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Original Research Article

Study of Efficacy of Ropivacaine Alone versus Ropivacaine with Dexamethasone in supra clavicular Branchial Plexas Block

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Abstract

Background: Although bupivacaine is a well-established long-acting regional anesthetic like other amides, ropivacaine is used due to its non-cardiotoxicity, having similar efficacy; hence, it is used alone and compared by mixing with dexamethasone.

Method: Out of 90 (ninety), 45 patients were given dexamethasone and ropivacaine, and 45 patients were given ropivacaine alone.

Results: The onset of motor block and sensory block and the duration of motor block were longer in patients treated with dexamethasone and ropivacaine with a significant p-value ($p < 0.001$) as compared to ropivacaine alone.

Conclusion: It is confirmed and concluded that dexamethasone added to ropivacaine in a supraclavicular block for upper limb surgery significantly shortens the onset time and prolongs the duration of sensory and motor blocks without causing any sedation or toxicity.

Keywords: brachial plexus, motor block, sensory block, Ropivacaine, Dexamethasone.

Introduction

Brachial plexus block for upper limb surgery has proved to be a safer and more effective method of regional anesthesia [1]. But it is observed that surgeries on the upper limb are still being performed mainly under general anesthesia despite unanimous consensus toward regional anesthesia. Various approaches have been described, such as supraclavicular, interscalene, transscalene [2], infraclavicular, and axillary, but they are associated with some technical difficulties, inadequate blocks, and significant complications.

Although bupivacaine is a well-established long-acting regional anesthetic. Like all amide anesthetics, it has been associated with cardiotoxicity when used in high concentrations or when accidentally administered intravascularly. Hence there is a need of a drug that can have all the advantages of bupivacaine without cardiotoxicity; hence, ropivacaine is a long-acting regional anesthetic that is structurally related to bupivacaine without cardiotoxicity. It is an S (-) enantiomer, unlike bupivacaine, which is a racemate, developed for the purpose of reducing potential cardiotoxicity and improving relative sensory and motor block profiles [3].

It is also noted that dexamethasone (8 mcg) added to a perineural local anesthetic injection augments the duration of peripheral nerve block analgesia [4]. Hence, an attempt is made to compare and evaluate ropivacaine alone versus ropivacaine and dexamethasone in the supraclavicular brachial plexus.

Material and Method

90 (ninety) patients admitted to the surgery department of Government Medical College, Wanaparthy, Telangana-509103, were studied.

Inclusion Criteria: The patients aged 10-60 years posted for various elective upper limb surgeries. ASA Grade I and II who gave their consent in writing for the study were selected.

Exclusion Criteria: Patients below 18 years of age, ASA grade III, IV, or V patients using tricyclic

antidepressants, pregabalin, serotonin-norepinephrine reuptake inhibitors, or tramadol. Patients hypersensitive to amide local anesthesia or with a history of hypersensitivity to dexamethasone were excluded from the study.

Method: Every patient underwent a routine examination for the general condition of the patient. Height, weight, and age of the patients were noted. Pre-anesthetic evaluation was done in the evening before surgery in all patients. A detailed examination of the cardiovascular and respiratory systems was done. Moreover, surface anatomy is where the block was going to be given. Blood was collected for routine examination, such as Hb%, CBC, fasting, and postprandial blood sugars. Blood urea and S. creatinine levels. An ECG and chest X-ray were taken. Urine examination for albumin, sugar, and microscopy was also done in every patient. Out of 60 patients, 30 patients are given ropivacaine alone and are named as the R group, and 30 are given ropivacaine and dexamethasone and are named as the RD group. The patients in group R are administered 28 ml of 0.5% ropivacaine injection alone + 2 ml saline, and RD was given 28 ml of 0.5% ropivacaine with 2 ml of 8 mg dexamethasone.

Every patient was premedicated with 1 mg IV midazolam 20 minutes before giving the block. The patients were connected with a monitor to record heart rate (HR), non-invasive measurement of systolic blood pressure (SBP), diastolic blood pressure (DBP), continuous electrocardiogram (ECG) monitoring, and hemoglobin oxygen saturation (SPO2). The baseline systolic BP, DBP, and SBP were recorded.

The site of injection was shaved and disinfected. The injection site was infiltrated with 1 ml of 2% lidocaine subcutaneously. A nerve stimulator was used to locate the brachial plexus. The location endpoint was a distal motor response with an output lower than 0.6 ml. During injection, negative aspiration was performed after 6.5-7.0 ml to avoid intravascular injection. Sensory and motor block along with monitoring of vitals was determined every 5 minutes in the first 30 minutes and then every 15 minutes during the 1st hour, followed by every second hour for 24 hours. Any hypertensive reaction to the drugs, evidence of pneumothorax, and adverse events were also monitored. To evaluate the duration of the sensory block and motor block, patients were asked to inform the time when incisional discomfort as a sensation of pain began and also the time when full power returned to the shoulder. In the postoperative period, when the patients complained of pain at the operative site, an injection of diclofenac 75 mg IM was given, and patients were followed up for 24 hours for any side effects.

The duration of the study was from January 2025 to July 2025.

Statistical Analysis: The demographic profile and duration of surgery in both groups were compared with a z-test, and results were noted. The statistical analysis was carried out using SPSS software. The ratio of male and female was 2:1.

Observation and Results

Table 1: Comparison of duration and efficacy in both groups

- Duration of surgery (in minutes): 103.50 (±2.5) in group A, 101.12 (± 1.5) in group B, t test was 5.47 and p<0.001.
- Onset of sensory block (in minutes): 17.10 (± 1.57) in group A, 15.12 (± 1.40) in group B, t test was 6.31 and p<0.001.
- Onset of Motor block (in minutes): 15.80 (± 2.60) in group A, 19.65 (± 2.65) in group B, t test was 6.95 and p<0.001.
- Duration of sensory block (in minutes): 610.72 (± 12.30) in group A, 1120.50 (± 10.20) in group B, t test was 214 and p<0.001.
- Duration of Motor block (in minutes): 540.30 (± 20.30) in group A, 825.28 (± 25.80) in group B, t test was 58.2 and p<0.001.

Table 1: Comparison of surgical parameters in both groups

Parameters	Group R (45) Mean ±SD	Group RD (45) Mean ±SD	t test	p value
Duration of surgery (in minutes)	103.50 (± 2.5)	101.12 (±1.5)	5.47	P<0.001
Onset of surgery (in minutes)	17.10 (±1.57)	15.12 (± 1.40)	6.31	P<0.001
Onset of motor lock (in minutes)	15.80 (± 2.60)	19.65 (± 2.65)	6.95	P<0.001
Duration of sensory Block (in minutes)	610.72 (± 12.30)	1120.50 (± 10.20)	214	P<0.001
Duration of Motor Block (in minutes)	540.30 (± 20.30)	825.28 (±25.80)	58.2	P<0.001

The comparison between Group A and Group B, parameters have significant p value (p<0.001).

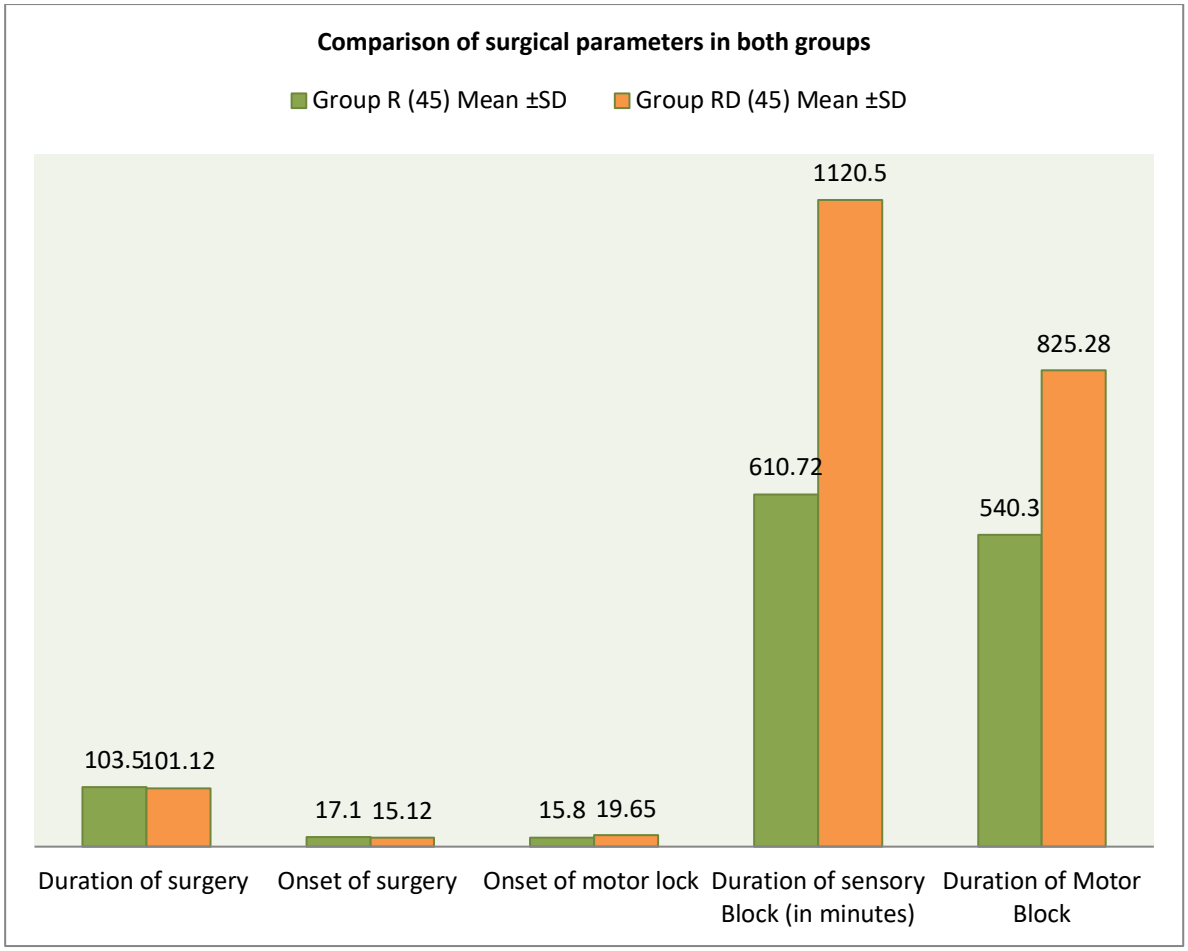

Figure 1: Comparison of surgical parameters in both groups

Discussion

In the present study of the efficacy of ropivacaine alone versus ropivacaine with dexamethasone in a supraclavicular brachial plexus block. The onset of motor block (in minutes), duration of sensory block (in minutes), and duration of motor block (in minutes). The total number of rescue injections in 24 hours had significant ($p < 0.001$) results. These findings are more or less in agreement with previous studies [5,6,7].

Dexamethasone is known for its anti-inflammatory, immunosuppressive, and antiemetic properties; these corticosteroids exert their effects by inhibition of phospholipase A-2 as well as changes in cell function induced by glucocorticoid receptor activation [8].

The mechanism involved for the extended analgesic effect of dexamethasone is attributed to its action locally on nociceptive C-fibers (via glucocorticoid receptors) to increase the activity of inhibitory potassium channels, thus decreasing their activity [9]. It is reported that dexamethasone effectively produced earlier onset of action and significant prolonged duration of analgesia, which is mediated via the glucocorticoid receptor. When dexamethasone alone is used in a regional block, the blockade does not occur [10]. Dexamethasone is proposed to bring about this effect by altering the function of potassium channels in excitable cells [11]. Hence, dexamethasone must be added with another anesthetic drug to enhance its duration of motor or sensory blockage.

Summary and Conclusion

The present study has proved that dexamethasone and ropivacaine used for supraclavicular brachial plexus block for upper limb surgery have significantly shortened the onset time and prolonged the duration of motor and sensory block without producing sedation in patients and without any side effects like nausea and vomiting. This study demands further such studies in a large number of patients of both sexes at different age groups to confirm these results because the exact mechanism and actions of the dexamethasone and ropivacaine combination are still unclear.

Limitation of study: Owing to remote location, small number of patients, and lack of the latest techniques, we have limited findings and results. This research work was approved by the ethical committee of Government Medical College, Wanaparthy, and Telangana-509103.

References

1. Murphy DBm Mc, cartneu CJ: Novel alagestic adjuvant for brachial plexus blocks a systemic review Anesth. Analg. 2000, 90; 1122-8.
2. Cunnings KC, Napierkowski DE: Effect of dexamethasone on duration of intersciene nerve block with Ropivacaine or Bupivacaine Br. J. Anaesthesia 2011, 107; 446-53.
3. Pathak RG, Anand PS: Supraclavicular brachial plexus block with or without dexamethasone A comparative study Int. J. Sci. Res. Publ. 2012, 12; 1-7.
4. Edward G. Moragn: Peripheral Nerve Block, 4th edition, chapter 17 In; Clinical Anesthesiology, New Delhi Tata McGraw Hill 2009.
5. Kopa CZ, Lacouture PG: The dose response and effects of dexamethasone on bupivacaine microcapsules for intercostal blockade (T9-T11) in healthy volunteers, Anesth, Analg. 2003, 96; 576-82.
6. Golwala MP, Swadia VN: Pain relief by dexamethasone as an adjuvant to local anesthetics in supraclavicular brachial plexus block J. Anaesth. Clin. Phamacol. 2009, 25 (3); 285-8.
7. Schulxe S, Anderson J: Effect of prednisolone on the systemic response and wound healing after colonic surgery. Archives Surgery 1997.
8. Bromage PR and Gertel M: Improved brachial plexus blockade with bupivacaine hydrochloride and carbonated lidocaine. Anesthesiology 1972, 36; 479-87.
9. Nguyen HC, Fath E: Transsciene brachial plexus block: A new posterolateral approach for brachial plexus blocks Anesth. Analg. 2007, 105; 872-875.
10. Miraxi H, Tekanl, Allinea K: Pre-operative use of cortico-steroid and bupivacaine combination in lumbar disc. Surgery spine 2002, 27; 343-346.
11. Attardi B, Takimato K: Giucocorticoid-induced up-regulation of pituitary K+ channels mRNA in vitro and in vivo receptor channels 1993, 1; 287-293.