Section: Anaesthesiology

Original Research Article

EFFICACY OF ROPIVACAINE 0.2% ALONE AND ROPIVACAINE 0.2% PLUS INJ. DEXAMETHASONE IN PROVIDING 'PNS' GUIDED AXILLARY BLOCK ANALGESIA ON ARRIVAL IN UPPER LIMB TRAUMA.

Tanay Pradhan[1], Vaishalee Ketan Badhe[2], Smita bramhane[3], Vaijayanti Badhe[4], Ketan Badhe[5]

[1]*Senior Resident, Department of Anaesthesiology and Critical Care Dr. BVP rural Medical College, Loni, India.*
[2]*Associate Professor, Department of Anaesthesiology and Critical care, Dr. BVP rural Medical College, Loni, India.*
[3]*Assistant Professor, Department of Anaesthesiology and Critical care, Dr. BVP rural Medical College, Loni, India.*
[4]*Professor, Department of Anaesthesiology and critical Care, Dr. BVP rural Medical College, Loni, India.*
[5]*Associate Professor, Department of Surgery, Dr. BVP rural Medical College, Loni, India.*

Received *: 05/12/2024*
Received in revised form *: 31/01/2025*
Accepted *: 15/02/2025*

Corresponding Author:
Dr. Vaishalee Ketan Badhe
Associate Professor, Department of Anaesthesiology and Critical care, Dr. BVP rural Medical College, Loni, India.
Email: drvaishalee@rediffmail.com

DOI:10.70034/ijmedph.2025.1.126

Source of Support: Nil,
Conflict of Interest: Nonedeclared

Int J Med Pub Health
2025; 15 (1); 671-678

ABSTRACT

Background: Undergoing interventions such as joint manipulation, chest radiography, MRI, and CT scanning benefit substantially from the analgesic effects of peripheral nerve blocks. Peripheral nerve blocks ensure that patients remain pain-free during these procedures and mitigate the physiological stress response to pain. Consequently, patients experience a more comfortable hospital stay and demonstrate increased acceptance of surgical procedures due to the absence of pain. This pain-free hospital experience highlights the pivotal role of anesthesiologists in acute pain management. The effective analgesia provided by nerve blocks upon admission obviates the need for additional analgesics, thereby reducing the risk of adverse effects. **Aim:** To compare the efficacy of ropivacaine 0.2% and ropivacaine 0.2% with inj dexamethasone in providing "Peripheral nerve stimulator "guided axillary block analgesia on arrival.

Materials and Methods: The present study was observational, descriptive longitudinal study. The present study was carried out at the department of anaesthesiology and critical care, Pravara Rural Hospital, Loni. Patients of 18-60 yrs age group of either sex belonging to ASA-I, ASA-II GRADE with upper limb fractures ranging from distal humerus to distal phalynx. The primary objective was compare and analyse the onset and duration of sensory analgesia by 0.2% inj ropivacaine alone and with inj ropivacaine 0.2% with inj dexamethasone 8mg in on arrival block while secondary objectives included comparing the multiple hemodyanamic parameters, motor blockade and to check for subsequent side effects after administration of the block.

Result: The study showed patients receiving ropivacaine 0.2% alone had faster onset of action as compared to patients receiving ropivacaine 0.2% with 8mg dexamethasone. However duration of analgesia, sensory blockade and VAS score was significantly better in patients receiving ropivacaine 0.2% with inj dexamethasone 8mg than patients receiving inj ropivacaine 0.2% alone. Both the drug formulations had similar heamodynamic effects and there was no significant change.

Conclusion: The findings of the present study indicate that the addition of dexamethasone to ropivacaine 0.2%prolonged both the onset and duration of sensory block compared to ropivacaine alone in "on arrival block" These outcomes will assist clinicians in evaluating the efficacy and postoperative pain management of ropivacaine alone versus ropivacaine with dexamethasone. However, further studies are recommended, as this study was conducted at a single centre with a limited sample size.

Keywords: Axillary Block, On Arrival Block, Sensory Analgesia, Visual Analogue Score.

INTRODUCTION

Trauma is a major cause of morbidity and mortality worldwide.[1] Regional anesthesia has recently attracted the interest from both the military and civilian medical care provider as a safe, effective and convenient technique for pain control and during the acute treatment of the patients with traumatic injuries.[2]

Regional anesthesia techniques provide effective pain management and are frequently employed during surgery and postoperative care, reducing the need for systemic anesthetics and intravenous analgesics. Moreover, studies on outcomes demonstrate that regional anesthesia accelerates recovery, reduces intensive care unit and hospital stays. It also enhances cardiac and pulmonary function, lowers infection rates and neuroendocrine stress responses, and facilitates earlier restoration of bowel function.[3]

In the recent years, the nerve block techniques have been on the increase for painless emergency procedure due to ease of application. The block remains the only alternative in upper limb as it provides superior analgesia and avoids common side effects. In addition to providing pain relief, it may decrease the administration of systemic analgesics such as opioids and decrease their side-effects.[4,5]

The axillary method to brachial plexus blockade provides satisfactory anesthesia for elbow, forearm, and hand surgery. It also provides reliable cutaneous anesthesia of the inner upper arm including the medial cutaneous nerve of arm and intercostobrachial nerve, areas often missed with other approaches.[6]

Bupivacaine is a well-established long-acting regional anesthetic and has been linked to cardiotoxicity when used in high concentrations or accidentally administered intravascularly, like all amide anesthetics. Therefore, there is a need for a drug that retains all the benefits of bupivacaine without its cardiotoxic effects. Ropivacaine is a long-acting regional anesthetic that is structurally related to bupivacaine.[7]

Ropivacaine, an amide-type local anesthetic, is produced as the hydrochloride monohydrate of the (S)-enantiomer.[8] It is a potent and long-lasting local anesthetic, recommended for various regional anesthetic blocks, excluding spinal anesthesia. It is the first local anesthetic officially registered for use in continuous epidural analgesia.[9]

Furthermore, still there is a challenge to the anesthesiologists to extend the duration of analgesia while decreasing the adverse effects with single-shot brachial plexus block. For significant prolongation of brachial plexus analgesia, continuous catheter placement is the preferred method. Alternatively, for moderate extension of analgesia, various adjuvant drugs can be combined with the local anesthetic. However, there are presently no clinically accessible ultralong-acting local anesthetics or slow-release formulations available.[10]

Therefore, researchers have explored combining local anesthetics with adjunctive medications to extend the duration of nerve block anesthesia. Various adjuvants such as epinephrine, clonidine, opioids, ketamine, and midazolam have been experimented with, limited success. Corticosteroids have all been studied previously in an attempt to prolong the duration of analgesia after peripheral nerve blockade with varying degrees of success.[11]

Dexamethasone is a potent and highly selective glucocorticoid and has shown effectiveness in a limited number of preclinical and clinical trials. Recent research suggests that adding 8 mg of dexamethasone to perineural local anesthetic injections can prolong the duration of peripheral nerve block analgesia.[12] Dexamethasone is very potent and highly selective glucocorticoid, its potency is about 40 times that of hydrocortisone. It is commonly utilized in clinical practice for managing various inflammatory and autoimmune disorders.[13]

Undergoing interventions such as joint manipulation, chest radiography, MRI, and CT scanning benefit substantially from the analgesic effects of nerve blocks. These blocks ensure that patients remain pain-free during these procedures and mitigate the physiological stress response to pain. Consequently, patients experience a more comfortable hospital stay and demonstrate increased acceptance of surgical procedures due to the absence of pain. This pain-free hospital experience highlights the pivotal role of anesthesiologists in acute pain management. The effective analgesia provided by nerve blocks upon admission obviates the need for additional analgesics, thereby reducing the risk of adverse effects nausea vomitting itching respiratory depression, gastritis and even peptic ulcer disease in case of overuse of NSAIDS and other supplementary analgesic medications.

The primary aim in managing pain on arrival is to reduce medication dosage to decrease side effects while ensuring sufficient pain relief. Previous studies have demonstrated that combining dexamethasone with local anesthetics can increase the onset and extend the duration of pain relief. Therefore, this study aims to compare the onset of block and total analgesic duration between 0.2% ropivacaine administered alone and 0.2% ropivacaine combined with 8mg dexamethasone for upper limb surgeries

MATERIALS AND METHODS

Methodology: This observational, descriptive longitudinal study was conducted at the Department of Anaesthesiology and Critical Care, Pravara Rural Hospital, Loni. The present study included patients aged between 18 to 55 years who provided written informed consent and were undergoing axillary

block analgesia for upper limb trauma, fulfilling all inclusion and exclusion criteria. Ethics approval and informed consent form was obtained from the patients.

60 patients with upper limb trauma were approached for consent to receive axillary block analgesia. An 18-gauge intracath was secured, and monitors were attached to the patient. Verbal Counselling was done and the patient's injured limb was positioned comfortably (abducted at 90 degrees, elbow flexed at 90 degrees). Standardized monitoring of baseline vital signs (heart rate, saturation, blood pressure, and respiratory rate) was recorded.

The patient was cleaned, draped, and aseptic precautions were taken. The axillary artery was palpated, and the axillary nerve was identified using a peripheral nerve stimulator (PNS) "Stimuplex HNS 12" guided by a 5 cm insulated PNS needle.

Two sets of syringes were prepared:

- First set contained Two syringes containing 18 ml of 0.2%ropivacaine and 2 ml of normal saline (NS) 0.9%.
- Second set contained Two syringes containIng 18 ml of 0.2%ropivacaine and 2 ml of injection Dexa (8 mg).

A 5cm PNS needle was attached to a 10 ml syringe and inserted at a 20-degree angle just next to the axillary artery. The needle was advanced until a distinct sensation was felt; indicating penetration of the sheath, and paraesthesia was obtained. If no blood was aspirated, Total 20 ml of solution was injected. Vitals, sensory blockade onset and duration, and effective analgesia were checked at 5 minutes.

VAS score was checked at 2, 5, 30 minutes and 2, 4, and 6 hours, up to 24 hours duration. Reversal of analgesia was checked and compared between groups. Patient's vitals, VAS score, sensory level (absence of sensation to pin prick), and motor blockade (Bromage scale) were recorded every 15 minutes for the first hour, then every 2 hours. All data were gathered by an attending anaesthesiologist who was blinded to the participant's study group allocation.

Assessment

Sensory block was assessed using a 3-point scale: 0 = normal sensation, 1 = loss of sensation to pin prick, 2 = loss of sensation to touch (anesthesia).

Motor blockade was assessed using the modified Bromage scale: 4 = full muscle strength, 3 = reduced strength but able to move against resistance, 2 = able to move against gravity but not against resistance, 1 = discrete movements of muscle group, 0 = lack of muscle movement.

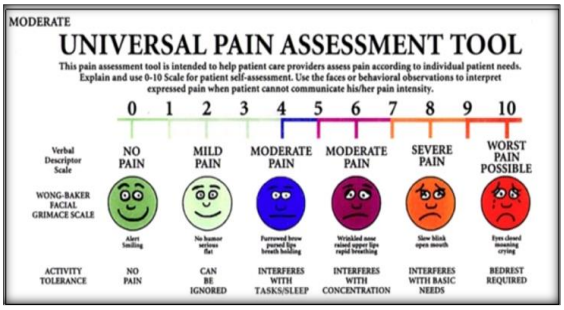

Figure 12: Visual analogue scale

Patient satisfaction score

1. Excellent
2. Satisfactory
3. Poor

Possible side effects of axillary block analgesia Incidence of drowsiness, pruritus, nausea/ Vomiting, Horner's syndrome, phrenic nerve palsy, Pneumothorax, respiratory depression, large hematoma, neurogenic shock (rare) and signs and Symptoms for local anesthetic toxicity are looked for and noted, if any.

RESULTS

Demographic characteristics of patients in the study group

The mean age in Group R was 54.25 years ± 18.32, while in Group RD, it was slightly lower at 52.34 years ± 21.22. The t-test revealed a non-significant result (p=0.64), suggesting that there were no statistically significant differences in age between the two groups. [Table1]

In Group R, there were 25 (53.20%) males and 22 (46.80%) females, while in Group RD, there were 27 (57.44%) males and 20 (42.56%) females. (p=0.67), indicated no statistically significant differences in gender distribution between the two groups. [Table 2]

Group R had a mean weight of 58.36 kg with a standard deviation of 6.52, while Group RD had a mean weight of 60.42 kg with a standard deviation of 8.11. p>0.05 indicated that the difference in mean weight between the two groups was not statistically significant. [Table 3]

Group R had a mean height of 166.34 cm with a standard deviation of 7.42, while Group RD had a mean height of 165.21cm with a standard deviation of 8.18. A p value of 0.01 indicated that the difference in mean height between the two groups was not statistically significant. [Table 4]

Comparison of ASA grades between Group R and Group RD showed no significant difference. In Group R, 55.32% were ASA grade I and 44.68% were ASA grade II. In Group RD, 48.94% were ASA grade I and 51.06% were ASA grade. A p-value of 0.53, indicated no significant disparity in ASA grades between the two groups. [Table 5]

Mean values for heart rate, systolic blood pressure (SBP), diastolic blood pressure (DBP), and mean

arterial pressure (MAP) were similar between the two groups. Hemodynamic variations between Group R and Group RD revealed no significant differences. (p>0.05). [Table 6]

Group R had a faster sensory onset (7.23 ± 0.83 minutes) compared to Group RD (10.31 ± 2.01 minutes), with a p-value <0.0001. Additionally, Group RD experienced a longer sensory block duration (591.29 ± 101.21 minutes) compared to Group R (489.18 ± 78.34 minutes), with a p-value <0.0001. [Table 7]

Group R had a mean VAS score of 5.26 ± 0.23, whereas Group RD had a significantly lower mean VAS score of 3.35 ± 0.12. The comparison of VAS (Visual Analog Scale) pain scores between Group R and Group RD showed a significant difference (p<0.0001). [Table 8]

In Group R, 14.89% experienced bradycardia compared to 10.64% in Group RD ($\chi 2 = 1.65$, p = 0.19). Hypertension was reported in 17.02% of Group R and 14.89% of Group RD, nausea in 25.53% of Group R and 21.28% of Group RD, and vomiting in 4.26% of Group R compared to 0% in Group RD. The side effects between Group R and Group RD showed no significant differences. (p>0.05). [Table 9]

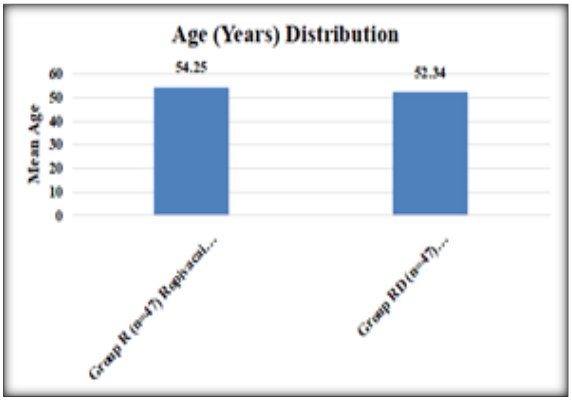

Figure 1: Age (Year) Distribution

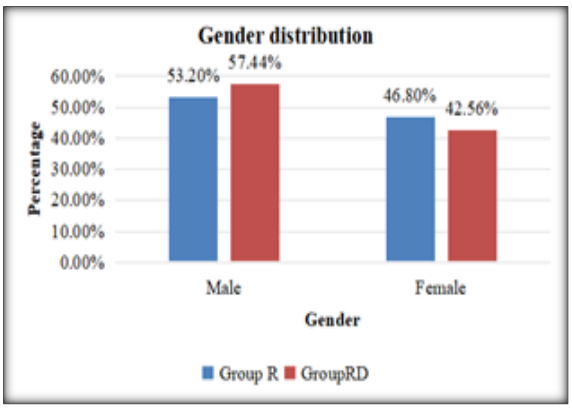

Figure 2: Gender Distribution

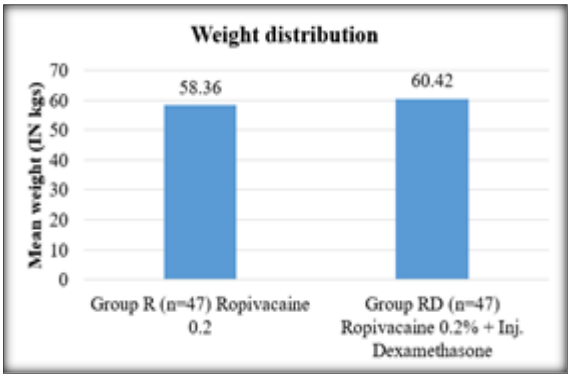

Figure 3: Weight Distribution

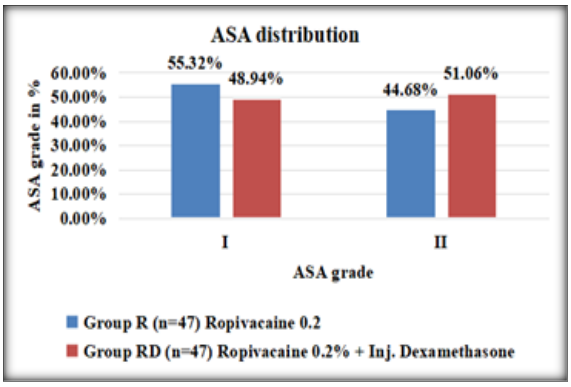

Figure 4: ASA Distribution

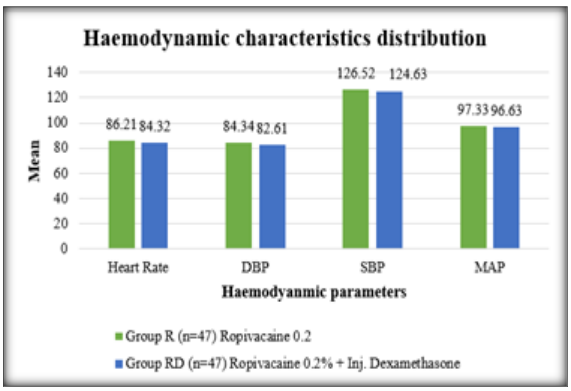

Figure 5: Haemodynamic Characteristics distribution

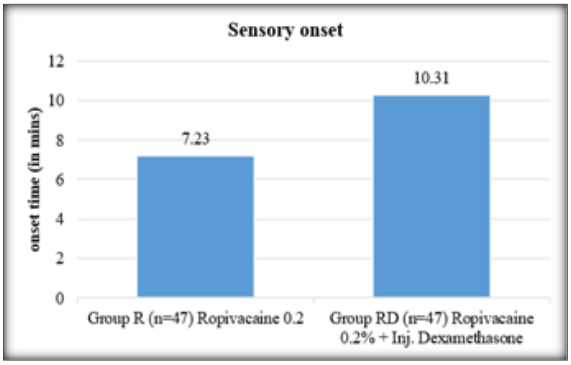

Figure 6: Sensory onset

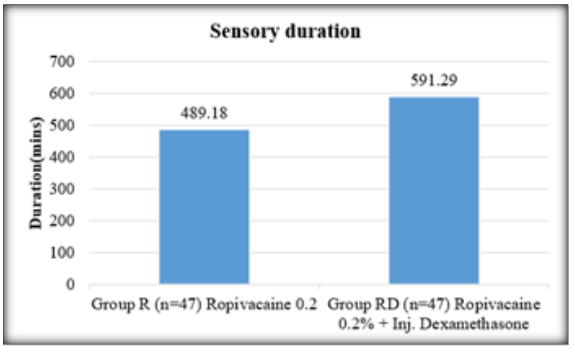

Figure 7: Sensory duration

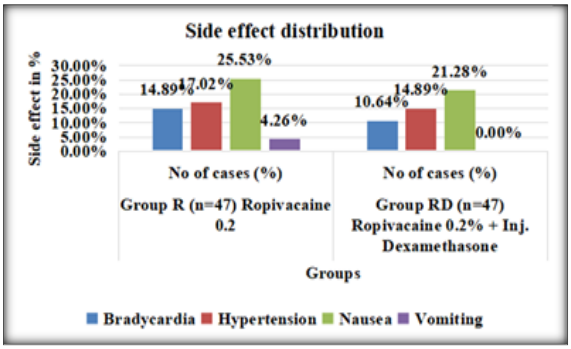

Figure 9: Side effect distribution

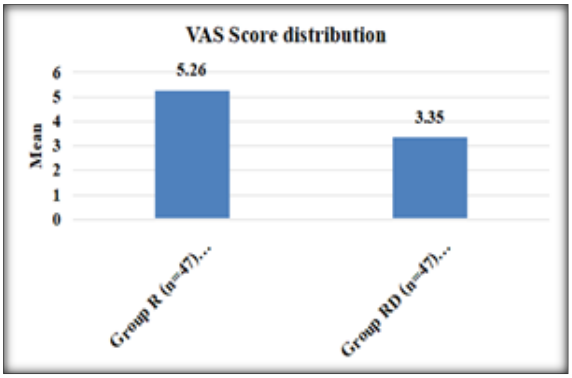

Figure 8: VAS score distribution

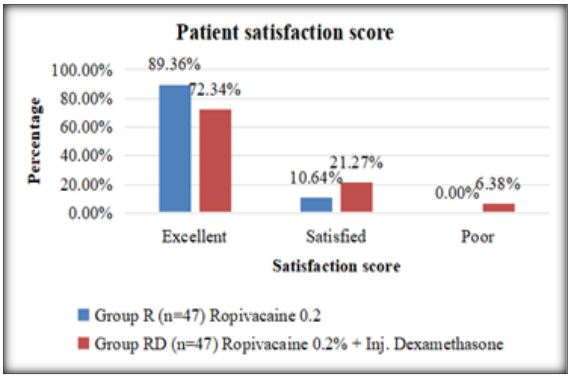

Figure 10: Patient satisfaction score

Table 1: Distribution according to age in group R and group RD

Variables	Group R (n=47) Ropivacaine 0.2	Group RD (n=47) Ropivacaine 0.2% + Inj. Dexamethasone	t-test, P-value
Age (Years)	54.25 ± 18.32	52.34 ± 21.22	T=-0.46, p=0.64

Table 2: Distribution according to gender in group R and group RD

Gender	Group R (n=47) Ropivacaine 0.2	Group RD (n=47) Ropivacaine 0.2% + Inj. Dexamethasone	Chi-square, P-value
Male	25 (53.20%)	27 (57.44%)	Chi-square=, P=0.67
Female	22 (46.80%)	20 (42.56%)	
Total	47	47	

Table 3: Distribution according to weight in group R and group RD

Weight (Kg)	Group R (n=47) Ropivacaine 0.2	Group RD (n=47) Ropivacaine 0.2% + Inj. Dexamethasone	t-test, P-value
Mean ± SD	58.36 ± 6.52	60.42 ± 8.11	t=1.35, p=0.17

Table 4: Distribution according to height in group R and group RD

Height (cm)	Group R (n=47) Ropivacaine 0.2	Group RD (n=47) Ropivacaine 0.2% + Inj. Dexamethasone	t-test, P-value
Mean ± SD (range)	166.34 ± 7.42	165.21 ± 8.18	t=2.53; P=0.01

Table 5: Distribution according to ASA grade in group R and group RD

ASA grade (%)	Group R (n=47) Ropivacaine 0.2	Group RD (n=47) Ropivacaine 0.2% + Inj. Dexamethasone	t-test, P-value
I	26 (55.32%)	23 (48.94%)	$\chi 2$ =0.38; P=0.53
II	21 (44.68%)	24 (51.06%)	

Table 6: Haemodynamic characteristics in group R and group RD

Variables	Mean ± SD		Statistical significance	
	Group R (n=47) Ropivacaine 0.2	Group RD (n=47) Ropivacaine 0.2% + Inj. Dexamethasone	t-value	p-value
Heart Rate	86.21 ± 12.11	84.32 ± 12.52	−0.75	0.44
DBP	84.34 ± 8.26	82.61 ± 7.64	−1.05	0.29
SBP	126.52 ± 10.22	124.63 ± 11.14	-0.85	0.39
MAP	97.33 ± 7.42	96.63 ± 8.31	−0.43	0.66

Table 7: Onset of sensory block, motor block, surgical anaesthesia and duration of analgesia in group R and group RD

Parameters	Group R (n=47) Ropivacaine 0.2	Group RD (n=47) Ropivacaine 0.2% + Inj. Dexamethasone	t-test	P-value
Sensory onset	7.23 ± 0.83	10.31 ± 2.01	9.71	<0.0001
Sensory duration	489.18 ± 78.34	591.29 ± 101.21	5.47	<0.0001

Table 8: VAS score in group R and group D

VAS Score	Group R (n=47) Ropivacaine 0.2	Group RD (n=47) Ropivacaine 0.2% + Inj. Dexamethasone	t-test	P-value
Mean ± SD	5.26 ± 0.23	3.35 ± 0.12	-50.47	<0.0001

Table 9: Incidence of side effects in group R and group RD

Side Effects	Group R (n=47) Ropivacaine 0.2	Group RD (n=47) Ropivacaine 0.2% + Inj. Dexamethasone	χ2-test	P-value
	No of cases (%)	No of cases (%)		
Bradycardia	7 (14.89%)	5 (10.64%)	1.65	0.19
Hypertension	8 (17.02%)	7 (14.89%)		
Nausea	12 (25.53%)	10 (21.28%)		
Vomiting	2 (4.26%)	0 (0.00%)		

Table 10: Patient satisfaction score

Patient satisfaction score	Group R (n=47) Ropivacaine 0.2	Group RD (n=47) Ropivacaine 0.2% + Inj. Dexamethasone	χ2-test	P-value
	No of cases (%)	No of cases (%)		
Excellent	42 (89.36%)	34 (72.34%)	5.50	0.019
Satisfied	5 (10.64%)	10 (21.27%)		
Poor	0 (0.00%)	3 (6.38%)		

DISCUSSION

In the accident and emergency (A&E) department, various procedures, such as fracture manipulation and tendon repair, require anesthesia for the upper limb. Traditionally, this has been able through methods like general anesthesia, intravenous regional anesthesia (Bier's block), hematoma block, or intravenous sedation, each with its drawbacks.

Although axillary brachial plexus block is a recognized technique for upper limb anesthesia, its utilization in the A&E setting is not widespread. This type of anesthesia offers both sensory and motor blockage of the limb, along with sympathetic blockade of blood vessels, resulting in decreased postoperative pain and swelling.

Our study findings indicate that incorporating dexamethasone with ropivacaine notably extends the analgesic duration of plain ropivacaine after surgery. These outcomes align with previous research trends employing dexamethasone in brachial plexus models. However, making precise comparisons is difficult due to the diverse array of local anesthetic combinations and adjuncts, varied blocks under investigation, and differing methodologies for assessing block longevity.

Variations in study methodologies might explain the differences observed in the duration of analgesia among studies. Factors such as the utilization of local anesthetics with longer action durations, larger injectate volumes and adjuncts like epinephrine or bicarbonate with potential synergistic effects could contribute to these variations. It is noteworthy that the addition of dexamethasone extended the duration of analgesia and it might have also led to increased variability in this duration.

The objective of the current investigation was to assess the effectiveness of ropivacaine 0.2% alone and ropivacaine 0.2% plus dexamethasone in providing "PNS"-guided axillary block analgesia upon arrival in upper limb trauma. The axillary block is crucial in this context because it offers effective regional anesthesia for procedures on the upper extremities, minimizing the need for general anesthesia and its associated risks. We chose to utilize ropivacaine without additional adjuvants to minimize the potential for masking any pharmacodynamic effects of adjunctive dexamethasone. As a result, we discovered a statistically significant and clinically relevant interaction between these two components.

According to the conventional theory of steroid action, steroids bind to intracellular receptors, influencing nuclear transcription. Honorio et al,[14] proposed that steroids induce analgesia by impeding transmission in nociceptive c-fibers and suppressing ectopic neuronal discharge. Attardi et al,[15] suggested that steroids might achieve this effect by altering the function of potassium channels in excitable cells, potentially explaining dexamethasone's role in prolonging blockade in our study.

In the present study, the mean ages were 54.25 ± 18.32 years for Group R (Ropivacaine 0.2 alone) and 52.34 ± 21.22 years for Group RD (Ropivacaine 0.2% PLUS INJ. Dexamethasone), with no significant difference between the groups (p=0.64). Gender distribution was also similar, with 53.20%

males and 46.80% females in Group R, and 57.44% males and 42.56% females in Group RD (p=0.67).

This investigation also demonstrated that there was no significant difference in ASA grades between Group R and Group RD. In Group R, 55.32% of patients were ASA grade I, and 44.68% were ASA grade II. In Group RD, 48.94% were ASA grade I, and 51.06% were ASA grade II. With a p-value of 0.53, the comparison indicated no significant difference in ASA grades between the two groups.

In the present study, Group R had a faster sensory onset (7.23 ± 0.83 minutes) compared to Group RD (10.31 ± 2.01 minutes), with a p-value <0.0001. Additionally, Group RD experienced a longer sensory block duration (591.29 ± 101.21 minutes) compared to Group R (489.18 ± 78.34 minutes), with a p-value <0.0001. Furthermore, Group R had mean surgery duration of 82.16 minutes, while Group RD had a mean duration of 86.23 minutes. The t-test analysis yielded a t-value of 1.36 with a p-value of 0.18, indicating that the difference in surgery duration between the two groups was not statistically significant.

Furthermore, Movafegh et al,[16] investigated the impact of dexamethasone added to lidocaine using a nerve stimulator and found that while the duration of surgery and onset times of sensory and motor block were similar in both groups, the duration of sensory (242 ± 76 versus 98 ± 33 min) and motor (310 ± 81 versus 130 ± 31 min) blockade were significantly longer in the dexamethasone group compared to the control group (P < 0.01), resembling our study results.

Vieira et al,[17] observed that incorporating dexamethasone into a mixture of bupivacaine, clonidine, and epinephrine extended the duration of interscalene block from 14 to 24 hours (a 1.7-fold increase). However, it is important to consider that their results were influenced by the presence of two α-agonists in the local anesthetic mixture.

The present study also evaluated the incidence of side effects between two groups. They found that 14.89% of patients in Group R experienced bradycardia, compared to 10.64% in Group RD ($\chi 2$ = 1.65, p = 0.19). Hypertension was reported in 17.02% of Group R and 14.89% of Group RD. Additionally, nausea occurred in 25.53% of Group R and 21.28% of Group RD, while vomiting was observed in 4.26% of Group R and none in Group RD. Overall, there were no significant differences in side effects between Group R and Group RD (p > 0.05). The findings of the present study indicate that the addition of dexamethasone to ropivacaine prolonged both the onset and duration of sensory block compared to ropivacaine alone. These outcomes will assist clinicians in evaluating the efficacy and postoperative pain management of ropivacaine alone versus ropivacaine with dexamethasone. However, further studies are recommended, as this study was conducted at a single centre with a limited sample size. These findings also suggest that axillary brachial plexus blockade offers an alternative to traditional methods for patients requiring upper limb anesthesia in the A&E department. This technique is relatively simple to perform and provides satisfactory anesthesia in most cases, along with prolonged postoperative analgesia. Patients tolerate the procedure well, and it is associated with minimal side effects. We believe that regional anesthesia is effective and increased familiarity with this technique could enhance its adoption and benefit. The importance of an on-arrival block lies in its ability to provide immediate pain relief for procedures such as joint manipulation, CXR, MRI, and CT scans. This analgesic effect reduces the patient's stress response, contributing to a more comfortable hospital stay. A pain-free experience in the hospital facilitates acceptance of surgical procedures and underscores the critical role of anesthesiologists in managing acute pain relief. Additionally, the effectiveness of the on-arrival block eliminates the need for extra analgesics, allowing patients to avoid the side effects associated with additional medications.

CONCLUSION

To the best of our knowledge, this is the first comparative study to evaluate the efficacy of using 0.2% ropivacaine alone versus 0.2% ropivacaine combined with dexamethasone for providing PNS-guided axillary block analgesia in patients arriving with upper limb trauma. There is a notable lack of literature on the use of ropivacaine alone and in combination with dexamethasone, for axillary brachial plexus blocks. Further studies are necessary to highlight and better understand the roles and benefits of these treatments in this context.

Patients receiving ropivacaine 0.2% with dexamethasone reported a significantly lower mean VAS score for pain upon arrival, indicating better pain relief. This finding suggests that the combination therapy provides more effective immediate analgesia in patients with upper limb trauma, potentially enhancing their comfort and satisfaction.

Furthermore, while there was a slight delay in the onset of sensory block in the group receiving ropivacaine with dexamethasone, this was outweighed by a significantly prolonged duration of sensory block. Patients in this group experienced extended pain relief compared to those receiving ropivacaine alone, which is particularly beneficial for managing postoperative pain in trauma patients.

Overall, the findings support the use of ropivacaine 0.2% combined with dexamethasone for axillary block analgesia in upper limb trauma patients. This combination provides superior pain relief and a prolonged duration of sensory block compared to ropivacaine alone, without increasing the risk of adverse effects. It offers a valuable option for optimizing pain management in this clinical setting, potentially improving patient outcomes and

satisfaction. The study also highlighted that the axillary brachial plexus blockade serves as an effective alternative to traditional methods for upper limb anesthesia. Furthermore, the on-arrival block's effectiveness eliminates the need for additional analgesics, helping patients avoid the associated side effects.

REFERENCES

1. Clark L, Varbanova M. Regional anesthesia in trauma. Adv Anesth. 2009;27(1):191-222.
2. Grabinsky A, Sharar SR. Regional anesthesia for acute traumatic injuries in the emergency room. Expert Rev Neurother. 2009;9(11):1677-90.
3. Malchow RJ, Black IH. The evolution of pain management in the critically ill trauma patient: emerging concepts from the global war on terrorism. Crit Care Med. 2008;36(Suppl 7): S346-S357.
4. Beaudoin FL, Nagdev A, Merchant RC, Becker BM. Ultrasound-guided femoral nerve blocks in elderly patients with hip fractures. Am J Emerg Med. 2010;28(1):76-81.
5. Ritcey B, Pageau P, Woo MY, Perry JJ. Regional nerve blocks for hip and femoral neck fractures in the emergency department: a systematic review. Can J Emerg Med. 2016 ;18(1):37-47.
6. Satapathy AR, Coventry DM. Axillary brachial plexus block. Anesthesiol Res Pract. 2011;2011.
7. Hansen TG. Ropivacaine: a pharmacological review. Expert Rev Neurother. 2004;4(5):781-91.
8. Bertini L, Tagariello V, Mancini S, Ciaschi A, Posteraro CM, Di Benedetto P, Martini O. 0.75% and 0.5% ropivacaine for axillary brachial plexus block: a clinical comparison with 0.5% bupivacaine. Reg Anesth Pain Med. 1999 Nov;24(6):514-8.
9. Salonen MH, Haasio J, Bachmann M, Xu M, Rosenberg PH. Evaluation of efficacy and plasma concentrations of ropivacaine in continuous axillary brachial plexus block: high dose for surgical anesthesia and low dose for postoperative analgesia. Reg Anesth Pain Med. 2000 Jan;25(1):47-51.
10. Rose JS, Neal JM, Kopacz DJ. Extended-duration analgesia: update on microspheres and liposomes. Reg Anesth Pain Med. 2005 May;30(3):275.
11. Neal JM, Gerancher JC, Hebl JR, Ilfeld BM, McCartney CJ, Franco CD, Hogan QH. Upper extremity regional anesthesia: essentials of our current understanding, 2008. Reg Anesth Pain Med. 2009;34(2):134-70.
12. Cummings III KC, Napierkowski DE, Parra-Sanchez I, Kurz A, Dalton JE, Brems JJ, Sessler DI. Effect of dexamethasone on the duration of interscalene nerve blocks with ropivacaine or bupivacaine. Br J Anaesth. 2011;107(3):446-53.
13. Kumar S, Palaria U, Sinha AK, Punera DC, Pandey V. Comparative evaluation of ropivacaine and ropivacaine with dexamethasone in supraclavicular brachial plexus block for postoperative analgesia. Anesth Essays Res. 2014;8(2):202-8.
14. Honorio TB. Epidural Steroids: In P. Prithvi Raj. Pain medicine, a comprehensive review. Mosby publications. 1999:259–63
15. Attardi B, Takimoto K, Gealy R. Glucocorticoid induced upregulation of a pituitary K+ channel mRNA in vitro and in vivo. Receptors Channels. 1993; 1:287–93.
16. Movafegh A, Razazian M, Hajimaohamadi F, Meysamie A. Dexamethasone added to lidocaine prolongs axillary brachial plexus blockade. Anesth Analg. 2006; 102:263–7.
17. Vieira PA, Pulai I, Tsao GC, Manikantan P, Keller B, Connelly NR. Dexamethasone with bupivacaine increases duration of analgesia in ultrasound-guided interscalene brachial plexus blockade. Eur J Anaesthesiol. 2010; 27:285–8.