

Supraclavicular Brachial Plexus Block with or without Dexamethasone

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ABSTRACT

Aim: To assess the effect of supraclavicular brachial plexus block in patients with or without dexamethasone.

Study design: Double blind randomized controlled trial

Place and duration of study: Department of Anesthesia and Critical Care, The Indus Hospital a free of cost tertiary care hospital in Karachi from 9th May 2019 to 19th February 2020.

Methodology: Sixty patients were enrolled with 30 patients in each intervention group. Patients who came for elective or emergency surgery of the upper limb below shoulder were included in the study. Block performed on patients lying supine at 45 degree. The dexamethasone group received 0.25% plain bupivacaine 18 ml with 2ml dexamethasone (0.4mg/ml) and control group received 0.25% plain bupivacaine 18 ml with 2 ml normal saline.

Results: The age of the group B patients was higher than the group A patients such as 43.4 ± 15.7 years vs 38.6 ± 14.2 years. The ASA level presented higher scoring than II in patients from Group B with 63.3% those patients who called for pain. In this study the intra operative vital signs showed an insignificant variance in both groups. However, a significant increase in duration of analgesia was observed in group A.

Conclusion: Perineural administration of dexamethasone with clinical bupivacaine concentration can prolong the duration of anesthesia.

Keywords: Supraclavicular, Brachial plexus block, Dexamethasone

INTRODUCTION

Regional anesthesia is becoming more common in anesthesia practice because of its safety and additive benefits over general anesthesia. It entails benefits such as less and easily manageable cardiovascular complications, reduced bleeding from the surgical site and thus less transfusion requirements¹. There is also less perioperative pain and reduced traditional opioid requirements and prolonged postoperative analgesia². In elderly patients it gives an additional benefit of reduced aspiration risk³. Various approaches exist to conduct brachial plexus block but the supraclavicular method is the easiest and reliable method of anesthesia in below shoulder joint surgery and also for perioperative pain management.⁴ Various drugs such as morphine, clonidine, dexmedetomidine, magnesium, and corticosteroids are used in addition to local anesthesia^{4,5}.

Corticosteroids such as dexamethasone; having anti-inflammatory response are the commonly used adjuvants to the local anesthesia pertaining to their fewer complications such as sedation and respiratory depression^{3,6,7}. The mechanism of their action involves blocking the transmission of nociceptive C-fibers and suppressing the ectopic neural discharge^{8,9}. Recent literature also supports that an increase in duration of anesthesia is also related with dexamethasone addition^{10,11}.

The present study was designed to assess the affect of supraclavicular brachial plexus block in patients with or without dexamethasone. The results of this study were to establish a standard protocol for an efficient analgesic procedure and improved health outcomes.

MATERIALS AND METHODS

This double blinded randomized controlled trial (RCT) was conducted at Department of Anesthesia and Critical Care, The Indus Hospital Karachi from 9th May 2019 to 19th February 2020 and 60 patients were enrolled. The study was ethically approved prior to initiation. Patients were divided in two equal groups; Group A (N=30) was dexamethasone group who received 0.25% plain bupivacaine 18 ml with dexamethasone (0.4mg/ml) while group B (N=30) was control group who received 0.25% plain bupivacaine 18 ml with 2 ml normal saline. Upper limb surgeries below shoulder (both elective and emergency surgeries), age 18–70 years, ASA I–

III and either gender were included in the study. Known allergy to local anesthetics, any contraindication to steroids, deranged coagulation profile (INR > 1.5, platelets count < 80,000 or any history of bleeding disorder), severe respiratory disease, local infection to injection site, neurological disease, any brachial plexus lesion, pregnant women and unsuccessful block were excluded. All eligible patients who consented for participation were assessed pre-operatively. Demographic information which was routinely assessed in the preoperative clinic or at the bedside was filled. Prior to the anesthesia, an intravenous line was maintained and patients were monitored for BP, heart rate, saturation. Ultrasound guided supraclavicular block was performed while the patient was lying supine at 45 degree, with face turned towards the non-operative site. A linear, high-frequency US probe was placed in the supraclavicular fossa, in a coronal-oblique plane posterior to the clavicle. The first rib and pleura were identified in all patients. A 22-gauge 50-mm insulated nerve block needle was inserted through the skin and positioned under US guidance. Once needle was in a satisfactory position and after negative aspiration of blood, the study medication was injected. After supraclavicular block all patients underwent general anesthesia with no intravenous analgesics. Data was entered and analyzed using SPSS-21.0. Independent sample t-test/Chi square test was applied as appropriate to assess significant difference in duration of analgesia between both the groups. $P < 0.05$ was considered significant.

RESULTS

The age of group B patients was higher than group A patients such as 43.4 ± 15.7 years vs 38.6 ± 14.2 years. The weight of Group B patients was greater than group A. The ASA level was greater than II in patients from Group B with 63.3% who called for pain (Table 1).

No statistically significant difference was detected between the baseline characteristics of the two study groups (Table 2). In this study the intra operative vital signs showed an insignificant variance in both groups. However, a significant increase in duration of analgesia was observed in group A (Table 3).

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Table 1: Demographic and pain scoring of group A and B patients (n=60)

Variable	Group A	Group B	P value
Age (years)	38.6±14.2	43.4±15.7	0.22
Gender	Male	17 (56.7%)	1.000
	Female	13 (43.3%)	
Weight (kg)	63.5±13.5	68.5±14.7	0.17
ASA Level	I	24 (80%)	0.23
	≥ II	5 (16.7%)	
Pain Medications	No call for pain medications	12 (40%)	0.79
	Called for pain medications	18 (60%)	

Table 2: Comparison of pre-operative vital signs of group A and B (n=60)

Pre-operative vital signs	Group A	Group B	P value
Systolic blood pressure	134.5 (100-175)	147.5 (93-188)	0.29
Diastolic blood pressure	79.6±12.8	79.9±11.9	0.91
Heart rate	85.1±14.5	86.4±15.5	0.73
Oxygen saturation	99 (98-99)	99 (98-99)	0.47
Respiratory rate	16 (16-18)	17 (16-18)	0.25
Temperature	98.6 (98.4-98.9)	98.6 (98.6-98.6)	0.80

Table 3: Comparison of intra-operative vital signs and anesthesia duration within group A and B (n=60)

Intra-operative vital signs on incision	Group A	Group B	P value
Systolic blood pressure	121 (103-141)	113.5 (102-126)	0.49
Diastolic blood pressure	72.1±13.7	70.2±11.4	0.56
Heart rate	81±13.3	82.1±13.8	0.75
Oxygen saturation	99.5 (99-100)	100 (99-100)	0.54
Respiratory rate	17 (14-18)	18 (16-20)	0.14
Temperature	98.6 (98.2-98.6)	98.5 (98-98.6)	0.91
Duration of surgery	46.5 (30-75)	40 (30-55)	0.13
Duration of analgesia	506.8±534.4	392.5±422.1	0.36
Duration of analgesia	844.7±101.4	619.7±85.4	0.09

DISCUSSION

Orthopedic surgeries related to upper limbs are considered as a major reason of post-operative pain. A supraclavicular brachial plexus-block is performed through anesthetics for allowing hemostatic ease as well as control in post-operative related pain.¹² A study evaluated restricted doses of dexamethasone in combination with levobupivacaine for achieving supraclavicular brachial-plexus blockage¹³. In the current research a double blinded strategy was opted for comparing group A and B in context with their heart rate, systolic as well as diastolic blood pressures. There was no significant variance was found among vital signs of both groups.

None of the patients suffered bradycardia or tachycardia after administration of dexamethasone in them. Studies of Choi et al⁶, Persec et al¹³ and Shreshtha et al¹⁴ also correlated with the present study results and elaborated no significant variance in hemodynamic parameters of group received dexamethasone in comparison to the group without dexamethasone was reported. A faster onset of sensory as well as motor blockage was observed in Group A of the present study. The results are in similarity with the one reported earlier, however a direct evaluation seems difficult to achieve due to variety of analgesics and blocks available.¹⁵⁻¹⁷

Movafegh et al¹⁸ reported in their research that the commencement period of sensory as well as motor block was analogous in patients who were added with dexamethasone to those added with lidocaine in the axillary brachial-plexus blockage. Still their study emphasized that duration of dexamethasone group sensory blockage as 242±76 versus 98±33 minutes and motor blockage as 310±81 versus 130±31 minutes was significantly more in comparison to control groups. In addition to this dexamethasone has also proven to reduce total analgesic usage making it, a nontoxic and an efficient choice.^{19,20} Similar results were elaborated in the current research findings interpreting dexamethasone addition as a better choice during local anesthesia.

CONCLUSION

Perineural administration of dexamethasone with clinical bupivacaine concentration can prolong the duration of the sensory and motor nerve block and also can extend the duration of post-

operative analgesia without causing disturbances in hemodynamic parameters.

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