deviation; NSS- Not Statistically Significant
REFERENCES

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