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Original Research Article.

Analysis of Post Operative Analgesic Efficacy Between Inter-Scalene Block versus Shoulder Block for Shoulder Arthroscopic Surgeries At a Tertiary Care Hospital

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ABSTRACT

Background: Interscalene brachial plexus block (ISB) has been shown to provide excellent analgesia for shoulder surgery and suprascapular nerve block (SSB) has been proposed as an alternative to the ISB. The present study was conducted to compare the post operative analgesic efficacy between inter-scalene block versus shoulder block for shoulder arthroscopic surgeries.

Materials and Methods: This study was conducted among 100 adult patients posted for arthroscopic Bankart repair surgery. Patients were divided into two groups: shoulder block [Group A (n = 50): 0.5% bupivacaine (suprascapular block 10 ml and axillary block 10 ml)] using ultrasound and nerve stimulator OR interscalene block [Group B (n = 50): 0.5% bupivacaine 10 ml]. The primary aim of the study was to compare the ISB with ShB for visual analogue score (VAS) in recovery area (zero hour). Time for block performance, VAS, patient satisfaction and complications were recorded.

Results: The mean age of patients in group A was 28.34yrs and group B was 29.43. 42 patients were male, and 8 patients were females in group A whereas in group B 40 were males and 10 were females. ASA I patients in group A were in both groups. Duration of surgery was more in group A (56.12 mins). The mean time for block performance was significantly more in group A (10.2 min vs. 4.3 min). The sensory blockade was complete in 50 patients in group A whereas complete in 47 patients in group B. The motor blockade was partial in 49 patients in group A, whereas complete motor blockade was seen in 47 patients of group B. The VAS was similar in the two groups at 0, 6 and 24 h. VAS at 2 h and 4 h was higher in group A whereas VAS was higher in B at 12 h. Mean analgesic duration was significantly longer with group B (8.34 h vs. 4.23). No complications were seen in 44 patients in group A and in 43 patients in group B. Patient satisfaction at 24 h was excellent in 23 patients in group B whereas in 20 patients in group A.

Conclusion: The present study concluded that the ShB and ISB have similar efficacy in terms of VAS in recovery. Considering the undesirable effects associated with ISB, ShB may be preferred for arthroscopic shoulder surgeries.

Keywords: Shoulder Arthroscopy, Suprascapular Nerve Block, Interscalene Brachial Plexus Block.

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INTRODUCTION

Shoulder arthroscopy is a minimally invasive, ambulatory surgery useful for treating a variety of shoulder pathologies. But it is associated with severe post-operative pain, which causes significant discomfort to the patient and hence interferes with recovery and rehabilitation of the shoulder.[1] To date, the most effective method in controlling postoperative pain in shoulder surgery is regional nerve blocks, such as the interscalene brachial plexus block (ISNB) and the suprascapular nerve block (SSNB)[2,3]. Interscalene brachial plexus block may be the most reliable and most frequently used regional block technique for shoulder surgery; however, it has the potential for many complications. The most common of these complications is phrenic nerve palsy, which is reversible but may result in significant respiratory distress especially in patients with compromised respiratory function. Other less common yet serious complications include Horner's syndrome, recurrent laryngeal nerve block that may result in hoarseness of voice, vascular puncture, brachial plexus neuropathy, and unintended injection of local anesthetic into the subarachnoid space, epidural space, or vertebral artery.[4-6] SSNB is an effective alternative method of regional nerve block in shoulder surgery.[7,8] SSNB provides superior analgesia compared to placebo or local anesthetic infiltration and is considered noninferior compared to ISNB.[9-12] The main advantage of SSNB is that it results in fewer adverse effects than ISNB, especially in

hemidiaphragmatic palsy.[9-12] Additionally, the catheter lies deep in the muscle layer and does not easily migrate, even when the patient's neck moves.[13,14] The present study was conducted to compare the post operative analgesic efficacy between inter-scalene block versus shoulder block for shoulder arthroscopic surgeries.

MATERIALS AND METHODS

The present study was conducted among 100 adults of ASA grades 1 and 2, of either sex, undergoing elective unilateral arthroscopic shoulder surgery under general anaesthesia in the Department of Anaesthesiology, Santosh Medical College and Hospital, Ghaziabad, Uttar Pradesh, India. Informed consents were taken from the patients. Any patient with a history of local anaesthetic allergy, coagulopathy, anticoagulant therapy, local-site infection, body mass index (BMI) >30 kg/m^2, inability to understand visual analogue scale (VAS), cardiopulmonary disorder and previous neurological deficit in the upper limbs were excluded from the study.

The patients were randomly divided into 2 groups of 50 each. Group A (n = 50): shoulder block using 10 ml of 0.5% bupivacaine each for SSN and AN block. Group B (n = 50): inter-scalene block using 10 ml of 0.5% bupivacaine. All patients underwent a detailed pre-anaesthetic check-up and kept fasting after midnight. An intravenous (IV) access was secured using 20-G cannula on the opposite hand. Both the blocks were performed with dual assistance of high-frequency (10–12 Hz) 38-mm linear ultrasound transducer and peripheral nerve stimulator in a block room 30 min before the anaesthesia induction. Preoperative measurements (baseline vital parameters, procedural duration, pain on injection, sensory and motor block) were noted. For performing inter-scalene block, the roots of brachial plexus were visualised in supine position. A 22-G 50-mm nerve block needle was inserted in-plane and LA was injected in aliquots after eliciting response distal to deltoid muscle at 0.4 mA. SSN block was performed using Harmon and Hearty's technique, while AN block was performed using Rothe et al.[15] technique in sitting position using linear ultrasound probe and 22-G 100-mm nerve block needle in plane.[16] After 30 min, anaesthesia was induced with IV fentanyl (2 µg/kg) and propofol (2–2.5 mg/kg) and intubation performed using vecuronium (0.1 mg/kg). Anaesthesia was maintained by nitrous-oxide and isoflurane to achieve a minimum alveolar concentration (MAC) of 1. If haemodynamic parameters increased >20% above baseline, inj. fentanyl (1 µg/kg) was administered. Primary outcome was postoperative pain at time '0' (after the patient was shifted to recovery) which was assessed using VAS [0 (no pain) to 10 (worst pain)]. Secondary outcomes were pain scores at times 2, 4, 6, 12 and 24 h using VAS, block performance time, sensory and motor blockade, and any adverse effects. Rescue analgesia in the form of Inj. paracetamol 1 g IV was administered on demand or if VAS was ≥ 4 (maximum 4 doses, 6 h apart). Inj. tramadol 50 mg was administered to patients having inadequate pain relief within 6 h of paracetamol as secondary rescue analgesic. Satisfaction in terms of overall quality of pain relief was rated by the patient at the end of 24 h as excellent, good, fair, and poor. The analysis was done with the use of Statistical Package for the Social Sciences (SPSS) version 21.0 (Armonk, NY: IBM). The categorical data were expressed as numbers (percentages) while continuous data were presented as mean ± standard deviation (SD) and median values.

Table 1: Characteristics of the patients

Characteristics of the patients	Group A (n=50)	Group B(n=50)
Age (yrs)	28.34±12.2	29.43±07.23
Gender (male/female)	42/8	40/10
ASA I/II	45/5	46/4
Duration of surgery (min)	56.12±11.45	52.4±10.54

Table 2: Block characteristics in the two groups

Group	Group A (n=50)	Group B(n=50)
Duration of block procedure (min)	10.2±1.12	4.3±.56
Sensory block		
Partial	0	3
Complete	50	47
Motor block		
Partial	49	3
Complete	1	47
Complications		
None	44	43
Pain on injection	6	2
Dyspnea	0	2
Ptosis	0	3
Duration of analgesia (h)	4.23±2.09	8.34±4.1

Median (IQR) VAS		
0	0	0
2	2	1
4	2	1
6	2	2
12	1	5
24	0	0
Patient satisfaction at 24 h		
Excellent	20	23
Good	20	19
Fair	10	8
Poor	0	0

RESULTS

Mean age of patients in group A was 28.34yrs and group B was 29.43. 42 patients were male, and 8 patients were females in group A whereas in group B 40 were males and 10 were females. ASA I patients in group A were in both groups. Duration of surgery was more in group A (56.12 mins). The mean time for block performance was significantly more in group A (10.2 min vs. 4.3 min). The sensory blockade was complete in 50 patients in group A whereas complete in 47 patients in group B. The motor blockade was partial in 49 patients in group A, whereas complete motor blockade was seen in 47 patients of group B. The VAS was similar in the two groups at 0, 6 and 24 h. VAS at 2 h and 4 h was higher in group A whereas VAS was higher in B at 12 h. Mean analgesic duration was significantly longer with group B (8.34 h vs. 4.23). No complications were seen in 44 patients in group A and in 43 patients in group B. Patient satisfaction at 24 h was excellent in 23 patient in group B whereas in 20 patient in group A.

DISCUSSION

The incidence of post-operative pain after arthroscopic shoulder surgery is reported to be around 30–70%. Since pain is a distressful entity, it causes a delay in recovery and rehabilitation of the operated shoulder.[17] That is why post-operative pain management is very important.[17] The mean age of patients in group A was 28.34yrs and group B was 29.43. 42 patients were male, and 8 patients were females in group A whereas in group B 40 were males and 10 were females. ASA I patients in group A were in both groups. Duration of surgery was more in group A (56.12 mins). The mean time for block performance was significantly more in group A (10.2 min vs. 4.3 min). The sensory blockade was complete in 50 patients in group A whereas complete in 47 patients in group B. The motor blockade was partial in 49 patients in group A, whereas complete motor blockade was seen in 47 patients of group B. The VAS was similar in the two groups at 0, 6 and 24 h. VAS at 2 h and 4 h was higher in group A whereas VAS was higher in B at 12 h. Mean analgesic duration was significantly longer with group B (8.34 h vs. 4.23). No complications were seen in 44 patients in group A and in 43 patients in group B. Patient satisfaction at 24 h was excellent in 23 patients in group B whereas in 20 patients in group A.

Although ISB has been considered one of the most reliable and effective methods for intraoperative and postoperative analgesia during arthroscopic shoulder surgery, it is associated with significant complications.[18,19]

Price et al. also found that a combination of suprascapular with axillary block resulted in the complete shoulder joint analgesia. They also reported that shoulder blockade gave pain relief similar to ISB with low morphine consumption post-operatively.[2]

Ryu et al. compared the anesthetic properties of these two blocks using 12.5 ml 1% mepivacaine, and 12.5 ml of 7.5% ropivacaine for similar shoulder surgery procedures and concluded that ultrasound guided supraclavicular blocks can be performed as an alternative to ultrasound guided interscalene blocks in patients undergoing arthroscopic shoulder surgery.[21]

Lee et al. had documented a consistent pain relief with minimal variation in pain scores with ShB while there was a wide variation with ISB.[22]

Pitombo et al. also established that both techniques were safe, effective and had similar satisfaction scores.[23]

CONCLUSION

The present study concluded that the ShB and ISB have similar efficacy in terms of VAS in recovery. Considering the undesirable effects associated with ISB, ShB may be preferred for arthroscopic shoulder surgeries.

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