Original Article ISSN (O):2395-2822; ISSN (P):2395-2814

Ultrasound Guided Interscalene Block & Shoulder Block for Postoperative Analgesia for Shoulder Surgeries

M V Kameswar Rao[1], Kamala Kanta Pradhan[2]

[1]Associate Professor, Department of Raiodiagnosis, M. K. C. G Medical College, Berhampur, Odisha, India.
[2]Assistant Professor, Department of Anaesthesiology and critical care, SCB Medical College, Cuttack, Odisha, India.

Received: June 2019
Accepted: July 2019

ABSTRACT

Background: Shoulder arthroscopic surgeries can produce intense postoperative pain. Interscalene block provides good analgesia after shoulder surgery, but concerns over its associated risks have prompted the search for alternatives. Suprascapular block along with axillary nerve block was recently proposed as an alternative to interscalene block, but evidence of its comparative efficacy is conflicting. The aim of our study was to compare suprascapular and axillary nerve blocks with interscalene block in shoulder surgery for postoperative analgesia. **Methods:** A total of 76 patients scheduled for shoulder arthroscopic surgery were equally divided into two groups of 38patients each: Interscalene (ISB) group and suprascapular with axillary nerve (SHB) group. Both the nerve block was achieved by both ultrasound and nerve stimulator guidance. Visual analogue scale score was evaluated at 1, 4, 6, 12, and 24 h postoperatively. The time to first analgesia request, total analgesic requirement for 24 hr postoperatively, patient satisfaction, and any complications were recorded. **Results:** SHB provided equivalent analgesia to ISB in terms of post operative VAS scores.Time to 1st analgesia request was 7.2±1.3 hr in ISB group and 5.9±1.2 hr in SHB group which was not statistically significant.Patient satisfaction scores were significantly higher in SHB group compared to ISB group. Complication like subjective dyspnea and weakness of arm was significantly higher in ISB group compared to SHB group. **Conclusions:** SHB was as effective as ISB for postoperative pain relief but with fewer complications due to selective blockade of suprascapular and axillary nerve.

Keywords: Interscalene block, shoulder arthroscopy, suprascapular block, axillary block.

1

INTRODUCTION

Shoulder arthroscopy is a minimally invasive, ambulatory surgery useful for treating a variety of shoulder pathologies. But it has been associated with severe intraoperative and postoperative pain, capable of causing interference with recovery and rehabilitation of the shoulder and ultimately causing significant discomfort to the patient.[1]

Of all blocks for shoulder surgery, the interscalene block is the most widely used block which has been reported to provide excellent post-operative analgesia but it comes at the cost of certain side effects like phrenic nerve paralysis and resulting diaphragmatic paralysis causing distress to the patient. Other complications associated with ISB are weakness of arm, hoarseness and horners syndrome.[2]

This necessitates the finding of a block that provides similar analgesic efficacy to the ISB but it attenuates the complications accompanied by the block. So, instead of the ISB, targeting the selective nerve supply to the shoulder may be a better alternative. The suprascapular nerve supplies about 60-70% of the shoulder joint & axillary nerve supplies about 25 – 30% of the shoulder joint.[3] The suprascapular nerve supplies sensation for most of the posterior, medial, and superior part of the shoulder joint capsule. It also supplies the supraspinatous and infraspinatous muscles of the rotator cuff and some branches to the teres minor, the glenoid, acromion, and the posterior surface of the scapula.[4] The anterior, lateral, and inferior structures of the shoulder joint are supplied by the axillary nerve, which also supplies the deltoid muscle and gives some fibers to the teres minor. The axillary nerve also supplies the skin overlying the deltoid muscle.[5] The use of ultrasound and nerve stimulator in performing both blocks provided better visualization and localization of the nerves, resulting in successful blockade with fewer complications.[6] So instead of the ISB , combined block of these two nerve can be used to block the shoulder joint for postoperative analgesia. But there is conflicting view in literature regarding the efficacy of ISB and combined block of suprascapular nerve and axillary nerve. So we have done this study to compare both blocks for postoperative analgesia after shoulder surgery.

Name & Address of Corresponding Author
Dr Kamala Kanta Pradhan
Assistant Professor,
Department of Anaesthesiology and critical care,
SCB Medical College,
Cuttack, Odisha,
India.

Primary aim of our study was to compare the analgesic efficacy of the ISB and combined block of suprascapular nerve and axillary nerve in terms of post operative VAS scores recorded at 60 mins, 4 hrs, 12 hrs and 24 hrs after surgery. The secondary outcome is to study the time for 1st analgesia request, total analgesic consumption and no of patient requiring analgesia in 24 hrs, patient satisfaction score and incidence of complications. We hypothesized that, the specific blockade of the suprascapular and axillary nerves (SHB) using ultrasound guidance with nerve stimulation may be as effective as ISB for postoperative pain relief after shoulder arthroscopy, but with fewer side effects. SHB provides equivalent analgesia to ISB for pain relief after shoulder arthroscopy with minimal side effects.

MATERIALS & METHODS

The study was conducted after obtaining approval from the ethical committee in a tertiary care hospital. The study included adults of 18-40 yrs, ASA I/II, undergoing unilateral shoulder arthroscopy who have consented to the procedure. Patients having BMI > 35 kg/m2, mental illness, COPD or any respiratory disease, coagulopathy, prior trauma, neuropathy, myopathy, and chronic opioid users (>6moths) were excluded from the study.

A total of 76 patients were recruited after satisfying the inclusion criteria. They were randomly allocated into one of the two groups (i.e. ISB or SHB group) using a computer generated sequence of random numbers and all results were kept in a sealed in an opaque envelope to be opened by the block performing anesthesiologist prior to the study. The study undertaken was a randomized, parallel, single blind trial. In this study the observer who recorded all the post surgery observations was blinded to the study.

In the night before the surgery the patients were explained regarding the type of procedure, risk and benefits involved in the study and written consent was obtained. The patient was explained regarding the VAS scale and the score was assessed after verbal communication from the patient.[7]

An intravenous access was achieved and all routine monitoring techniques (i.e. NIBP, SpO2, ECG was done. Patients were sedated with midazolam (0.05mg/kg) and pentazocine (0.3-0.5 mg/kg). Baseline sensory assessment was done over the to be operated shoulder (C4 –top of the shoulder, C5 – lateral shoulder, C6 – thumb , C7 – third finger, C8 – fourth finger).[8] For all purposes, a GE logiqF8 (General Electric Healthcare, Little Chalfont, United Kingdom) with a high frequency (6-15 MHZ) 38mm L6-12 linear probe was used.

Ultrasound guided interscalene block

The patient was positioned supine with face turned away from the side of the block and the neck slightly extended. Interscalene block was performed according to a technique described by Spence et al,[9] and assisted with nerve stimulation. An in plane puncture through the middle scalene muscle was done using a 50 mm nerve block needle (B.Braun Medical Inc. Bethlehem, Pennsylvenia, USA). The C6 root was identified and the tip of the needle was kept infero posterior to it. After confirming extravascular placement of the needle using Doppler and observing contraction of the deltoid at a maximum threshold current of 0.6mA, (pulse width 0.1msec, frequency 2HZ), 10 ml of 0.75% ropivacaine was injected into the groove.

Visualization of structures were analysed according to a five point scale ; very good – clearly visible roots as monofascicular or bifascicular pattern; good – identifiable but pattern not clear; acceptable – nerve root though not clear but can be discriminated from muscle; poor- differentiation is not clear but with contrast can be discriminated; very poor – no structures are visible.

Ultrasound guided shoulder block

The patient was positioned in a semi recumbent position with the operating arm on the contralateral shoulder. Suprascapular nerve (SN) block were performed according to the method described by Harmon Hearty et al,[10] and Peng et al,[11] the probe was kept over the scapular spine to identify the trapezius and the supraspinatous muscle. Then it was moved laterally to identify the concavity of the supraspinatous fossa and the hyperechoic fascia of the supraspinatous muscle. In the concavity of the fossa the suprascapular artery and the suprascapular nerve run in close proximity. A 50 mm nerve block needle (B.Braun Medical Inc. Bethlehem, Pennsylvenia, USA) was used in the long axis view for the block. After confirming extravascular placement of the needle and stimulation of the supraspinatous and infraspinatous muscles with a current of 0.6 mA, pulse width 0.1 mSec, frequency 2 HZ, 10 ml of 0.75% ropivacaine was injected below the supraspinatous fascia.

The patient was positioned in semi recumbent position with the arm slight flexed and adducted at the elbow. Axillary nerve (AN) block was performed by a technique described by Price et al.[12] The posterior surface of humerus was visualized in SAX. The AN & PCA were visualized longitudinally.A 50 mm nerve block needle (B.Braun Medical Inc. Bethlehem, Pennsylvenia, USA) was used for the procedure. After confirming extravascular placement of the needle and observing deltoid response to a stimulation of 0.6 mA, pulse width 0.1 mSec, frequency 2 HZ, 10 ml of 0.75% ropivacaine was injected into the space.

Visualization of structures were graded according to a five point scale ; very good – artery identified as a round pulsating structure ; good – just arterial pulsation visible; acceptable- pulsation visible within the muscle , Doppler needed to be used for confirmation; poor – identification done using reference landmarks; poor – nothing s visible.
To maintain a strict observer blinding, whether used or not all the three sites of block were covered with surgical dressing prior to inspection.

Post block evaluation

After performing the nerve blocks, block assessment was done every every 5 minutes until 30 mins to ensure completeness of the block. For the interscalene block, sensory block was assessed by pin prick sensation over the lateral side of forearm and thumb. Motor block was assessed by asking the patient to abduct the arm and flex the forearm against resistance. For the shoulder block, sensory block assessment was done the skin covering the posterior part of deltoid. Motor block assessment was done by asking the patient to abduct the shoulder against resistance against flexed arm at 30 degrees and elbow flexion at 90 degrees. All patients were assessed on a 4 point scale and any score >1 or change in baseline haemodynamics>30% while assessing the block was considered a failure and excluded from the study.
All patients received GA using glycopyrolate (0.005mg/kg), induced with propofol (1-2 mg/kg), atracurium (0.5 -0.7 mg/kg) and sevoflurane at MAC 1. Endotracheal tube was given and controlled ventilation was done. No analgesics were provided intraopertively and Ondansetron (4mg) was given to all patients. All patients were extubated successfully and were received by a nurse blinded to the study. All results were recorded by an observer who was blinded to the study. Mean VAS scores at rest at 1hr, 4hrs, 6hrs, 12hrs, 24 hours after surgery, time required for first rescue analgesia, number of patients requiring rescue analgesia, total dose of rescue analgesia required, incidence of subjective dyspnoea, hoarseness of voice, weakness of arm, horner's syndrome, PONV and patient satisfaction. Patient satisfaction: the following day after theoperation the patients were evaluated with a questionnaire on a 10-point scale to assess the patient satisfaction about the procedure 24 hpostoperatively (from 0 = not satisfi ed to 10 = fullysatisfi ed).[12]

Based on a previous study,[13] we assumed an SD of the VAS scores of 1.5 in both technique on the first postoperative day. The required sample size for each group was thus determined to be at least 35, taking $\alpha = 0.05$ and power = 0.90. To account for a possible 10% loss to follow-up, the sample size was inflated to 38 participants per group. Block characteristics were evaluated using a $\chi 2$ test or Fisher exact test 2-sided for frequencies and a Mann-Whitney U test for continuously scaled data. $P < 0.05$ was considered statistically significant

RESULTS

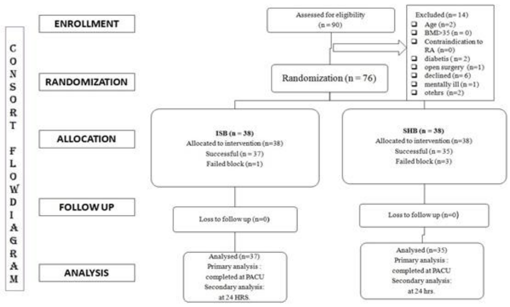

Figure 1: shows consort flow diagram of patient selection and dropouts.In ISB group there was 1 failed block and in SHB group there was 3 failed block.

The demographic data and duration and type of surgery were comparable between the two groups (P > 0.05) [Table 1].

Table 1: Demographic parameters

		Interscalene block (ISB)	Suprascapular with axillary block (SHB)
Age (years)		37.694 ± 13.648	37.055 ± 12.648
Sex, n(%)	Female	8(21.62%)	6(17.14%)
	Male	29(82.85%)	29(82.85%)
ASA,n(%)	ASA I	25(67.56%)	29(82.85%)
	ASA II	10(27.02%)	5(14.28%)
	ASA III	2(5.4%)	1(2.85%)
BMI (kg/m^2)		25.083 ± 3.483	26.027 ± 3.629
Preop VAS Scores		4.183 ± 1.847	4.227 ± 1.981
Surgical Procedure, n(%)			
Rotator Cuff repair		19(51.35%)	19(54.28%)
Decompression+Rotator Cuff repair		5(13.51%)	5(14.28%)
Decopmpression+Biceps Tenodesis(BT)		4(10.81%)	4(11.42%)
Bankart repair		9(24.32%)	7(20.0%)

Figure 2: Postoperative mean VAS score

There was no statistical difference in VAS score at different time intervals in both groups. (p>0.05) [Figure 2]

Table 2: Time to 1st analgesia request and analgesic consumption in 24 hrs

Parameters	ISB Group(n=37)	SHB Group(n=35)	P value
Time to 1st analgesia request(hrs)	7.2±1.3	5.9±1.2	p>0.05
Total analgesic consumption in 24 hrs(gram)	2.8±0.9	3.0±1.1	p>0.05

Ultrasound guided SHB provided equivalent analgesia to ISB in terms of post-operative pain scores. Difference in time to 1st analgesia request and IV Paracetamol consumption was not significant during 24 hours post operatively. [Table 2]

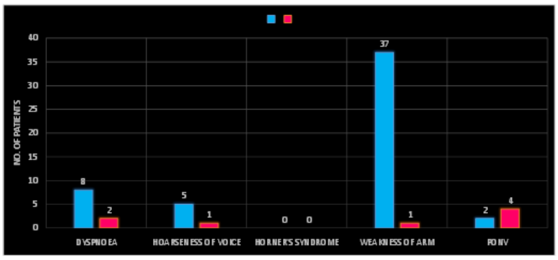

Figure 3: Complications

In the current study, incidence of dyspnea and discomfort relating to muscle weakness of the operated arm was significant in the ISB group compared to SHB group. In contrast, in the SHB group motor functions of the arm and the shoulder girdle was preserved. The SHB group had the lowest incidence of complications compared with the other groups. In the ISB group there complications like Horner's syndrome, which appeared with the onset of the block in 1 patient who was reassured about its benign nature and that it will disappear with time without any sequelae. No patient in the two groups developed pneumothorax. [Figure 3]

Figure 4: Satisfaction Score.

Overall patient satisfaction scores were statistically significant in the SHB compared to ISB group. [Figure 4]

DISCUSSION

In the current study, ultrasound-guided suprascapular with axillary nerve block (SHB) when compared to ISB, provided equivalent analgesia in the immediate postoperative period after arthroscopic shoulder surgery. The time to first analgesic request was significantly longer in both groups. There was no difference in the total dose of paracetamol consumption in 24 hrs. Patient satisfaction was significantly higher in the SHB group compared in the ISB group. The incidence of complications like dyspnea and weakness of arm was significantly higher in the ISB group compared with the other group. The shoulder rotator cuff consists of tendons from four muscles: supraspinatus, infraspinatus, subscapularis, and teres minor. The suprascapular nerve is responsible for supplying 70% of sensory and motor coordination, which includes the upper, medial, and posterior joint regions, posterior capsule, acromioclavicular joint, subacromial bursa, and coracoclavicular ligament and, variably, the skin around these regions.[14] The axillary nerve complements the main innervation, positioned laterally to the radial nerve and entering the quadrangular space, where it divides into two branches: the anterior branch innervates the middle and anterior portion of the deltoid muscle and the posterior branch innervates the teres minor and the posterior fibers of this muscle and terminates as the arm lateral superior cutaneous nerve.[15] Compared to the interscalene blockade, which blocks(C5,C6 nerve root) the entire shoulder girdle and upper limb, the selective block is limited to the supraspinatus, infraspinatus, and teres minor muscles, preserving the arm, forearm, and hand muscles.[15] Subscapularis muscle and the anterior glenohumeral joint capsule, supplied by the subscapular nerve, are not anesthetized by the selective technique. So the sensory innervation of the shoulder originates primarily from the axillary nerve and subscapular nerve but may also involve limited contributions from the subscapular nerves (C5 and C6), the lateral pectoral nerves (C5, C6, and C7), and the musculocutaneous nerves (C5, C6, and C7).[16] The present study used suprascapular and axillary nerve blockade (ShB) as an alternative to ISB and found that it was safe and effective in producing postoperative analgesia with minimal complications. Also, using combined ultrasound and nerve stimulator as guidance for the blockade facilitates the direct visualization and localization of the neural structure, which allows better local anesthesia disposition around the roots of the plexus and the peripheral nerves, thus improving the success of block performance and reducing the complications of each blockade. Our findings agrees with previous trials by Pitombo et al,[17] and Dhir et al.[18] Pitambo et al concluded that both techniques are safe, effective, and with the same degree of satisfaction and acceptability. The selective blockade of both nerves showed satisfactory analgesia, with the advantage of providing motor block restricted to the shoulder.

Dhir et al concluded that Combined suprascapular and axillary nerve block provides nonequivalent analgesia compared with ISB after arthroscopic shoulder surgery.[18] In our study, the incidence and discomfort related to muscle weakness were most pronounced in ISB group. Recent study recommended lowering the concentration of ropivacaine for ISB in order to minimize motor block and increase patient satisfaction. In contrast, the literature on suprascapular block generally advocates a higher ropivacaine concentration. Thus, to minimize study heterogeneity, we opted to use 0.75% ropivacaine in both groups.[19,20] Zanfaly et al in their study concluded that SHB was as effective as ISB for postoperative pain relief but with fewer complications.[21] Thus, SHB is a good alternative for patients at high risk for adverse events with ISB which was similar to our study.

Wiegel M. et al studied patients undergoing arthroscopic shoulder surgery under general anesthesia, and concluded that the suprascapular block seems preferable to ISB.[22] It provides excellent postoperative analgesia without exposing patients to impaired mobility and to risks of the more potent but also more invasive ISB which was similar to ours. Hussain et al in his review suggests that there are no clinically meaningful analgesic differences between suprascapular block and interscalene block except for interscalene block providing better pain control during recovery room stay; however, suprascapular block has fewer side effects.[23] These findings suggest that suprascapular block may be considered an effective and safe interscalene block alternative for shoulder surgery. Our study was also similar to study by Lee SM et al,[13] and Dechroches et al,[24] and Lee JJ et al.[25] In a recently published study by Neutus et al, they concluded that Suprascapular-axillary nerve block is inferior to ISB in terms of analgesia and opioid requirement in the immediate period after arthroscopic shoulder surgery but is associated with a lower incidence of dyspnea and discomfort.[26] The difference in pain and opioid consumption gradually decreases as the blocks wear off in order to reach similar pain scores during the first postoperative night and at 24 hours. Our study contains some limitations. First, because of the different number of injections, patients could not be blinded to group allocation. Second, dyspnea was reported with an NRS. Admittedly, the latter constitutes a subjective approach that lacks sensitivity and specificity to diagnose phrenic nerve palsy. Third, all blocks were performed by an experienced anesthesiologist. Block success inherently depends on technical expertise, and success rate may be different in the hands of trainees. Also this study did not measure the cortisol level intraoperatively to assess the stress response and the analgesic effect of the block, which needs further research.

CONCLUSION

Our data demonstrate that, in the postoperative period after arthroscopic shoulder surgery, SHB is equivalent to ISB in reducing postoperative pain and analgesic consumption but is associated with a lower incidence of dyspnea and weakness of arm resulting in patient discomfort.

REFERENCES

1. Kumara AB, Gogia AR, Bajaj JK, Agarwal N: Clinical evaluation of post-operative analgesia comparing suprascapular nerve block and interscalene brachial plexus block in patients undergoing shoulder arthroscopic surgery. J Clin Orthop Trauma 2016; 7:34–9.
2. Abdallah FW, Halpern SH, Aoyama K, Brull R. Will the real benefits of single-shot interscalene block please stand up? A systematic review and meta-analysis. Anesth Analg. 2015;120:1114–1129.
3. Chang KV, Wu WT, Hung CY, Han DS, Yang RS, Chang CH, Lin CP: Comparative effectiveness of suprascapular nerve block in the relief of acute post-operative shoulder pain: A systematic review and meta-analysis. Pain Physician 2016; 19:445–56.
4. Fernandes MR, Barbosa MA, Sousa AL, Ramos GC: Suprascapular nerve block: Important procedure in clinical practice. Rev Bras Anestesiol 2012; 62:96–104.
5. Tran DQ, Elgueta MF, Aliste J, Finlayson RJ: Diaphragmsparing nerve blocks for shoulder surgery. Reg Anesth Pain Med 2017; 42:32–8.
6. Chapman GA, Johnson D, Bodenham AR. Visualisation of needle position using ultrasonography. Anaesthesia 2006;61:148–58.
7. Gallagher EJ, Liebman M, Bijur PE: Prospective validation of clinically important changes in pain severity measured on a visual analog scale. Ann Emerg Med 2001; 38:633–8
8. Wiegel M, Moriggl B, Schwarzkopf P, Petroff D, Reske AW.Anterior Suprascapular Nerve Block Versus Interscalene Brachial Plexus Block for Shoulder Surgery in the Outpatient Setting: A Randomized Controlled Patient- and Assessor-Blinded Trial. Reg Anesth Pain Med. 2017 May/Jun;42(3):310-318.
9. Spence BC, Beach ML, Gallagher JD, Sites BD. Ultrasound-guided interscalene blocks: understanding where to inject the local anaesthetic. Anaesthesia. 2011;66:509–514.
10. Harmon D, Hearty C. Ultrasound-guided suprascapular nerve block technique. Pain Physician. 2007;10:743–746.
11. Peng PW, Wiley MJ, Liang J, Bellingham GA. Ultrasound-guided suprascapular nerve block: a correlation with fluoroscopic and cadaveric findings. Can J Anaesth. 2010;57:143–148.
12. Price DJ1.The shoulder block: a new alternative to interscalene brachial plexus blockade for the control of postoperative shoulder pain. Anaesth Intensive Care. 2007 Aug;35(4):575-81.
13. Lee SM, Park SE, Nam YS, et al. Analgesic effectiveness of nerve block in shoulder arthroscopy: comparison between interscalene, suprascapular and axillary nerve blocks. Knee Surg Sports Traumatol Arthrosc. 2012;20: 2573–2578.
14. Moote C, Li M, Miniaci A. A random double blind comparison of intra-articular bupivacaine and placebo for analgesia after outpatient shoulder arthroscopy. Anesthesiology. 1994;81:A49.
15. Liu SS, Gordon MA, Shaw PM, Witfred S, Shetty T, Yadeau JT.A prospective clinical registry of ultrasound-guided regional anesthesia forambulatory shoulder surgery. Anesth Analg 2010; 11: 617–623.
16. Checcucci G, Allergra A, Bigazzi P, Gianesello L, Ceruso M, Gritti G.A new technique for regional anesthesia for arthroscopic shoulder surgerybased on a suprascapular nerve block and an axillary nerve block: anevaluation of the first results. Arthroscopy 2008; 24:689–696.
17. Price D, Abeysekera M, Chaddock M: A randomised comparison of combined suprascapular and axillary (circumflex) nerve block with interscalene block for postoperative analgesia following arthroscopic shoulder surgery. Anaesthesia and Intensive Care Journal; 2012; 40:183–4.

18. Pitombo PF, Barros RM, Matos MA, Módolo NS. Selective suprascapular and axillary nerve block provides adequate analgesia and minimal motor block. Comparison with interscalene block. Braz J Anesthesiol. 2013;63:45–51.
19. Dhir S, Sondekoppam RV, Sharma R, Ganapathy S, Athwal GS. A comparison of combined suprascapular and axillary nerve blocks to interscalene nerve block for analgesia in arthroscopic shoulder surgery: an equivalence study. Reg Anesth Pain Med. 2016; 41:564–571.
20. Shin YDS, Han JS: The effect of sono-guided brachial plexus block on postoperative pain control for arthroscopic shoulder surgery: Comparison with general anesthesia. Anesth Pain Med 2010; 5:183–6.
21. Chan CW, Peng PW: Suprascapular nerve block: A narrative review. Reg Anesth Pain Med 2011; 36:358–73.
22. Barber FA: Suprascapular nerve block for shoulder arthroscopy.Arthroscopy 2005; 21:1015
23. Feigl GC, Anderhuber F, Dorn C, Pipam W, Rosmarin W, Likar RModified lateral block of the suprascapular nerve: a safe approach and how much to inject? A morphological study. Reg Anesth Pain Med. 2007 Nov-Dec;32(6):488-94.
24. Singelyn FJ, Seguy S, Gouverneur JM.Interscalene brachial plexus analgesia after open shoulder surgery: continuous versus patient-controlled infusion. Anesth Analg. 1999 Nov;89(5):1216-20.
25. Urmey W.F., Gloeggler P.J. Pulmonary function changes during interscalene brachial plexus block: effects of decreasing local anesthetic injection volume. Reg Anesth. 1993;18:244–249
26. Zanfaly H, Aly A: Shoulder block versus interscalene block for postoperative pain relief after shoulder arthroscopy. Ain-Shams Journal of Anaesthesiology 2016; 9:296–303.
27. Desroches A, Klouche S, Schlur C, Bauer T, Waitzenegger T, Hardy P. Suprascapular Nerve Block Versus Interscalene Block as Analgesia After Arthroscopic Rotator Cuff Repair: A Randomized Controlled Noninferiority Trial.Arthroscopy. 2016 Nov; 32(11):2203-2209.
28. Lee JJ, Kim DY, Hwang JT, et al. Effect of ultrasonographically guided axillary nerve block combined with suprascapular nerve block in arthroscopic rotator cuff repair: a randomized controlled trial. Arthroscopy. 2014;30:906–914.
29. Neuts A, Stessel B, Wouters PF, Dierickx C, Cools W, Ory JP et al. Selective Suprascapular and Axillary Nerve Block Versus Interscalene Plexus Block for Pain Control After Arthroscopic Shoulder Surgery: A Noninferiority Randomized Parallel-Controlled Clinical Trial. Reg Anesth Pain Med. 2018 Oct;43(7):738-744.

How to cite this article: Rao MVK, Pradhan KK. Ultrasound Guided Interscalene Block & Shoulder Block for Postoperative Analgesia for Shoulder Surgeries. Ann. Int. Med. Den. Res. 2019; 5(4):RD29-RD34.

Source of Support: Nil, **Conflict of Interest:** None declared