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ORIGINAL ARTICLE

Compare the Effectiveness of Nulbuphine with Ropivacaine Versus Ropivacaine alone in Patients undergoing Upper Limb Surgeries

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ABSTRACT

Objective: Ropinivacaine coupled with nulbuphine was used in this study to compare ropivacaine alone in the supraclavicular block.

Study Design: Comparative/Randomized study

Place and Duration: Anesthesia Deptt Sir Ganga Ram Hospital, Lahore. August 2020 to July 2021

Methods: There were 105 patients, with a range in age from 20 to 70 years, who underwent elective upper limb surgical procedures. A total of 108 patients were divided into two groups: group I consisted of 52 patients, while group II consisted of 53 patients. Group I received ropivacaine in combination with nulbuphine, while group II received ropivacaine in combination with normal saline (control). Comparisons and contrasts were made between the effectiveness of the two groups. The data was analyzed with the help of SPSS 22.0.

Results: Using a p-value greater than 0.05, it was determined that there was no statistically significant difference between the two groups in terms of age, gender, body mass index, and American Society of Anesthesiologists (ASA) class I and II. A statistically significant difference (p=0.005) was found between the two groups in terms of sensory and motor block (see Table 1).The mean time of sensory blockage in group I was 427.13±15.62 minutes, whereas in group II it was 262.32±17.32 minutes. Mean time of motor block was also greater in group I than in group II (416.11±17.55 versus 231.19±16.71). There was a statistically significant difference in the duration of analgesia between groups I and II.

Conclusion: Ropinivacaine 0.75 percent mixed with 10mg nulbuphine is particularly effective in supraclavicular brachial plexus block in terms of sensory and motor block, as well as analgesia duration when compared to ropivacaine alone.

Keywords: Nulbuphine, Ropivacaine, Brachial Plexus Block, Duration of Analagesia, Supraclavicular

INTRODUCTION

There are reliable alternatives to general anaesthesia (GA) for upper-limb surgery, including brachial plexus block. Use of regional nerve blocks is beneficial when done correctly. Both intraoperative and postoperative analgesia are provided by these analgesics. Stress response is minimised and key physiological functions aren't interfered with as much as they would be otherwise. Ultrasound guidance can lower the risks of inadequate or unsuccessful blocks, as well as local anaesthetic toxicity, which can be reduced.[1]

Regional blocks can be performed safely using ultrasound imaging of anatomical features. The anaesthetist can monitor the administration of local anaesthesia in real time while using USG to ensure that the needle is properly placed.[2,3]

When injected into the epidural space, ropivacaine is thought to be superior to bupivacaine because it provides a more precise block. Bupivacaine is more harmful to the heart and central nervous system than this medication. When used at high concentrations in peripheral nerve block and epidural anaesthesia, it is an useful local anaesthetic agent. Brachial plexus block with ropivacaine has proven to be extremely beneficial. Since local anaesthetics do not provide long-lasting pain relief, several medicines have been utilised as adjuvants. In procedures like subarachnoid block (SAB) and epidural block, agonist–antagonist opioid nalbuphine was tested as an adjuvant and shown to be useful in lengthening the length of time the blocking agent was in your system. Analgesia can be maintained or even enhanced, while negative effects associated with the use of -opioid analgesia are mitigated.[6] Within two to three minutes of taking Nalbuphine (0.2–0.4 mg/kg), it begins to take effect, lasts for about three and a half hours, and has few adverse effects.[7,8] nalbuphine has a favourable safety profile and can be used to treat pain in children with burns, cancer, or other haematological or neoplastic conditions. Despite its well-documented benefits in the treatment of pain, nothing is known about the effects of nalbuphine as an adjuvant to local anaesthetics during brachial plexus block surgery.

It is still a challenge for anesthesiologists to provide enduring analgesia with single-shot brachial plexus block while limiting side effects. With the use of continuous catheters, it is possible to significantly extend the analgesia of the brachial plexus. Modest extension of analgesia (24 hours) can be achieved by mixing several adjuvant medicines with local anaesthetic. No clinically available long-acting anaesthetic or slow-release formulations exist.[9] There has been minimal success in extending anaesthesia from nerve block adjuvants such as clonidine, opioids, and midazolam by combining them with local anaesthesia. Analgesic duration following peripheral nerve blockade has been tried to extend with various degrees of success with the use of corticosteroids in the past.[12] Preclinical and clinical trials have shown that the glucocorticoid dexmethasone can be beneficial in a small number of patients[13,14]. Dexamethasone 8 mg perineural injections have been shown to increase the duration of peripheral nerve block analgesia, according to current research.[15] In comparison to hydrocortisone, dexamethasone is a powerful and selective glucocorticoid. For the treatment of numerous inflammatory and autoimmune conditions, dexamethasone is commonly prescribed.

Preventing adverse effects while delivering enough analgesia is a primary goal of postoperative pain management. A shorter hospital stay and lower costs are all benefits of effective postoperative pain management. Patients are happier and more comfortable as a result. Using a brachial plexus block instead of general anaesthesia may be a superior option in a new trend of day care surgeries.

Ropinivacaine and nulbuphine were used in this trial to compare to ropivacaine alone in the treatment of supraclavicular brachial plexus blocks.

MATERIALS AND METHODS

This comparative study was conducted at Anesthesia Department Sir Ganga Ram Hospital, Lahore. Study participants ranged in age from 20 to 70 years old and had upper limb surgical operations. After all patients signed a consent form, we collected data on their age, gender, BMI, and ASA class I or II. Exclusion criteria included coagulopathy, infection at the injection site; allergy to local anaesthesia; preexisting neuromuscular, severe cardiovascular or

pulmonary disease; renal/hepatic disorder; refusal to technique; or failure of block or inability to see the brachial plexus with ultrasound guidance.

There were two groups: one received 25ml of 0.75 percent ropivacaine and one received 25ml of 0.75 percent ropivacaine with nulbuphine. Untrained anesthesiologists used US guidance (a 6–13 MHz linear probe with the Sonosite MicromaxxTM Bothell, Washington, United States system) to administer the brachial plexus block to all of the patients. Because of the strict regulations in the United States, the short bevelled insulated needle (21G, 50mm) was used. There was a comparison of the effectiveness of the dosages in terms of time to sensory and motor block onset, time to sensory and motor block completion, and time to analgesia onset and duration.

All of the data was analysed using SPSS 22.0. According to the Chi-Square test used to compare parameters, the significance level was found to be 0.5%.

RESULTS

Age, gender, BMI, and ASA class did not differ significantly between the two groups with a p-value >0.05. In group I, there were 28 (53.8 percent) men and 24 (46.2 percent) females with a mean age of Group I had a mean age of 34.11±16.18 years, while Group II had a mean age of 35.18±9.47 years with 32 males and 21 females. In group I, the BMI was 24.3±4.39 kg/m2, whereas the BMI was 24.4±9.51 kg/m2 in group II. When it came to ASA classes, 40 patients (76.9%) in group I and 12 (23.1 percent) in group II both had ASA class I, while 42 patients (79.2%) and 11 (20.8 percent) in group II both had ASA class I and II. (Table 1)

Table 1: Demographics of all the patients

Variables	Group I (n=52)	Group II (n=53)
Mean age (Yrs)	34.11±16.18	35.18±9.47
Mean BMI (kg/m^2)	24.3±4.39	24.4±9.51
Gender		
Male	28 (53.8%)	32 (60.4%)
Female	24 (46.2%)	21 (39.6%)
ASA class		
I	40 (76.9%)	42 (79.2%)
II	12 (23.1%)	11 (20.8%)

P-value >0.05

Statistical significance was found between the two groups in the time it took for sensory and motor block to manifest itself. (p=0.005). (Table 2)

Table 2: Both groups' sensory and motor block onset times were compared.

Variables	Group I (n=52)	Group II (n=53)	P-value
Mean onset Sensory block (min)	7.03±4.23	15.1±3.35	0.04
Mean onset Motor block (min)	8.13±6.17	14.6±6.29	0.03

The mean duration of sensory block in group I was 427.13±15.62 minutes, whereas the mean duration of sensory block in group II was 262.32±17.32 minutes. When comparing groups I and II, the mean duration of motor block was the same (416.11±17.55 minutes in group I and 231.19±16.71 minutes in group II.). Group I had a significantly longer duration of analgesia than group II, as indicated by a p-value of 0.05. (Table 3)

Table No 3: There was a comparison between the two groups in terms of the duration of analgesia and sensory and motor block

Variables	Group I (n=52)	Group II (n=53)	P-value
Mean duration Sensory block	427.13±15.62	262.32±17.32	<0.003
Mean Duration Motor block	416.11±17.55	231.19±16.71	<0.002
Duration of Analgesia	701.17±8.26	441.31±14.78	<0.002

According to our findings, there were no differences in adverse drug outcomes between the two groups.

DISCUSSION

Compared to other brachial plexus techniques, a supraclavicular block offers the most uniform anaesthetic for the entire upper extremity in a quick, dense, and predictable manner. [16] Using brachial plexus blocking for upper limb surgical procedures is an excellent alternative to using general anaesthesia (GA). Both intraoperative and postoperative analgesia are provided by this medication. Needed was an adjuvant with few adverse effects, which could prolong the block while being inexpensive and readily available. With the addition of adjuvants in peripheral nerve block, the risk of systemic toxicity dropped significantly.[17]

With the aid of ultrasound guidance, we evaluated the efficacy of nulbuphine 10mg in combination with 0.75 percent ropivacaine compared to 0.75 percent ropivacaine alone when performing a supraclavicular plexus block. Participation in this study was entirely voluntary on the part of patients undergoing upper limb surgery. In both groups I and II, males constituted the vast majority of the patients. The average patient age in the ropivacaine + nulbuphine group was 34.11 years, while the average patient age in the ropivacaine alone group was 35.18 years. This study, like many others in which women were underrepresented[18,19], was dominated by a 40-year-old male participant for the most part. In terms of BMI, there was no discernible difference between the ASA classes I and II, according to the findings.[20]

According to the results of this study, the onset of sensory and motor block (p=0.005) was significantly different between the two groups compared to the baseline. The findings of a study by Madan and colleagues Group I had an average onset time of sensory block of 12.04 minutes, while group II had an average onset time of 8.88 minutes. The mean onset time varied significantly between the two groups, and this difference was statistically significant. Comparison of the nalbuphine and group I groups showed a significant difference in the time it took for the first signs of motor block to appear (14.88 min).[21] According to Gupta et al., nalbuphine 10 mg in combination with bupivacaine improved the quality of supraclavicular brachial plexus block and lengthened sensory and motor block, while having no effect on the time it took for the blockade to begin to take effect.[22]

Rophivacaine alone had shorter sensory block durations of 262.32 minutes, longer motor block durations of 231.19 minutes, and shorter rescue analgesia durations of 701.17 minutes in patients who received nulbuphine as an adjuvant to ropivacaine, compared to those who received ropivacaine alone and received nulbuphine as an adjuvant to ropivacaine. Analgesia rescue times were significantly longer in patients who received nulbuphine in addition to ropivacaine at concentrations of 0.5 percent or 0.75 percent than in those who received bupvicaine alone in previous studies.[23,24]

Neither group experienced any unfavourable side effects, and there was no statistically significant difference in hemodynamic changes between the two groups.

CONCLUSION

In terms of sensory and motor block, as well as analgesia duration, we found that ropivacaine 0.75 percent combined with 10mg nulbuphine was superior to ropivacaine alone in supraclavicular brachial plexus block. Furthermore, neither group's patients had any issues.

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