ORIGINAL ARTICLE

Determine the Effectiveness of Nulbuphine with Ropivacaine in Supraclavicular Brachial Plexus Block

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ABSTRACT

Aim: To examine the efficacy of ropivacaine with nulbuphine and compare with ropivacaine alone in supraclavicular block.

Study Design: Randomized controlled trial

Place and Duration of Study: Main Operation Theatre DHQ Teaching Hospital/Gujranwala Medical College, Gujranwala from 1st November 2018 to 30th September 2019.

Methodology: Forty eight patients of both genders with ages 18 to 65 years undergoing upper limb surgical procedures electively were enrolled in this study. All the patients were divided equally in to two groups, each group consist of 24 patients. Group A received ropivacaine with nulbuphine and group B received ropivacaine with normal saline. Effectiveness between both groups was examined.

Results: No significant difference was observed regarding age, gender, body mass index and ASA class I/II between both groups with p-value >0.05. A significant difference was found regarding onset time of sensory and motor block between both groups (p=0.001). In group A mean duration of sensory block was more 425.18±17.82 minutes as compared to group B 254.43±20.44 minutes. Mean duration of motor block was also more in group A 418.65±20.84 minutes as compared to group B 226.15±12.52 minutes. Duration of analgesia was high in group A as compared to group B with p-value <0.05.

Conclusion: Ropivacaine 0.75% with 10mg nulbuphine is very effective in supraclavicular brachial plexus block in term of sensory, motor block and duration of analgesia as compared to ropivacaine alone.

Keywords: Supraclavicular, Brachial plexus block, Ropivacaine, Nulbuphine, Duration of analagesia

INTRODUCTION

Supraclavicular brachial plexus blockade is an efficient regional anesthetic technique for upper arm surgeries. It is a reliable, alternative to general anesthesia for certain group of patients as it is devoid of undesired effects of general anesthesia and stress of laryngoscopy. The postoperative period is also free from pain, nausea, vomiting, and respiratory depression. The supraclavicular approach is chosen for brachial plexus block as here it is enclosed in a fascial sheath that extends from neck to the axilla.[1]

The success of brachial plexus block relies on nerve localization, needle placement, and deposition of local anesthetic solution at right place by a single injection of local anesthetic.[1]The conventional blind technique relies on surface landmarks before needle insertion and elicitation of paresthesia while ultrasound guidance detects the anatomical variants of brachial plexus and related anatomical structures, accurate needle placement, and monitoring of drug spread in the appropriate tissue planes with painless performance. Ultrasound increases the success rate and reduces the injury to adjacent structures.[2-4] It also minimized the local anesthetic volume, thereby reducing the incidences of their systemic toxicity.[5]

Ropivacaine, an amide LA, has decreased potential for the central nervous system toxicity and cardiotoxicity due to reduced lipophilicity which provides wider safety margin.[6,7] Due to brief duration of action of LAs, various adjuvants along with LAs have been tried to extend the duration of analgesia in regional blocks. Peripheral opioid administration prolongs analgesia without producing systemic side effects. Nalbuphine is a mixed k-agonist-μ-antagonist opioid with a moderate analgesic effect when compared to morphine. Easy availability, low cost, and less side effects make it more suitable than other commonly used opioids.[8]

We conducted this study with aimed to compare the efficacy of ropivacaine with nulbuphine and ropivacaine alone in supraclavicular brachial plexus block.

MATERIALS AND METHODS

This randomized controlled trial was conducted at Hospital Main Operation Theatre DHQ Teaching Hospital/Gujranwala Medical College, Gujranwala from 1st November 2018 to 30th September 2019. A total 48 patients of both genders with ages 18 to 65 years undergoing upper limb surgical procedures electively were enrolled. Patients detailed demographics including age, sex, body mass index, and ASA class I or II were recorded after written consent from all the patients. Patients with clinically significant coagulopathy, infection at the injection site, allergy to local anesthetics, preexisting neuromuscular, severe cardiovascular, or pulmonary disease, renal or hepatic disorder, refusal to technique, or inability to visualize the brachial plexus with ultrasound guidance or failure of block were excluded. All the patients were divided equally in to two groups, each group consist of 24 patients. Group A received 25 ml of ropivacaine 0.75% with 1 ml (10mg) nulbuphine and group B received 25ml of 0.75% ropivacaine with normal saline. All the patients received brachial plexus block through the supraclavicular approach using US guidance (The Sonosite Micromaxx™ Bothell, Washington, USA machine with a 6–13 MHz linear probe) by an experienced anesthesiologist. A 21G 50 mm short beveled insulated needle was inserted under US guidance under all aseptic precaution.

Effectiveness of doses in term of onset time to sensory and motor block, time duration of sensory and motor block and duration of analgesia were examined and compare the findings between both groups. All the data was analyzed by SPSS 24. Chi-square test was applied to compare the parameters between both groups with p-value <0.05 was taken as significant.

RESULTS

There were 15 (62.5%) male and 9 (37.5%) female with mean age 36.48±12.44 years in group A and in group B 17 (70.83%) were male and 7 (29.17%) were females with mean age 37.08±11.37 years. Mean BMI of group A patients was 23.02±2.86 kg/m^2 and in group B it was 23.45±2.68 kg/m^2. In group A 19 (79.17%) patients had ASA class I and 5 (20.83%) had ASA class II, in group II 20 (83.33%) and 4 (16.67%) patients had ASA class I and II. No significant difference was observed between both groups regarding age, gender, BMI and ASA class with p-value >0.05 (Table 1). Mean time onset to sensory block in group A was 8.12±2.14 minute while in group B it was 13.47±4.77 minute, a significant longer time was observed in group B as compared to group A with p-value 0.002. In group A mean time onset to motor block was 9.42±2.14 minutes and in group B it was 13.88±3.56 minutes, a significant difference was observed between both group [p-value 0.004] (Table 2).

Table 1: Demographics of all the patients

Variable	Group A	Group B
Age (years)	36.48±12.44	37.08±11.37
BMI (kg.m^2)	23.02±2.86	23.45±2.68
Gender		
Male	15 (62.5%)	17 (70.83%)
Female	9 (37.5%)	7 (29.17%)
ASA class		
I	19 (79.17%)	20 (83.33%)
II	5 (20.83%)	4 (16.67%)

P>0.05 (Not significant)

Table 2: Comparison of onset time to sensory and motor block between both groups

Variable	Group A	Group B	P-value
Mean onset Sensory block (min)	8.12±2.14	13.47±4.77	0.002
Mean onset Motor block (min)	9.42±2.14	13.88±3.56	0.004

Table 3: Comparison of time duration of sensory and motor block and duration of analgesia between both groups

Variable	Group A	Group B	P-value
Duration sensory block	425.18±17.82	254.43±20.44	<0.001
Duration motor block	418.65±20.84	226.15±12.52	<0.001
Duration of analgesia	698.72±15.55	436.52±22.43	<0.001

In group A mean duration of sensory block was more 425.18±17.82 minutes as compared to group B 254.43±20.44 minutes. Mean duration of motor block was lonnger in group A 418.65±20.84 minutes as compared to group B 226.15±12.52 minutes. Duration of analgesia was longer in group A as compared to group B with p-value <0.05 (Table 3). We found no adverse effect regarding use of drugs between both groups.

DISCUSSION

Many of drugs have been used to attain the better efficacy for brachial plexus block by supraclavicular approach in which bupvicaine and nulbuphine showed better effectiveness.[9,10] We conducted present study to examine the effectiveness of nulbuphine 10mg with 0.75% ropivacaine and compare with ropivacaine 0.75% alone in supraclavicular brachial plexus block under ultrasound guidance. In this regard 48 patients whom were undergoing upper limb surgical procedures electively were enrolled in this study. Majority of patients in both groups A and B were male 62.5% and 70.83% and females were 37.5% and 29.17%. Mean age of patients in ropivacaine + nulbuphine group was 36.48±12.44 years and in ropivacaine alone group was 37.08±11.37. These results was comparable to many of previous studies in which male patients were predominant as compared to females 65% to 80% Vs 30% to 40% and the average age of patients was 40 years.[11,12] We found no significant difference regarding body mass index and ASA class I and II. A study by Gupta et al[13] regarding efficacy of nulbuphine as an adjuvant to 0.5% bupvicaine reported that mean BMI of nulbuphine with bupvicaine group patients was 21.63±3.21 and in other group it was 20.58±2.78 kg/m^2.

In present study Mean time onset to sensory block in group A was 8.12±2.14 minute while in group B it was 13.47±4.77 minute, a significant longer time was observed in group B as compared to group A with p-value 0.002. In group A mean time onset to motor block was 9.42±2.14 minutes and in group B it was 13.88±3.56 minutes, a significant difference was observed between both group (p-value 0.004). These results were similar to the study by Nazir et al[14] regarding analgesic effectiveness of nulbuphine as an adjuvant to bupvicaine reported that patients received nulbuphine with bupvicaine had significantly shorter onset time to sensory and motor block as compared to bupvicaine alone with p-value <0.05. Another study by Yadav et al[15] reported there was no significant difference between both groups (nulbuphine with ropivicaine and ropivicaine alone) regarding onset time to sensory and motor block 11.58±3.56 vs 10.84±3.24 (p=0.40) and 13.12±4.98 vs 11.23±3.29 (p=0.09).

In this study we found that patients whom were received nulbuphine as an adjuvant to ropivacaine had significantly longer duration of sensory block 425.18±17.82 minutes and motor block 418.65±20.84 minutes also had longer duration of rescue analgesia 698.72±15.55 minute as compared to patients whom were received ropivacaine alone sensory block 254.43±20.44 minute, motor block 226.15±12.52 minutes and rescue analgesia 436.52±22.43 minutes. These results were comparable to many of previous studies in which patients received nulbuphine as an adjuvant to 0.5% and 0.75% ropivacaine had significantly longer time duration to sensory, motor block and rescue analgesia when compared to bupvicaine alone.[15-18] We found no significant difference regarding hemodynamic changes between both groups and none of patients had developed any adverse effect.

CONCLUSION

Ropivacaine 0.75% with 10mg nulbuphine is very effective in supraclavicular brachial plexus block in term of sensory, motor block and duration of analgesia as compared to ropivacaine alone. Moreover, none of patient had developed any complication in both groups.

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