Section: Anesthesia

Original Research Article

COMPARATIVE EVALUATION OF EFFICACY OF POSTOPERATIVE ANALGESIA OF SHOULDER BLOCK VERSUS INTERSCALENE BLOCK IN ARTHROSCOPIC SHOULDER SURGERIES AT A TERTIARY CARE HOSPITAL

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Received *: 06/08/2025*
Received in revised form *: 25/08/2025*
Accepted *: 20/09/2025*

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DOI: 10.70034/ijmedph.2025.4.27

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

Int J Med Pub Health
2025; 15 (4); 144-147

ABSTRACT

Background: Shoulder arthroscopy is a minimally invasive, day-care procedure used to diagnose and treat a wide range of glenohumeral and peri-articular disorders. Among regional techniques for shoulder surgery, the interscalene brachial plexus block (ISB) is most commonly used, as it provides superior postoperative analgesia and reduces opioid requirements. Hence, the present study was conducted for comparative evaluation of efficacy of postoperative analgesia of shoulder block versus interscalene block in arthroscopic shoulder surgeries at a tertiary care hospital.

Materials & Methods: This study compared the analgesic efficacy of shoulder block (Group A) and interscalene block (Group B) in 40 patients undergoing elective unilateral arthroscopic shoulder surgery under general anaesthesia. Anaesthesia was induced with fentanyl, propofol, and vecuronium, then maintained with nitrous oxide and isoflurane, with supplemental fentanyl given if haemodynamics rose more than 20% above baseline. Sensory and motor block were graded, VAS scores recorded for 24 hours, and data analysed using SPSS with chi-square and t-tests.

Results: In this study, patients were randomized to receive either shoulder block (SHB) or interscalene block (ISB), with both groups comparable in baseline demographics and surgical profiles. ISB was associated with a shorter block procedure, longer analgesic duration, and significantly lower VAS scores at 2 and 4 hours, while SHB showed similar outcomes at later intervals. Overall, ISB provided superior early postoperative analgesia, whereas SHB remained effective in the later postoperative period.

Conclusion: Interscalene block demonstrated advantages over shoulder block by offering shorter procedure time, prolonged analgesia, and better early postoperative pain control. Both groups were comparable in demographics and safety outcomes, with no significant difference in complications. Thus, while ISB proved superior for early analgesia, SHB remained a safe and effective alternative with comparable late postoperative results.

Key words: Shoulder Block, Interscalene Block, Arthroscopic Surgeries.

INTRODUCTION

Shoulder arthroscopy is a minimally invasive, day-care procedure employed to diagnose and treat a broad spectrum of glenohumeral and peri-articular disorders. Despite being minimally invasive, it is often associated with intense postoperative pain, which can delay mobilization, impair functional recovery, and limit participation in rehabilitation protocols. Effective multimodal analgesia and

regional anesthesia techniques are therefore essential to optimize outcomes and enhance patient satisfaction.[1]

Among regional techniques for shoulder surgery, the interscalene brachial plexus block (ISB) is commonly used because it provides consistent postoperative analgesia and reduces opioid requirements. However, its proximity to the phrenic nerve means unintended cranial spread can transiently block the C3–C5 roots, producing ipsilateral hemidiaphragmatic paresis and dyspnea—particularly relevant in patients with limited pulmonary reserve. Other expected effects include temporary deltoid and arm weakness from motor blockade, dysphonia due to recurrent laryngeal nerve involvement, and Horner's syndrome (ptosis, miosis, anhidrosis) from sympathetic chain spread.[2-4] Risk can be mitigated but not eliminated. Ultrasound guidance with low-volume, extrafascial injections, or targeting more distal structures (e.g., superior trunk, combined suprascapular–axillary nerve blocks, or supraclavicular/infraclavicular variants) may preserve analgesia while reducing phrenic involvement. Additional considerations include cautious dosing to avoid local anesthetic systemic toxicity, vigilance for neuropraxia or hematoma, and patient selection (avoiding ISB in severe COPD or contralateral diaphragmatic dysfunction). When used thoughtfully within a multimodal regimen—or via continuous catheter techniques— interscalene block (ISB) remains a powerful tool, balanced against its predictable physiologic trade-offs.[5-7]

Hence; the present study was conducted for comparative evaluation of efficacy of postoperative analgesia of shoulder block versus interscalene block in arthroscopic shoulder surgeries at a tertiary care hospital.

MATERIALS AND METHODS

A total of 40 patients scheduled for elective unilateral arthroscopic shoulder surgery under general anesthesia were enrolled. All the patients were randomized in two study groups with 20 patients in each group as follows: Group A- Shoulder block and Group B: Interscalene block (ISB). Standard pre-anaesthetic evaluation, overnight fasting, and IV access were performed. After 30 minutes, anaesthesia was initiated with intravenous fentanyl (2 µg/kg) and propofol (2–2.5 mg/kg), followed by endotracheal intubation using vecuronium (0.1 mg/kg). Maintenance of anaesthesia was achieved with nitrous oxide and isoflurane, targeting a minimum alveolar concentration (MAC) of 1. In cases where haemodynamic variables rose more than 20% above baseline, an additional dose of fentanyl (1 µg/kg) was administered. Sensory block and motor block were graded. VAS was assessed for up to 24 hours postoperatively. All the results were recorded in Microsoft excel sheet and was subjected to statistical analysis using SPSS software. Chi-square test and student t test were used for evaluation of level of significance.

Table 1: Demographic and clinical variable

Variable		Group A	Group B	p value
Age (years)		38.6	40.7	0.228
Sex, n (%)	Female	12 (40%)	15 (37.5%)	0.887
	Male	28 (60%)	35 (62.8%)	
ASA, n (%)	ASA I	29 (72.5%)	30 (75%)	0.140
	ASA II	11 (27.5%)	10 (25%)	
BMI (kg/m^2)		24.1	24.6	0.363
Duration of surgery (mins)		62.6	60.1	0.910

Table 2: Block variables.

Group	Group A	Group B	p value
Duration of block procedure (min)	10.9	4.1	0.000*
Sensory block (partial/complete)	0/40	1/39	0.943
Motor block (partial/complete)	40/0	3/37	0.000*
Duration of analgesia (mins)	268.3	497.8	0.000*

Table 3: Comparison of VAS.

Time (h)	SHB	ISB	p value
0	0	0	-
2	2.5	1.3	0.000*
4	2.6	1.1	0.000*
6	2.2	2.3	0.668
12	1.5	2.3	0.912
24	0	0	-

RESULTS

In the present study, patients were divided into two groups: Group A, who received shoulder block (SHB), and Group B, who underwent interscalene block (ISB). Both groups were comparable in terms of demographic and baseline clinical variables. The mean age was 38.6 years in Group A and 40.7 years in Group B, showing no significant difference. Sex

distribution was also similar, with females comprising 40% in Group A and 37.5% in Group B, while males represented 60% and 62.8% respectively. The ASA physical status classification revealed a predominance of ASA I patients in both groups (72.5% in Group A and 75% in Group B), while ASA II constituted 27.5% and 25% respectively. The mean BMI was nearly identical between the two groups (24.1 vs. 24.6 kg/m²), and the average duration of surgery was also comparable (62.6 minutes in Group A vs. 60.1 minutes in Group B). These results indicate that the groups were well matched, minimizing demographic or baseline disparities as potential confounding factors. Analysis of block-related parameters revealed significant differences between the two techniques. The duration of block procedure was considerably longer in Group A (10.9 minutes) compared to Group B (4.1 minutes). Sensory block was achieved in almost all patients in both groups without any significant difference. Motor block, however, was complete in all patients of Group A, whereas Group B demonstrated predominantly partial motor block, and this difference was statistically significant. The duration of analgesia was notably longer in Group B, averaging 497.8 minutes, compared to 268.3 minutes in Group A, indicating the superior analgesic efficacy of ISB. Postoperative pain assessment using VAS scores further highlighted these differences. At 0 hours, both groups reported no pain. At 2 and 4 hours, VAS scores were significantly lower in Group B (1.3 and 1.1) compared to Group A (2.5 and 2.6), suggesting better early analgesia with ISB. At 6 hours, pain scores were nearly similar between the groups, while at 12 hours Group B reported slightly higher VAS scores than Group A, although this difference was not statistically significant. By 24 hours, both groups again reported no pain. There was no statistically significant difference in complications between the two groups. Overall, ISB was associated with shorter block performance time, complete motor block, prolonged analgesia, and superior pain control in the early postoperative period, whereas SHB demonstrated comparable outcomes at later time points.

DISCUSSION

Shoulder arthroscopy is among the most frequently performed procedures in orthopaedic practice. With advancements in surgical and anaesthetic techniques, it is now commonly carried out in ambulatory surgical settings, enabling early discharge, quicker recovery, and reduced hospitalization costs. Despite these advantages, effective postoperative pain management remains a major challenge, as it significantly affects both patient comfort and surgical outcomes.[5-7] Traditionally, opioids administered orally or parenterally have been used, but their use is often limited by side effects such as nausea, sedation, and risk of dependency. To address these concerns, various alternative strategies have been developed, including regional anaesthesia, early physiotherapy protocols, continuous infusion of local anaesthetics intra-articularly or in the subacromial space, cryotherapy systems, and multimodal analgesia regimens.[8-10] Hence; the present study was conducted for comparative evaluation of efficacy of postoperative analgesia of shoulder block versus interscalene block in arthroscopic shoulder surgeries at a tertiary care hospital.

In this study, patients were divided into two groups: Group A (shoulder block, SHB) and Group B (interscalene block, ISB). Both groups were comparable in baseline characteristics, including age, sex distribution, ASA status, BMI, and surgical duration, confirming they were well matched. Block-related parameters showed significant differences. The procedure duration was longer in SHB (10.9 min) than ISB (4.1 min). Sensory block success was similar, but motor block was complete in all SHB patients, while ISB produced predominantly partial motor block. Analgesia duration was markedly longer with ISB (497.8 vs. 268.3 min). Pain scores further supported these findings. At 2 and 4 hours, ISB showed significantly lower VAS scores, indicating better early analgesia, whereas scores at 6 and 12 hours were comparable and both groups reported no pain at 24 hours. Complications were not significantly different between groups. Overall, ISB offered shorter procedure time, longer analgesia, and superior early pain control, whereas SHB produced comparable results during the later postoperative period. Waleed A. et al. conducted a study comparing interscalene block (ISB) with the combined suprascapular and axillary nerve block (SSNB + ANB) for postoperative analgesia in arthroscopic shoulder surgery. Sixty ASA I–II patients aged 18–40 years were randomized to receive either ISB or SSNB + ANB, with all patients subsequently administered standardized general anaesthesia. Postoperative outcomes, including pain scores at recovery, 4, 6, 12, and 24 hours, complications, and patient satisfaction, were evaluated. The results showed no significant difference in visual analogue scale scores or analgesic consumption between the two groups; however, complications such as Horner's syndrome, hoarseness, marked upper arm weakness, and dyspnoea occurred exclusively in the ISB group. The authors concluded that SSNB + ANB represents a safe and effective alternative to ISB for postoperative pain management in selected shoulder arthroscopy cases.[11] In another previous study conducted by Sinha et al, authors evaluated whether reducing the volume of ropivacaine 0.5% from 20 mL to 10 mL for ultrasound-guided interscalene block could lower the incidence of diaphragmatic paresis and preserve pulmonary function in patients undergoing arthroscopic shoulder surgery. Thirty patients were randomized into two groups, and outcomes including hemidiaphragmatic excursion, pulmonary function tests, sensory and motor block characteristics, pain scores, and analgesic requirements were assessed. The results showed that

diaphragmatic paresis and significant reductions in spirometric values occurred in nearly all patients of both groups, with no difference in sensory spread, motor block, analgesia, or drug consumption. The authors concluded that lowering the volume from 20 to 10 mL did not reduce diaphragmatic dysfunction or pulmonary impairment, which persisted until recovery room discharge.[12]

CONCLUSION

Interscalene block demonstrated advantages over shoulder block by offering shorter procedure time, prolonged analgesia, and better early postoperative pain control. Both groups were comparable in demographics and safety outcomes, with no significant differences in complications. Therefore, while ISB was superior for early analgesia, SHB remained a safe and effective alternative, particularly for late postoperative pain control.

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