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Original Research

Comparative evaluation of Bupivacaine and Levobupivacaine in Supraclavicular brachial plexus block

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***ABSTRACT*:**
Background: Supraclavicular brachial plexus block is used as regional anaesthesia technique for upper limb surgery. Bupivacaine is most commonly used local anaesthetic in peripheral nerve blocks but it is cardiotoxic. Levobupivacaine has less cardiodepressor activity. The present study was conducted to compare the bupivacaine and levobupivacaine in supraclavicular plexus block. **Material and methods:** The present prospective clinical study was carried out in 56 patients of ASA grade I and II of either sex, aged 18-60 yrs. Before commencement of study, ethical committee approval and written informed consent was obtained. Patients were randomly divided into 2 groups:- Group A who received brachial plexus block with 30 ml of 0.5% Bupivacaine & Group B who received brachial plexus block with 30 ml of 0.5 % Levobupivacaine. A detailed physical and systemic examination was done and thorough history of all patients obtained. 30 ml of 0.5% solution of bupivacaine or 30 ml of 0.5% solution of levobupivacaine was infiltrated with repeated aspirations every 6.5-7.0 ml to avoid intravascular injection. Data were analyzed using SPSS version 22 for Windows &$P < 0.05$ was considered as statistically significant. **Results:** Results of our study shows that mean age of Group B was more than Group A. Onset of sensory block for Group B (17.56±1.8) was more than Group A. Onset of motor block for Group B (22.78.±1.8) was more than Group A. **Conclusion:** The results of our study shows that Levobupivacaine proves to be a better alternative to bupivacaine in supraclavicular brachial plexus block.
Keywords: Levobupivacaine, bupivacaine, supraclavicular brachial plexus block.

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INTRODUCTION:

Brachial plexus block by supraclavicular approach is one the most popular and reliable techniques to provide anesthesia and postoperative analgesia for forearm and hand surgeries.[1] The supraclavicular technique used by Kulenkampff in 1912 revealed that the nerves supplying the arm and the forearm are grouped closely together in the brachial plexus and a single injection could provide analgesia for the whole limb.[2]Lanz et al (1983) showed that blockade of the brachial plexus with a supraclavicular technique Directed near the first rib provides the most reliable.[3]Various local anesthetic agents have been used to produce brachial plexus block. Bupivacaine 0.5% is one of the most commonly used local anesthetic agents because of its higher potency and prolonged duration of action. One of the drawbacks of bupivacaine is its cardiotoxicity, especially when injected accidentally into the artery.[4] Levobupivacaine – S-enantiomer of bupivacaine is reported to have a safer pharmacological profile with lesser cardiac and neurological adverse effects due to its faster protein binding rate.[5,6] The present study was conducted to compare the bupivacaine and levobupivacaine in supraclavicular plexus block.

MATERIAL & METHODS:

The present prospective clinical study was carried out in 56 patients of ASA grade I and II of either sex, aged 18-60 yrs. Before commencement of study, ethical committee approval and written informed consent was obtained. Patients having history of hypersensitivity to Bupivacaine or Levobupivacaine, coagulopathy, local infection, fever, chest injuries, pregnant and lactating patients were excluded from this study.

Patients were randomly divided into 2 groups:-

Group A (Bupivacaine) (n=28): who received brachial plexus block with 30 ml of 0.5% Bupivacaine.

Group B (Levobupivacaine) (n=28): who received brachial plexus block with 30 ml of 0.5 % Levobupivacaine.

A detailed physical and systemic examination was done and thorough history of all patients obtained. The following data, e.g. age, weight, sex, pulse rate, respiratory rate, blood pressure, SpO2 and general examination was noted. Routine investigations such as hemoglobin, total leukocyte count, differential leukocyte counts, urine examination, blood sugar, blood urea, coagulation profile were done. After confirming NBM status, the patients received Tablet Rantac 150 mg orally 2 hours prior to surgery. Patients were provided anxiolysis and sedation with Inj. Midazolam – 0.02 mg/kg. NIBP, ECG and pulse oxymeter was applied. Intravenous line was secured with 18 G angiocath in large peripheral vein. Oxygen supplementation was started at the rate of 5 litres/min. Palpation of the subclavian artery at this site confirms the landmark. After appropriate preparation and development of a skin wheal, the anaesthesiologist stood at the side of the patient facing the patient's head. A 23-gauge, 4-cm needle was directed in a caudal, slightly medial, and posterior direction until a paraesthesia or motor response was elicited or the first rib was encountered. If the first rib is encountered without elicitation of a paraesthesia, the needle can be systematically walked anteriorly and posteriorly along the rib until the plexus or the subclavian artery is located. After this, 2-3 ml of drug was injected rapidly after aspiration. After this, 30 ml of 0.5% solution of bupivacaine or 30 ml of 0.5% solution of levobupivacaine was infiltrated with repeated aspirations every 6.5-7.0 ml to avoid intravascular injection. The sensory block was tested by sensation of pinprick and compared with same area on contralateral arm.It was assessed by the 'Hollmen Scale'. Motor block was evaluated by movement at the fingers, wrist, elbow and shoulder joints and assessed by the 'Modified Bromage Scale'. Data were analyzed using SPSS version 22 for Windows &$P < 0.05$ was considered as statistically significant.

RESULTS:

In our study total participants were 56 and the study groups were divided into 2 groups each group contain 28 participants each. Mean age of Group B was more than Group A. Onset of sensory block for Group B (17.56±1.8) was more than Group A. Onset of motor block for Group B (22.78.±1.8) was more than Group A.

Table 1: Demographic data

Variable	Group A (n=28)	Group B(n=28)	p-value
Mean age	32.4±6.87	38.13±8.97	0.878
Sex(m/f)	18/10	15/13	0.068

Table 2: Comparison of onset of block

Parameters	Group A	Group B	P-value
Onset of sensory block (mins)	10.43±1.7	17.56±1.8	<0.0001
Onset of motor block(mins)	13.56±1.9	22.78.±1.8	<0.0001

DISCUSSION:

In our study total participants were 56 and the study groups were divided into 2 groups each group contain 28 participants each. Mean age of Group B was more than Group A. Onset of sensory block for Group B (17.56±1.8) was more than Group A. Onset of motor block for Group B (22.78.±1.8) was more than Group A.

Dose of levobupivacaine was selected from previous studies.[7] Even we had selected a slightly lesser dose of drug to be on a safer side. Ambi *et al*. had chosen 36 ml of 0.5% levobupivacaine for perineural ultrasound-guided axillary brachial plexus block, and here, we have taken 30 ml of 0.375% levobupivacaine.[8]

Jose Ricardo, et al found that there was earlier sensory block onset with levobupivacaine 0.5% as compared with bupivacaine 0.5% ($p < 0.05$).[9]

Fusun et al observed that the motor block onset was earlier with levobupivacaine (6.40+/- 2.55 min) than bupivacaine (9.20+/- 1.73 min).[10]

While performing SCBP block by paraesthesia technique, many anaesthesiologists tend to use large volume (30–40 mL) of local anaesthetics to improve success rates and prolong sensory and motor block. However, this leads to complications such as phrenic nerve palsy and Horner's syndrome due to unusual spread, and also increases the chances of systemic local anaesthetic toxicity. Lower volume of local anaesthetics may produce either shorter duration of block or incomplete block. Ultrasound guided SCBP block enables adequate block with lower volume of local anaesthetic compared to blind techniques. Use of adjuvants such as dexamethasone may increase the duration of block without increasing the volume injected, and with minimal side effects.[11] The side effects associated with adjuvants such as clonidine, dexmedetomidine and opioids could be avoided using dexamethasone as an adjunct to levobupivacaine.[12]

CONCLUSION:

The results of our study shows that Levobupivacaine proves to be a better alternative to bupivacaine in supraclavicular brachial plexus block.

REFERENCES:

1. Bruce BG, Green A, Blaine TA, Wesner LV. Brachial plexus blocks for upper extremity orthopaedic surgery. J Am Acad Orthop Surg 2012;20:38-47.
2. Kulenkampff D, Persy MA. Brachial plexus anaesthesia : its indications, technique and dangers. Ann Surg 1928; 87:883-91. 2. Lanz E, Theiss D, Jankovic D. The extent of blockade following various techniques of brachial plexus block. Anesth Analg 1983;62:55–8.
3. Kohli S, Kaur M, Sahoo S, Vajifdar H, Kohli P. Brachial plexus block: Comparison of two different doses of clonidine added to bupivacaine. J Anaesthesiol Clin Pharmacol 2013;29:491-5.
4. Chiruvella S, Konkyana SK, Nallam SR, Sateesh G. Supraclavicular brachial plexus block: Comparison of varying doses of nalbuphine combined with levobupivacaine: A Prospective, double-blind, randomized trial. Anesth Essays Res 2018;12:135-9.

5. Foster RH, Markham A. Levobupivacaine: A review of its pharmacology and use as a local anaesthetic. Drugs 2000;59:551-79.
6. Murphy DB, McCartney CJ, Chan VW. Novel analgesic adjuncts for brachial plexus block: A systematic review. Anesth Analg 2000;90:1122-8.
7. Leone S, Di Cianni S, Casati A, Fanelli G. Pharmacology, toxicology, and clinical use of new long acting local anesthetics, ropivacaine and levobupivacaine. Acta Biomed 2008;79:92-105.
8. Ambi U, Bhanupriya P, Hulkund SY, Prakashappa DS. Comparison between perivascular and perineural ultrasound-guided axillary brachial plexus block using levobupivacaine: A prospective, randomised clinical study. Indian J Anaesth 2015;59:658-63.
9. Jose Ricardo Pinotti Pedro, Ligia Andrade Silva Telles Mathias, Judymara Lauzi Gozzani, Flavia Salles de Souza Pinotti Pedro, Jose Carlos Rittes, TSA: Supraclavicular Brachial Plexus Block: A Comparative Clinical Study between Bupivacaine and Levobupivacaine: Rev Bras Anestesiol 2009;59:6:665-673.
10. Fusun Eroglu,Berit Gokce Ceylan,Sinem Sari Ak,Mehmet Topal,Tolga Atay,Lutfi Yavuz,Isparta,Turkey:Comparative study of two agents in axillary brachial plexus block:Bupivacaine vs Levobupivacaine,Smyrna Tip Dergisi 27-34,16 december 2011,Arastirma Makalesi.
11. Alarasan AK, Agrawal J, Choudhary B, Melhotra A, Uike S, Mukherji A. Effect of dexamethasone in low volume supraclavicular brachial plexus block: A double-blinded randomized clinical study. J Anaesthesiol Clin Pharmacol 2016;32:234-9.
12. Tandoc MN, Fan L, Kolesnikov S, Kruglov A. Adjuvant dexamethasone with bupivacaine prolongs the duration of interscalene block: A prospective randomized trial.J Anaesth. 2011;25 (5):704-09.