

A comparative study of efficacy of Ropivacaine (0.75%) with adjuvants – Dexmedetomidine and Fentanyl in Supraclavicular Brachial Plexus Block

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Abstract

Background: Brachial plexus block provides adequate muscle relaxation and a minimal alteration in haemostasis, intraoperative analgesia and post-operative pain relief. Adjuvants with local anaesthetics in brachial plexus block are used to achieve a quick, dense and prolonged block. Recent days offer various adjuvants with local anaesthetic agents in brachial plexus block to achieve quick, dense and prolonged block. There is paucity of data regarding comparison of dexmedetomidine and fentanyl along with Ropivacaine in supraclavicular blocks. **Objectives:** The present study was undertaken to compare the onset and duration of sensory and motor blockade, duration of post-operative analgesia and intraoperative sedation levels and any side effects with dexmedetomidine and fentanyl. **Methodology:** The present Prospective Randomized Comparative study was conducted in the department of Anaesthesia, D.Y. Patil medical college, hospital and research institute, Kolhapur, over two years period. A total of 9 patients who fulfill inclusion and exclusion criteria were included in the study, they were randomly divided into 3 groups (3 patients each) according to computer-generated random number codes that were placed in a sealed envelope. Each group was named Group Dexmedetomidine, Group Fentanyl, and Group Ropivacaine. The data regarding haemodynamics such as blood pressure and Heart rate were obtained. A modified Bromage scale was used to assess the motor block. Whereas, Ramsay sedation scale was used to assess intraoperative sedation in subject and three point pin prick test for sensory block. Data was analysed using appropriate statistical tests. **Results:** The mean Heart rate in dexmedetomidine, fentanyl, and ropivacaine was 74.25 ± 11.10 bpm, 84.26 ± 5.62 bpm, and 94.36 ± 6.24 bpm respectively. A significant difference was found between the mean Heart rate when compared between the groups ($P=0.0002$). Bradycardia and hypotension were observed only in one patient of dexmedetomidine group. Whereas, there was no incidence of bradycardia in fentanyl and ropivacaine group subjects. A significant difference was found between mean Ramsay sedation score when compared between the groups (3.4 ± 0.49 vs 3.83 ± 0.37 vs 2.33 ± 0.47 , $P=0.0000$). A significant difference in the onset of sensory and motor block was found between the groups ($P=0.0000$) least was of dexmedetomidine group. There was a significant difference in the duration of the sensory and motor block and duration at which first postoperative analgesia between groups ($P=0.0000$) maximum duration of sensory and motor block and duration of post operative analgesia was of dexmedetomidine group. **Conclusion:** The onset of sensory and motor block was significantly rapid in Ropivacaine with dexmedetomidine group subjects. The duration of sensory and motor block was significantly more in Ropivacaine with dexmedetomidine group subjects. Duration of postoperative analgesia was significantly more in Ropivacaine with dexmedetomidine group subjects. Dexmedetomidine and fentanyl increase readiness for surgery. However, dexmedetomidine is better as an adjuvant to ropivacaine for brachial plexus block.

Key Words: Dexmedetomidine, Fentanyl, Ropivacaine, Onset of sensory and motor block, duration of postoperative analgesia

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INTRODUCTION

Brachial plexus block provides adequate muscle relaxation and a minimal alteration in haemostasis, intra operative analgesia and post-operative pain relief.¹ Adjuvants have been administered to achieve prolonged block with improved quality of anaesthesia and to decrease the total dose of local anaesthetics used.² Adjuvants with local anaesthetics in brachial plexus block are used to achieve a quick, dense and prolonged block.³ Brachial plexus block is administered by various approaches viz. supraclavicular, interscalene, infraclavicular and axillary routes. The supraclavicular approach is the oldest way to accomplish anaesthesia of the brachial plexus. Brachial plexus block is a popular and widely employed regional nerve block of the upper extremity. Pneumothorax (1-6%)^{4,5,6} Hemothorax, Horner's syndrome and phrenic nerve block are the potential complications. Ropivacaine, a long-acting amide local anaesthetic drug has a better safety profile, belonging to the Amino Amine group and causes differential sensory nerve block with a dose dependent motor blockade with reduced cardiotoxic and neurotoxic effects.⁷ Dexmedetomidine a highly selective α_2 adrenoreceptor agonist has been shown to have both sedative and analgesic effects and in combination with local anesthetic agents facilitate better anesthesia and analgesia and also has cardiovascular stabilizing effects.⁷ However, the reports of its use in supraclavicular brachial plexus block are limited. Whereas, fentanyl acts by binding to the opioid sites of the dorsal nerve roots.⁸ The drug based on expected stimuli and the person's responses can result in stable blood pressure and heart rate throughout a procedure and a faster emergence from anesthesia with minimal pain.⁹ However, there is paucity of data regarding comparison of dexmedetomidine and fentanyl along with Ropivacaine in supraclavicular blocks. Therefore, the present study was undertaken to compare dexmedetomidine and fentanyl along with Ropivacaine in Peripheral nerve stimulator guided supraclavicular blocks in patients undergoing upper limb surgeries.

AIM AND OBJECTIVES:

Aim: Comparison of dexmedetomidine and fentanyl along with Ropivacaine in peripheral nerve stimulator guided supraclavicular blocks in patients undergoing upper limb surgeries.

Objectives

- To compare the onset and duration of sensory and motor blockade.
- To compare the duration of post-operative analgesia.
- To compare the intraoperative sedation levels and any side effects with dexmedetomidine and fentanyl

MATERIAL AND METHODS

The present Prospective Randomized Comparative study with simple randomization and a double blinding trial was conducted in the department of Anaesthesia, D.Y. Patil medical college, hospital and research institute, Kolhapur, over two years period. This study was performed after the approval from Institutional Ethics Committee. A total of 9 patients who fulfill inclusion and exclusion criteria were included in the study. Patients age group 18 – 60 years, undergoing elective surgeries of the upper limb with ASA grade 1 and 2 with duration of surgery not extending more than 2 hours. Patients with known allergy to local anaesthetic agents, obese patients with BMI $>35\text{kgm}^2$ (Body weight >100 kg) or with bleeding disorders, peripheral neuropathy, local infection at the site of injection, were excluded. All the 9 patients were randomly divided into 3 groups according to computer-generated random number codes that were placed in a sealed envelope. Each group consisted of 3 patients and were named according to drugs used such as Group Dexmedetomidine, Group Fentanyl, and Group Ropivacaine. Pre-anaesthetic evaluations were performed one day before the surgery. Routine clinical and laboratory investigations were performed on all the patients. On the day of surgery pre-anaesthetic medications Inj. Ondansetron 4mg IV and Inj Ranitidine 50mg IV were given to the subjects, and a standardized protocol was followed. Patients in Group Dexmedetomidine received 28cc of 0.75% Ropivacaine and dexmedetomidine (1mcg/kg) a total volume of 30ml, Group Fentanyl patients received 28cc of 0.75% Ropivacaine and fentanyl (1mcg/kg) a total volume of 30ml, whereas, group plain Ropivacaine patients received 28cc of 0.75% Ropivacaine and 2ml of normal saline, a total volume of 30ml. Under aseptic conditions, brachial plexus block was performed by the nerve stimulator technique. The data regarding haemodynamics such as blood pressure and Heart rate were obtained. In case of bradycardia (HR<50 bpm), patients were administered with inj. Atropine (0.6 mg). In

case of hypotension (<20% from baseline), Inj. Mephentermine 6mg IV was given. The sensory block was assessed using a pin prick test. A modified Bromage scale was used to assess the motor block. Whereas, Ramsay sedation scale was used to assess intraoperative sedation in subjects. Data were collected and entered into a Microsoft excel sheet. Using the SPSS IBM 20 version Appropriate statistical tests were applied. P<0.05 was considered statistically significant.

RESULTS

In this study a total of 11 subjects were enrolled among them 2 patients experienced intraoperative pain (VAS-4). Even after intramuscular administration of Tramadol 100mg, patients experienced pain thus general anaesthesia was given and the procedure was completed and such patients were excluded from the study.

Age and gender distribution

The mean age of the dexmedetomidine group, fentanyl group, and ropivacaine group subjects was 38.12 ± 4.19 years, 41.10 ± 3.21 years, and 40.47 ± 3.01 years respectively. In dexmedetomidine group out of 3 patients 2 were female, in fentanyl group two were male and in ropivacaine groups, two were males. (Table 1)

Intraoperative comparison of Heart Rate

The mean Heart rate in dexmedetomidine, fentanyl, and ropivacaine was 74.25 ± 11.10 bpm, 84.26 ± 5.62 bpm, and 94.36 ± 6.24 bpm respectively. A significant difference was found between the mean Heart rate when compared between the groups ($P=0.0002$). The detailed comparison of mean Heart rate between groups is depicted in table 2.

Incidence of bradycardia and hypotension

Bradycardia and hypotension were observed only in one patient of dexmedetomidine group. Whereas, there was no incidence of bradycardia in fentanyl and ropivacaine group subjects.

Ramsay sedation scale:

A significant difference was found between mean Ramsay sedation score when compared between the groups

(3.4 ± 0.49 vs 3.83 ± 0.37 vs 2.33 ± 0.47 , $P=0.0000$). The detailed comparison of mean Ramsay sedation score between groups is depicted in table 3.

Comparison of onset of sensory block:

The onset of sensory block (SB) in the dexmedetomidine group, fentanyl group, and ropivacaine groups was 3.57 ± 0.50 min, 5.50 ± 0.51 min, and 8.07 ± 0.79 min respectively. A significant difference in the onset of sensory block was found when compared between the groups ($P=0.0000$) (Figure 1).

Comparison of onset of motor block

The onset of motor block (MB) in the dexmedetomidine group, fentanyl group, and ropivacaine groups was 4.47 ± 0.51 min, 7.53 ± 0.51 min, and 10.07 ± 0.79 min respectively. The difference between the onset of motor block in groups was statistically significant ($P=0.0000$) (Figure 2).

Comparison of duration of sensory block

The duration of sensory block in the dexmedetomidine group was 7.57 ± 0.50 hrs which was 5.47 ± 0.51 hrs and 3.43 ± 0.50 hrs in fentanyl and ropivacaine groups respectively. There was a significant difference in the duration of the sensory block when compared between groups ($P=0.0000$) (Figure 3).

Comparison of duration of motor block:

The duration of motor block in the dexmedetomidine group, fentanyl group, and ropivacaine group were 6.57 ± 0.50 hours, 4.47 ± 0.51 hours, and 2.50 ± 0.51 hours respectively. The difference was statistically significant ($P=0.0000$) (Figure 4).

Comparison of the requirement of postoperative analgesia:

The duration at which first postoperative analgesia was required in the dexmedetomidine group, fentanyl group, and ropivacaine group were 8.57 ± 0.50 hours, 6.57 ± 0.50 hours, and 5.30 ± 0.47 hrs respectively. The difference between the groups was statistically significant ($P=0.0000$) (Figure 5).

Table 1: Distribution of groups according to mean age (years) and gender

Groups	Age (years)		Gender	
	Mean	SD	Male	Female
Dexmedetomidine	38.12	4.19	1(33.33%)	2(66.67%)
Fentanyl	41.10	3.21	2(66.67%)	1(33.33%)
Ropivacaine	40.47	3.01	2(66.67%)	1(33.33%)

Table 2: Comparison of mean Heart Rate between groups (bpm)

Groups	Heart Rate(bpm)		P Value
	Mean	SD	
Dexmedetomidine	74.25	11.10	0.0002
Fentanyl	84.26	5.62	
Ropivacaine	94.36	6.24	

Table 3: Comparison of mean Ramsay sedation score between groups

Groups	Ramsay sedation scale		P Value
	Mean	SD	
Dexmedetomidine	3.4	0.49	0.0002
Fentanyl	3.83	0.37	
Ropivacaine	2.33	0.47	

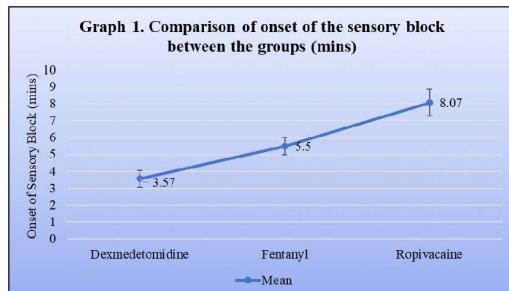
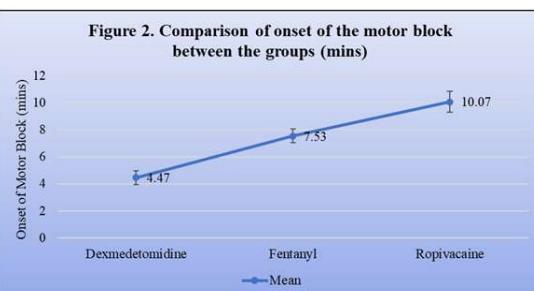
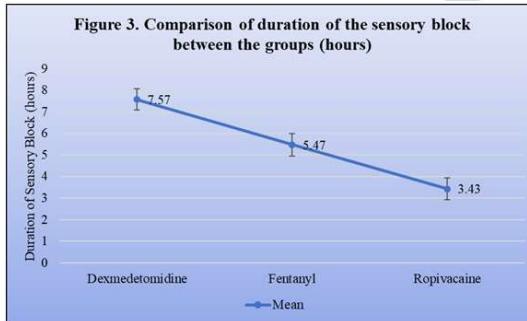
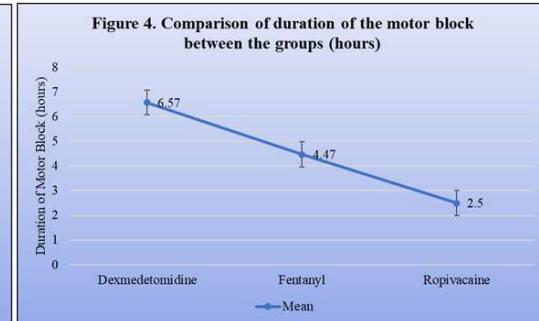
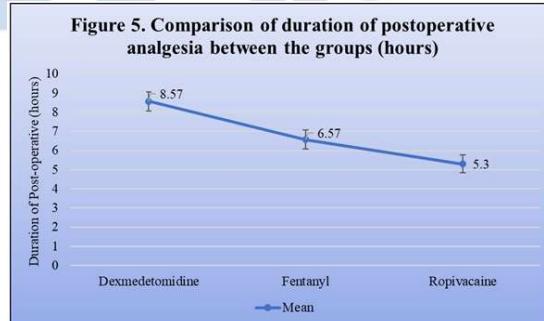
**Figure 1****Figure 2****Figure 3****Figure 4****Figure 5**

Figure 1: Comparison of onset of the sensory block between the groups (mins); **Figure 2:** Comparison of onset of the motor block between the groups (mins); **Figure 3:** Comparison of duration of the sensory block between the groups (hours); **Figure 4:** Comparison of duration of the motor block between the groups (hours); **Figure 5:** Comparison of duration of postoperative analgesia between the groups (hours)

DISCUSSION

The study aimed to compare dexmedetomidine and fentanyl along with ropivacaine in Peripheral nerve stimulator guided supraclavicular blocks in patients undergoing upper limb surgeries and by studying the effects of addition of dexmedetomidine, fentanyl we can have a possibility of newer options to ropivacaine. The significant findings of the study were the onset of sensory and motor block was significantly less in the

dexmedetomidine group compared to the fentanyl group, and ropivacaine group patients ($P=0.0000$). Duration of sensory and motor block was significantly high in the dexmedetomidine group than fentanyl group and ropivacaine group patients ($P=0.0000$). Furthermore, the duration at which first postoperative analgesia required was significantly more in the dexmedetomidine group than in the fentanyl group, and ropivacaine group patients ($P=0.0000$). These findings suggested that

dexmedetomidine combined with ropivacaine has better efficacy in Peripheral nerve stimulator guided supraclavicular blocks.

Age incidence: Here, the average age of the dexmedetomidine group, fentanyl group, and ropivacaine group subjects was 38.12 ± 4.19 years, 41.10 ± 3.21 years, and 40.47 ± 3.01 years respectively. There was no significant difference in age among the groups ($P > 0.05$). Various other studies have reported similar findings. In Dexmedetomidine, Fentanyl and Ropivacaine group, **Sahi P. et al.**¹⁰ had mean age 35.75 ± 10.89 , 36.30 ± 11.20 and 35.75 ± 10.89 years respectively and **Dharmarao PS. et al.**¹¹ had 39.5 ± 13.41 and 38.4 ± 11.35 years respectively.

Intraoperative comparison of Heart Rate: The mean Heart rate in dexmedetomidine, fentanyl, and ropivacaine was 74.25 ± 11.10 bpm, 84.26 ± 5.62 bpm, and 94.36 ± 6.74 bpm respectively. A significant difference was found between the mean Heart rate when compared between the groups ($P = 0.0002$). The detailed comparison of mean Heart rate between groups is depicted in table 2.

Comparison of gender predominance among studies: In dexmedetomidine group out of 3 patients 2 (66.7%) were female, in fentanyl group two (66.7%) were male and in ropivacaine groups also, two (66.7%) were males. Previous studies have shown variable gender predominance that may be due to differences in the inclusion and exclusion criteria of the studies. In Dexmedetomidine, Fentanyl and Ropivacaine group, **Sahi P. et al.**¹⁰ had 65%, 67.5% and 70% males respectively and **Dharmarao PS. et al.**¹¹ had 57.5% males and 55% females respectively.

Intraoperative bradycardia and hypotension: In this study, bradycardia and hypotension was noted in one patient of dexmedetomidine group. Whereas, in fentanyl and ropivacaine group subjects no incidence of intraoperative bradycardia and hypotension was observed. In the study **Hamed MA. et al.**¹² the incidence of bradycardia and hypotension was reported in $n=2$ patients. Whereas, **Dai W. et al.**¹³ suggested no incidence of bradycardia and hypotension. The difference in the results may be due to type and duration of the study.

Sedation: In this study sedation was assessed using the Ramsay sedation score. The mean sedation score in fentanyl group patients (3.83 ± 0.37) significantly more compared to ropivacaine (2.33 ± 0.47) and dexmedetomidine (3.4 ± 0.49) ($P = 0.0000$). Moreover, dexmedetomidine group patients predominantly had grade 3 sedation score. These findings are comparable with the study of **Swaro SW et al.**¹⁴

The onset of sensory and motor block: The patients administered with dexmedetomidine adjunctive to the ropivacaine showed significantly rapid onset of sensory and motor block compared to the fentanyl adjunctive and

ropivacaine alone ($P < 0.0000$). These findings are comparable with **Sahi P. et al.**¹⁰ Moreover, **Sudani C. et al.**¹⁵ and **Khemka V. et al.**¹⁶ also showed significant rapid onset of sensory and motor block in the ropivacaine with dexmedetomidine group compared to ropivacaine alone group subjects. However, **Dharmarao PS. et al.**¹¹ suggested an insignificant difference in the onset of sensory and motor block in the dexmedetomidine and fentanyl group. The rapid onset of sensory and motor block in the ropivacaine along with dexmedetomidine group may be due to its selective effect on sensory and motor nerves. These findings suggested that dexmedetomidine addition to ropivacaine improves the onset of sensory and motor block.

Duration of sensory and motor block: In this study, we found that the duration of sensory and motor block was significantly more in patients administered with Ropivacaine adjunctive with dexmedetomidine (7.57 ± 0.50 hours and 6.57 ± 0.50 hours) compared with fentanyl adjuvant (5.47 ± 0.51 hours and 4.47 ± 0.51 hours) and ropivacaine alone (3.43 ± 0.50 hours and 2.50 ± 0.51 hours) ($P = 0.0000$). Similarly, These findings are comparable with **Sahi P. et al.**¹⁰ **Rancourt et al.**¹⁷ performed a prospective, randomized, controlled, double-blind, crossover trial in 14 healthy volunteers to study the effect of ropivacaine alone and in combination with dexmedetomidine. They reported a prolonged duration of sensory block in patients treated with combination drugs. Similarly, **Chinnappa J. et al.**¹⁸ showed increased duration of sensory and motor block in patients who received ropivacaine and dexmedetomidine compared to those treated with ropivacaine alone. Furthermore, **Dharmarao PS. et al.**¹¹ depicted a better duration of sensory and motor block in dexmedetomidine with the ropivacaine group than fentanyl with the ropivacaine group. These findings suggest that dexmedetomidine adjunctive to ropivacaine has a prolonged duration of sensory and motor block.

Duration of postoperative analgesia: In this study, the duration of postoperative analgesia was significantly more in patients administered with ropivacaine combined with dexmedetomidine compared to fentanyl adjuvant to ropivacaine and ropivacaine alone groups. Various studies have shown similar results. **Sahi P. et al.**¹⁰ shows that in Dexmedetomidine, Fentanyl and Ropivacaine group, mean duration of postoperative analgesia (hours) was 619.92 ± 21.67 , 559.82 ± 21.66 and 505.57 ± 19.24 hours respectively, having significant differences with p value < 0.05 . **Sharma S et al.**¹⁸ study also shows duration of postoperative analgesia was significantly more in Dexmedetomidine group (1193.80 ± 223 hours) comparative to Ropivacaine group (828.23 ± 136.30 hours) ($p < 0.05$). Similarly, **Dash LK. et al.**¹⁹ study also shows duration of postoperative analgesia was significantly more

in Dexmedetomidine group (338.16 ± 10 hours) comparative to Ropivacaine group (247.20 ± 12 hours) ($p < 0.05$). These findings suggest that dexmedetomidine adjunctive to ropivacaine has prolonged duration of postoperative analgesia.

The study was undertaken to compare dexmedetomidine and fentanyl along with ropivacaine in peripheral nerve stimulator guided supraclavicular blocks in patients undergoing upper limb surgeries. The study indicates dexmedetomidine adjunctive to ropivacaine produces early onset of sensory and motor block, prolonged duration of sensory and motor block, and long postoperative analgesia compared to fentanyl combined with ropivacaine and ropivacaine alone. The strength of the study was the uniform application of the protocol. Moreover, we claim less bias in the study due to the study type. An important limitation of the study was the volume of local anaesthetic used. The volume used in our study was quite high though there were no side effects of such doses noted. The block could have been done with low volume. The use of ultrasound could have helped identify the plexus with a higher degree of accuracy and could have resulted in the use of a lower volume of drug which was unlike what happened in our study. In this study haemodynamic parameters were evaluated. Further, a multicentre study with a sufficient sample size assessing different dosages of drugs including all variables is the recommendation of the study.

CONCLUSION

The study aimed to compare dexmedetomidine and fentanyl along with ropivacaine in Peripheral nerve stimulator guided supraclavicular blocks in patients undergoing upper limb surgeries. The onset of sensory and motor block was significantly rapid in Ropivacaine with dexmedetomidine group subjects. The duration of sensory and motor block was significantly more in Ropivacaine with dexmedetomidine group subjects. Duration of postoperative analgesia was significantly more in Ropivacaine with dexmedetomidine group subjects. Dexmedetomidine and fentanyl increase readiness for surgery. However, dexmedetomidine is better as an adjuvant to ropivacaine for brachial plexus block.

REFERENCES

- Sreelakshmi V, Naveen Kumar BT, Vijayadurga S. Comparative study of the effect of addition of dexmedetomidine as an adjuvant to local anaesthetics in supraclavicular brachial plexus block. *J. Evid. Based Med. Healthc.* 2019; 6(12), 1032-1037.
- Borgeat A, Kalberer F, Jacob H, Ruetsch YA, Gerber C. Patient controlled interscalene analgesia with ropivacaine 0.2% versus bupivacaine 0.15% after major open shoulder surgery: the effects on hand motor function. *Anesth Analg.* 2001;92:218-23.
- Chinnappa J, Shivanna S, Pujari VS, Anandaswamy TC. Efficacy of dexmedetomidine with ropivacaine in supraclavicular brachial plexus block for upper limb surgeries. *J Anaesthesiol Clinic Pharmacol* 2017;33:81-5.
- Moore D: Supraclavicular approach for block of the brachial plexus, in Moore D(ed): Regional block. A handbook for use in the clinical practice of medicine and surgery, 4th ed. Springfield, Charles C Thomas Publisher, 1981; pp 221-42.
- Lanz E, Theiss D, Jankovic D: The extent of blockade following various techniques of brachial plexus block. *Anesth Analg* 62:55-8, 1983.
- Urmey W: Upper extremity blocks, in Brown D (ed): Regional anesthesia and analgesia. Philadelphia, W.B. Saunders Company, 1996; pp 254-78.
- Neelesh Nema, HarivallabhBadgaiyan, Sunil Raskaran, Shweta Kujur, Pooja Vaskle, MahendraMujalde, et al. "Effect of Addition of Dexmedetomidine to Ropivacaine Hydrochloride (0.75%) in Brachial Plexus Block through Supraclavicular Route in Upper Limb Surgeries: A Clinical Comparative Study". *Journal of Evolution of Medical and Dental Sciences* 2014; Vol. 3, Issue 55, October 23; Page: 12612-12621.
- Chen EY, Marcantonio A, Tornetta P. Correlation between 24-hour pre discharge opioid use and amount of opioids prescribed at hospital discharge. *JAMA surgery*. 2018 Feb 1;153(2):e174859-.
- Miller RD, Eriksson LI, Fleisher LA, Wiener-Kronish JP, Cohen NH, Young WL. Miller's anesthesia e-book. Elsevier Health Sciences; 2014 Oct 20.
- Sahi P, Kumar R, Sethi C, Gupta N, Singh A, Saxena P. Comparative evaluation of the effects of fentanyl and dexmedetomidine as an adjuvants in supraclavicular brachial plexus block achieved with ropivacaine. *Int J Con Med Res.* 2018;5(1):25-9.
- Dharmarao PS, Holyachi R. Comparative study of the efficacy of dexmedetomidine and fentanyl as adjuvants to ropivacaine in ultrasound-guided supraclavicular brachial plexus block. *Turkish Journal of Anaesthesiology and Reanimation.* 2018 Jun;46(3):208.
- Hamed MA, Ghaber S, Reda A. Dexmedetomidine and fentanyl as an adjunct to bupivacaine 0.5% in supraclavicular nerve block: a randomized controlled study. *Anesthesia, essays and researches.* 2018 Apr;12(2):475.
- Dai W, Tang M, He K. The effect and safety of dexmedetomidine added to ropivacaine in brachial plexus block: A meta-analysis of randomized controlled trials. *Medicine.* 2018 Oct;97(41).
- Swaro SW, Karan DA, Banerjee SW. Comparison of fentanyl and dexmedetomidine as an adjuvant to bupivacaine in supraclavicular brachial plexus block: a randomized-double blind prospective study. *Asian J Pharm Clin Res.* 2016;9(5):74-7.
- Sudani C, Rao SM, Munta K. A comparative study of ropivacaine alone versus ropivacaine with dexmedetomidine in supraclavicular brachial plexus block. *Anesthesiol Open J.* 2016;1(1):28-34.
- Khemka V, Jadeja PD. Comparative study of ropivacaine with dexmedetomidine versus ropivacaine alone in

- supraclavicular brachial plexus block for upper limb surgery. International Journal of Scientific Study. 2017;5(6):74-80.
17. Rancourt MP, Albert NT, Côté M, Létourneau DR, Bernard PM. Posterior tibial nerve sensory blockade duration prolonged by adding dexmedetomidine to ropivacaine. AnesthAnalg. 2012;115:958–62.
18. Sharma S, Shrestha A, Koirala M. Effect of Dexmedetomidine with Ropivacaine in Supraclavicular Brachial Plexus Block. Kathmandu Univ Med J. 2019;67(3):178-83.
19. Dash LK, Raghu K, Rajaram G. Ropivacaine with dexmedetomidine versus ropivacaine alone in ultrasonography-guided supraclavicular brachial plexus block: A comparative study. Journal of Datta Meghe Institute of Medical Sciences University. 2021 Jan 1;16(1):154.

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