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Original Article

Ultrasound-guided anterior suprascapular nerve block reduces respiratory complications compared to interscalene block in elderly patients undergoing shoulder arthroscopy

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Abstract: Objectives: To compare the safety and efficacy of ultrasound-guided anterior suprascapular nerve block (ASSB) versus interscalene block (ISB) in elderly patients undergoing shoulder arthroscopy surgery under general anesthesia. Methods: Elderly patients who underwent arthroscopic shoulder surgery under general anesthesia at the Central Hospital Affiliated to Shandong First Medical University from January 2022 to December 2023 were retrospectively included in this study. Demographic characteristics, intraoperative variables, perioperative vital signs, pulmonary function data, hemidiaphragmatic excursion (HDE), incidence of hemidiaphragmatic Paralysis (HDP), numerical rating scale (NRS) pain scores, and complications were compared between the two groups. Results: A total of 223 patients aged 60 years or older who underwent shoulder arthroscopies between January 2022 and December 2023 were included in this retrospective study. Depending on the nerve block method, patients were divided into two groups: the ISB (n = 108) and ASSB (n = 115) groups. Patients in the ASSB group demonstrated significantly greater ipsilateral HDE during quiet breathing (1.47 ± 0.42 cm) compared to the ISB group (1.36 ± 0.23 cm) (P = 0.010) and higher forced vital capacity (2.32 ± 0.52 L/min vs. 2.12 ± 0.85 L/min, P = 0.036). The ASSB group had a higher rate of no HDP (52.17% vs. 30.56% in ISB, P = 0.004) but lower incidence of partial HDP (65.74% vs. 46.09%). Postoperative NRS scores during activity were comparable between the two groups; however, NRS scores at rest were higher in the ASSB group. Additionally, the ASSB group had a lower overall incidence of complications, especially phrenic nerve block, yet the difference did reach statistical significance. Conclusions: Ultrasound guided ASSB is a feasible anesthesia alternative for elderly patients undergoing shoulder arthroscopy surgery. Compared to ISB, it provides better preservation of diaphragm function and reduces respiratory-related complications, while maintaining effective analgesic effects.

Keywords: Application value, ultrasound-guided, anterior suprascapular nerve block, general anesthesia, shoulder arthroscopy

Introduction

Arthroscopic shoulder surgery is commonly used to treat various shoulder conditions, including rotator cuff tears, labrum injuries, and subacromial impingement syndrome [1]. With the population aging, shoulder surgery is on a steady rise. Elderly patients often present with multiple comorbidities, and age-related physiologic changes that complicate perioperative management [2]. Effective analgesia not only promotes functional recovery but also reduces the risk of chronic pain development [3]. Interscalene block (ISB) is one of the most commonly used anesthetic techniques for shoulder surgery, primarily due to its potent postoperative analgesic efficacy [4]. However, ISBs are associated with inherent risks, which are more pronounced in elderly patients. Older patients often present with varying degrees of respiratory dysfunction [5].

ISB targets primarily the brachial plexus nerves in the neck region, but this technique frequently involves the phrenic nerve, resulting in ipsilateral diaphragmatic paralysis [6]. This adverse

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effect is particularly detrimental to elderly patients, as many already have reduced respiratory reserve capacity due to conditions such as chronic obstructive pulmonary disease (COPD) or heart failure [7]. Therefore, there is an urgent need to explore alternative analgesic methods that ensure effective pain relief while minimizing effect on respiratory function [8].

The anterior suprascapular nerve block (ASSB), a relatively novel regional nerve block technique, aims to relieve shoulder pain while exerting minimal effect on diaphragmatic function [9]. Sensory input to the shoulder joint comes primarily from the suprascapular nerve, which is situated far away from the phrenic nerve. This anatomic separation theoretically enhances the preservation of diaphragmatic function [10]. ASSB is typically performed under ultrasound guidance, where the ultrasound image directs needle placement, thereby reducing risks of nerve and surrounding tissue injury [11]. Despite its promising applications, current evidence remains limited, particularly in elderly populations, with few direct comparative studies between ASSB and ISB [12].

Selecting an optimal anesthesia approach is a complex decision-making process. Different shoulder surgeries vary in surgical difficulty and trauma levels, factors that directly influence postoperative analgesic requirements [13]. The suprascapular nerve primarily innervates the posterior aspect of the shoulder joint. However, isolating this nerve may sometimes fail to provide adequate analgesia, necessitating combined axillary nerve block for more comprehensive pain relief [14]. Comparative studies on the efficacy, safety, and complications between ultrasound-guided ASSB and ISB remain limited, with many studies lacking specific data for older patients [15, 16].

Therefore, this retrospective study aimed to fill this gap among patients aged ≥ 60 years.

Patients and methods

Study design and patient selection

This retrospective study involved 223 elderly patients who underwent shoulder arthroscopy under general anesthesia at the Central Hospital Affiliated to Shandong First Medical University between January 2022 and December 2023. This study was approved by the Ethics Committee of Central Hospital Affiliated to Shandong First Medical University. Data were collected from the medical records, including demographic characteristics, perioperative vital signs, surgical information, hemi-diaphragmatic excursion (HDE), incidence of hemidiaphragmatic paralysis (HDP), NRS scores, complications, and frequency of adjuvant medication use. Given the retrospective nature of this study and the use of anonymized patient information, the requirement of patients' informed consent was waived.

Inclusion and exclusion criteria

Inclusion criteria: aged ≥ 60 years; undergoing shoulder arthroscopy under general anesthesia; American Society of Anesthesiologists (ASA) physical status I or II; receipt of ultrasound-guided nerve block; complete medical data available.

Exclusion criteria: pre-existing respiratory, cardiac, renal, hepatic, or neurological conditions; contraindications to peripheral nerve blocks such as coagulopathy, brachial plexus neuropathy, or allergy to local anesthetics; revision surgery or conversion to open surgery; chronic pain; injection site infections; or preoperative home opioid use.

Intervention and grouping methods

Patients were divided into two groups according to the anesthesia method they received: those who received ultrasound-guided ISB were assigned to the ISB group (n = 108), while those who underwent ultrasound-guided ASSB were assigned to the ASSB group (n = 115).

Before surgery, all patients fasted from solid food for 8 hours and from clear fluids for 2 hours. Standard monitoring of vital signs was implemented, and both venous and radial arterial access were established. Normal saline (sodium chloride injection; National Drug Approval No. H20033074; specification: 10 mL: 90 mg) was infused at 10 mL/kg/h during the first 30 minutes, followed by a maintenance rate at 6 mL/kg/h thereafter. Patients were placed in the supine position with the head elevated at 30° and rotated at 45° toward the non-surgical side. The anterolateral neck region above the clavicle was prepared using

2% chlorhexidine in 70% isopropyl alcohol. Under aseptic conditions, all nerve blocks were performed using a high-frequency linear ultrasound probe (13-6 MHz; M-Turbo, Sonosite, USA). Local skin anesthesia was achieved with 1 mL of 1% lidocaine, and then a 22-gauge, 50-mm insulated needle (UniPlex NanoLine, Pajunk, Geisingen, Germany) was advanced under ultrasound guidance.

In the ISB group, ultrasound-guided interscalene brachial plexus block was performed using a linear ultrasound probe (GE Logic P9, 7-15 MHz). The block was performed using an in-plane technique, with needle insertion (Contiplex C, B. Braun) from lateral to medial. Upon reaching the brachial plexus near the C5 and C6 nerve roots, 5 mL of 0.5% bupivacaine was injected. For patients in the ASSB group, the anterior suprascapular nerve block was conducted under ultrasound guidance. Initial scanning was performed with a linear ultrasound probe (GE Logic P9, 7-15 MHz, Korea) positioned in an oblique coronal orientation over the suprascapular area, allowing visualization of the suprascapular nerve beneath the omohyoid muscle. Using an in-plane approach, a needle was advanced through a catheter (Contiplex C, B. Braun, Melsungen, Germany) and 5 mL of 0.5% bupivacaine was administered.

Primary outcomes

HDE and Incidence of HDP: HDE was assessed at two time points: before nerve block (preoperative baseline) and at 60 minutes after nerve block (postoperative). After surgery, patients were transferred to the ward, where HDE was assessed prior to any further procedures. With the patient in the supine position, HDE was measured bilaterally in the subcostal region between the mid-clavicular and anterior axillary lines using a 5-2 MHz curvilinear probe and the M-mode function of an ultrasound machine (M-Turbo, Sonosite, USA). The liver or spleen served as an acoustic window, depending on the side examined. Measurements were recorded during normal breathing and the sniff maneuver. The severity of HDP was determined by the percentage reduction in diaphragmatic excursion at one hour after nerve block. A complete HDP was defined by a reduction of 75%-100% in diaphragm movement or a paradoxical motion compared to baseline values. Partial HDP was defined as a reduction of 25%-75%, while minimal or no HDP was defined as a reduction of < 25%.

Secondary outcomes

Demographic data included age, sex, body mass index (BMI), ASA classification, education background, and monthly income. In addition, comorbidities such as anemia, diabetes, and hypertension were recorded, along with smoking and alcohol consumption status.

Vital signs included heart rate, systolic blood pressure, diastolic blood pressure, degree of saturation of oxygen, and body temperature.

Surgical details included the type of arthroscopic surgery performed (e.g., Bankart repair, rotator cuff repair, or superior labrum anterior posterior (SLAP) repair), operation duration, anesthesia time, and total intraoperative fentanyl consumption.

Postoperative pain intensity was measured using the Numerical Rating Scale (NRS), with scores ranging from 0 (no pain) to 10 (most severe pain). A score of 1-3 indicates mild pain; 4-6 indicates moderate pain, and 7-10 indicates severe pain. Postoperative pain was measured at rest and during activity, and patients chose a number to indicate their pain level. The NRS has demonstrated acceptable reliability, with a Cronbach's coefficient of 0.71 [17].

Pulmonary function was measured by measuring forced vital capacity (FVC), forced expiratory volume in one second (FEV1), and peak flow rate (PFR) using a hand-held electronic spirometer (Contec SP 10, China). Patients were instructed to sit down and perform a rapid maximal inhalation followed by a forceful exhalation. Each test was repeated three times, and the best value was used for analysis.

Postoperative complications were recorded, including hematoma, pneumothorax, local infection, phrenic nerve block, and nerve injury.

Additionally, postoperative medications, including non-steroidal anti-inflammatory drugs (NSAIDs), opioids, antiemetic drugs, muscle relaxants, and cortical steroids, were documented.

Statistical methods

Data analysis was performed using SPSS 29.0 (SPSS Inc., Chicago, IL, USA). Categorical data

were presented as frequencies and percentages ([n (%)]) and compared between groups using the chi-square (χ^2) test. Continuous variables were first assessed for normality using the Shapiro-Wilk test. For continuous variables with normal distribution, expressed as mean ± standard deviation (SD), comparisons between the two groups (ASSB vs. ISB) at a single time point were performed using independent samples t-tests. For repeated-measures data, such as the NRS scores collected at multiple postoperative time points, a two-way repeated-measures ANOVA was employed to examine the main effects of group (ASSB vs. ISB), time, and the group-by-time interaction. If a significant interaction or main effect was detected, post hoc pairwise comparisons with Bonferroni correction were performed. Non-normally distributed data, reported as [median (25th percentile, 75th percentile)], were analyzed using the Wilcoxon rank-sum test. A *p*-value < 0.05 was considered significant.

Results

Demographic characteristics

No significant differences were observed between the two groups in terms of mean age (P = 0.373), BMI (P = 0.889), gender distribution (P = 0.438), or prevalence of anemia, diabetes, hypertension, smoking and alcohol consumption status, educational level, ASA classification, average monthly income, or average length of hospital stay (P > 0.05 for all) (**Table 1**), indicating good comparability between groups.

Vital signs

The vital signs, including heart rate, SBP, DBP, oxygen saturation, and body temperature, did not differ significantly between the ISB group and ASSB group (all, P > 0.05) (**Table 2**).

Surgical data

The distribution arthroscopic procedures, including Bankart repair, rotator cuff repair, and SLAP repair, was comparable between the two groups (P = 0.158) (**Table 3**). Additionally, no significant differences were observed in mean surgery duration (P = 0.079), anesthesia duration (P = 0.711), pr the amount of intraoperative fentanyl consumption (P = 0.081) between the two groups.

Hemi-diaphragmatic excursion (HDE)

There was a significant difference in ipsilateral HDE during quiet breathing, with the ASSB group showing greater diaphragmatic excursion compared to the ISB group (P = 0.010). However, ipsilateral HDE during sniffing was not significantly different (P = 0.054). Conversely, contralateral HDE during both quiet breathing and sniffing showed no significant differences between the two groups (P = 0.604; P = 0.083) (**Table 4**).

HDE at 60 min after block

During both quiet breathing and the sniff maneuver, there was a significant difference in the ipsilateral HDE, with the ASSB group demonstrating a greater HDE (P = 0.005 for quiet breathing; P = 0.006 for sniffing) (**Figure 1A**, **1B**). Conversely, contralateral HDE during quiet breathing and sniffing was significantly greater in the ISB group compared to the ASSB group (P = 0.032 for quiet breathing; P = 0.024 for sniffing) (**Figure 1C**, **1D**).

Incidence of hemidiaphragmatic paralysis (HDP)

There was a significant difference in the incidence of HDP between the two groups (P = 0.004) (**Table 5**). Specifically, the incidence of no HDP (reduction in diaphragmatic excursion < 25%) was significantly higher in the ASSB group than in the ISB group, while the occurrence of partial HDP (25%-75%) was more frequent in the ISB group; However, complete HDP (> 75%) was relatively rare in both groups.

Numerical rating scale (NRS) scores

For NRS scores at rest, two-way repeated measures ANOVA revealed significant main effects of group (F(1, 221) = 8.92, P = 0.003), time (F(3, 663) = 156.73, P < 0.001), and group-by-time interaction (F(3, 663) = 3.28, P = 0.021). *Post hoc* tests with Bonferroni correction showed that the NRS scores at rest were significantly higher in the ASSB group compared to the ISB group at 4 hours (P adj = 0.004), 6 hours (P adj = 0.045), whereas no significant differences were observed at 8 hours or 12 hours (P adj > 0.05) (**Figure 2A**).

For NRS scores during activity, two-way repeated measures ANOVA revealed a significant

Table 1. Comparison of demographic characteristics between the two groups

Data	ISB group (n = 108)	ASSB group (n = 115)	t/χ^2	P
Age (years)	68.52 ± 5.37	67.78 ± 6.87	0.892	0.373
BMI (kg/m^2)	24.76 ± 4.75	24.85 ± 4.56	0.140	0.889
Sex (Male %)	47 (43.52%)/61 (56.48%)	56 (48.7%)/59 (51.3%)	0.601	0.438
Anemia (yes/no)	19 (17.59%)/89 (82.41%)	14 (12.17%)/101 (87.83%)	1.297	0.255
Diabetes (yes/no)	23 (21.3%)/85 (78.7%)	18 (15.65%)/97 (84.35%)	1.182	0.277
Hypertension (yes/no)	30 (27.78%)/78 (72.22%)	34 (29.57%)/81 (70.43%)	0.087	0.768
Smoking history (yes/no)	32 (29.63%)/76 (70.37%)	29 (25.22%)/86 (74.78%)	0.546	0.460
Alcohol consumption history (yes/no)	37 (34.26%)/71 (65.74%)	37 (32.17%)/78 (67.83%)	0.109	0.741
Educational level (high school or below/college or above)	26 (24.07%)/82 (75.93%)	32 (27.83%)/83 (72.17%)	0.407	0.523
Monthly average income (< 3000/3000-6000/> 6000)	25 (23.15%)/55 (50.93%)/28 (25.93%)	20 (17.39%)/51 (44.35%)/44 (38.26%)	4.046	0.132
ASA (I/II)	75 (69.44%)/33 (30.56%)	77 (66.96%)/38 (33.04%)	0.159	0.690
Length of Stay (days)	2.93 ± 0.47	3.02 ± 0.73	1.125	0.262

ASSB: anterior suprascapular nerve block; ISB: interscalene block; BMI, body mass index; ASA, American Society of Anesthesiologists.

Table 2. Comparison of perioperative vital signs between the two groups

Data	ISB group (n = 108)	ASSB group (n = 115)	t	P
Heart Rate (bpm)	74.57 ± 8.45	73.85 ± 7.43	0.673	0.501
SBP (mmHg)	121.56 ± 10.34	123.34 ± 11.1	1.241	0.216
DBP (mmHg)	75.38 ± 7.45	76.32 ± 7.32	0.945	0.346
Oxygen Saturation (%)	98.24 ± 1.21	98.01 ± 1.29	1.362	0.174
Body temperature (°C)	36.57 ± 0.35	36.49 ± 0.62	1.227	0.221

ASSB: anterior suprascapular nerve block; ISB: interscalene block; SBP: systolic blood pressure; DBP: diastolic blood pressure.

Table 3. Comparison of surgical data between the two groups

Item	ISB group (n = 108)	ASSB group (n = 115)	t/χ^2	P
Type of arthroscopic surgery (Bankart repair/rotator cuff repair/SLAP repair)	57 (52.78%)/21 (19.44%)/30 (27.78%)	75 (65.22%)/15 (13.04%)/25 (21.74%)	3.693	0.158
Duration of surgery (min)	96.28 ± 26.34	91.33 ± 12.79	1.767	0.079
Duration of anesthesia (min)	113.59 ± 19.72	112.75 ± 13.28	0.371	0.711
Intraoperative fentanyl consumption (μg)	99.14 ± 9.52	101.87 ± 13.51	1.754	0.081

ASSB: anterior suprascapular nerve block; ISB: interscalene block; SLAP: superior labrum anterior and posterior.

Table 4. Comparison of HDE before nerve block between the two groups (cm)

Variable	ISB group (n = 108)	ASSB group (n = 115)	t	P
Quiet breathing Ipsilateral HDE	1.36 ± 0.23	1.47 ± 0.42	2.591	0.010
Sniff Ipsilateral HDE	1.95 ± 0.57	2.07 ± 0.38	1.935	0.054
Quiet breathing Contralateral HDE	1.39 ± 0.31	1.37 ± 0.21	0.520	0.604
Sniff Contralateral HDE	1.93 ± 0.37	2.02 ± 0.4	1.743	0.083

ASSB: anterior suprascapular nerve block; ISB: interscalene block; HDE: Hemi-diaphragmatic excursion.

main effect of time ($F(3, 663) = 80.34$, $P < 0.001$), but no significant main effect of group ($F(1, 221) = 2.15$, $P = 0.144$) or group-by-time interaction ($F(3, 663) = 1.23$, $P = 0.297$). Post hoc analyses confirmed that there were no significant differences between the two groups at any individual time point (P adj > 0.05 for all) (**Figure 2B**).

Pulmonary function after block

The ASSB group exhibited significantly higher FVC ($P = 0.036$) and FEV1 ($P = 0.025$) compared to the ISB group (**Figure 3**). PFR was also higher in the ASSB group than in the ISB group, but this difference did not reach significance ($P = 0.066$).

Surgical complications

There were no significant differences in the incidence of complications between the groups (**Table 6**). Specifically, hematoma formation ($P = 0.437$) and local infections ($P = 0.943$) were observed in both groups, but without a significant difference between groups. Pneumothorax and nerve damage were reported only in the ISB group, but also without between-group differences (both $P = 0.450$). Phrenic nerve block was more common in the ISB group, and this difference was also not significant ($P = 0.187$).

Adjuvant medications

The proportion of patients receiving adjuvant medications, including non-steroidal anti-inflammatory drugs (NSAIDs) ($P = 0.226$), opioid ($P = 0.721$), antiemetic drugs ($P = 0.692$), muscle relaxants ($P = 0.230$), and corticosteroids ($P = 0.283$), were comparable between the two groups (**Table 7**).

Discussion

This retrospective study compared the effectiveness of ultrasound-guided ASSB with ISB in elderly patients undergoing shoulder arthroscopy under general anesthesia. Our findings demonstrated significant differences in ipsilateral HDE during quiet and sniff breathing after the block between the two groups. The ASSB group showed greater ipsilateral HDE, which likely stems from its targeted anatomic selectivity, highlighting a key advantage of this block technique. Unlike ISB, which targets the brachial plexus at a proximal cervical level, ASSB focuses on the anterior suprascapular nerve block and largely spares the phrenic nerve [18, 19]. Such selectivity was associated with a lower incidence of ipsilateral diaphragmatic paresis, a known issue with ISB from unintended phrenic nerve involvement [20]. The anatomic specificity of ASSB underlies its superior diaphragmatic sparing effect compared to ISB.

Preservation of diaphragmatic function is of particular clinical importance in older patients, who often have weaker respiratory reserves due to age-related health problems. In this study, improved diaphragmatic preservation with ASSB was reflected by more favorable pulmonary function outcomes, including FVC and FEV_1. Maintenance of diaphragmatic activity contributes to more effective ventilation-perfusion matching and may reduce postoperative pulmonary risks, which is especially important for elderly patients [21, 22]. Preserving diaphragmatic function with ASSB is a valuable strategy for mitigating perioperative pulmonary risk in vulnerable elderly population undergoing shoulder arthroscopy.

Despite its advantages in diaphragmatic and pulmonary preservation, ASSB was associated with slightly higher pain scores at rest in the early postoperative period. This may be explained by the sensory innervation pattern of the suprascapular nerve, which predominantly supplies the posterior aspect of the shoulder joint [23]. In contrast, ISB produces a more extensive neural blockade, thereby providing

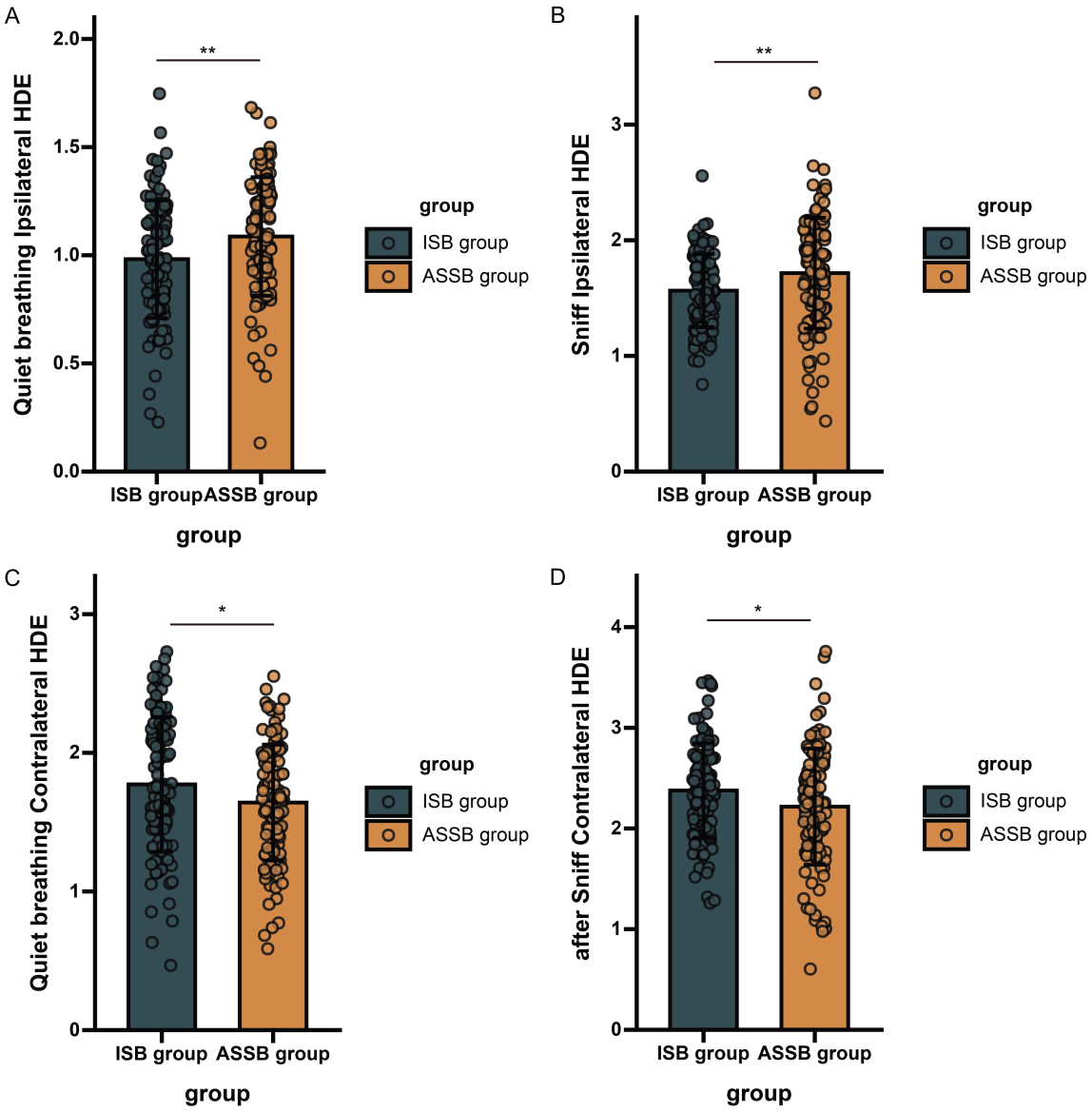

Figure 1. Comparison of HDE 60 min after block between the two groups (cm). A: Quiet breathing Ipsilateral HDE; B: Sniff Ipsilateral HDE; C: Quiet breathing Contralateral HDE; D: Sniff Contralateral HDE. ASSB: anterior suprascapular nerve block; ISB: interscalene block; HDE: Hemi-diaphragmatic excursion; *: P < 0.05; **: P < 0.01.

Table 5. Comparison of the incidence of HDP between two groups

Variable	ISB group (n = 108)	ASSB group (n = 115)	χ^2	P
None (< 25%)	33 (30.56%)	60 (52.17%)	10.909	0.004
Partial (25%-75%)	71 (65.74%)	53 (46.09%)		
Complete (> 75%)	4 (3.7%)	2 (1.74%)		

ASSB: anterior suprascapular nerve block; ISB: interscalene block; HDP: Hemi-diaphragmatic palsy.

broader early analgesic coverage [24]. However, this wider effect was at the expense of a higher risk of side effects such as diaphragmatic dysfunction [25]. It is worth noting that early differences in pain relief did not persist long and were not observed during activity, meaning both approaches achieved similar overall pain control after surgery. ASSB provide effective analgesia comparable to ISB while significantly reducing the risk of diaphragmatic paralysis.

Compared to ISB, the ASSB technique was associated with a better safety profile. Severe complications such as pneumothorax and infec-

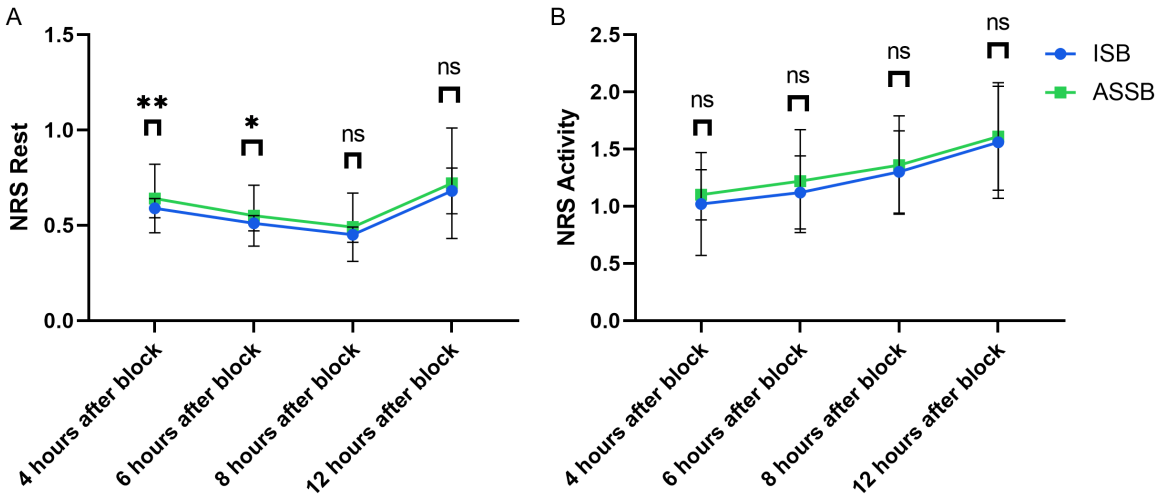

Figure 2. Comparison of NRS scores between the two groups during postoperative rest and activity. A: Rest; B: During activities. ASSB: anterior suprascapular nerve block; ISB: interscalene block; NRS: Numerical Rating Scale; ns: No significant difference; *: P < 0.05; **: P < 0.01.

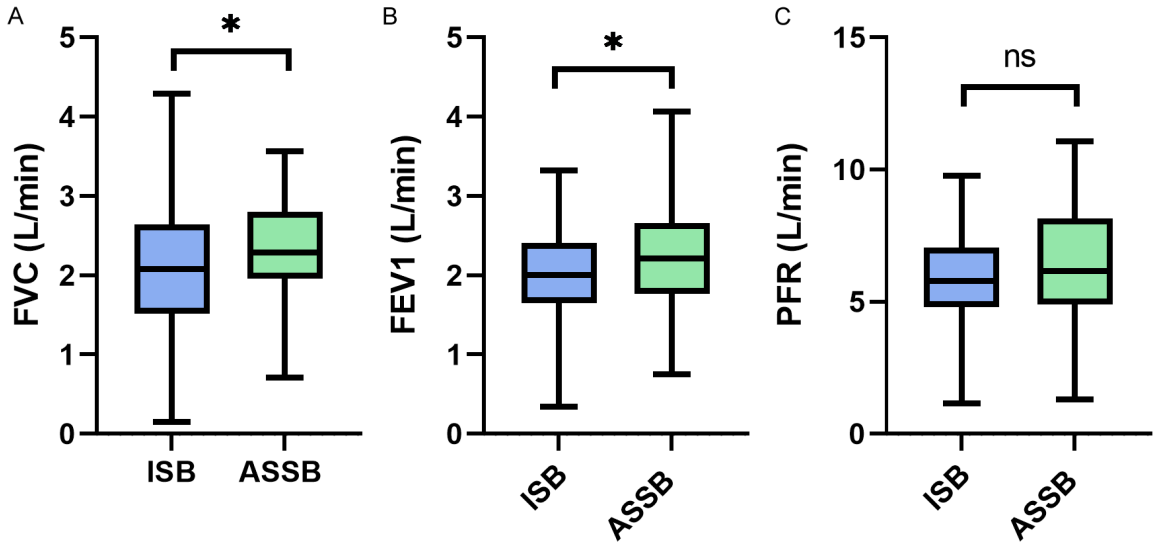

Figure 3. Comparison of pulmonary function after nerve block between the two groups. A: FVC (L/min); B: FEV1 (L/min); C: PFR (L/min). ASSB: anterior suprascapular nerve block; ISB: interscalene block; FVC: Forced vital capacity; FEV1: forced expiratory volume in one second; PFR: peak flow rate; ns: No significant difference; *: P < 0.05.

Table 6. Comparison of surgery-related complications between the two groups

Complication	ISB group (n = 108)	ASSB group (n = 115)	X^2	P
Hematoma (%)	6 (5.56%)	3 (2.61%)	0.604	0.437
Pneumothorax (%)	2 (1.85%)	0 (0%)	0.570	0.450
Local Infection (%)	3 (2.78%)	2 (1.74%)	0.005	0.943
Phrenic Nerve Block (%)	5 (4.63%)	1 (0.87%)	1.743	0.187
Nerve Damage (%)	2 (1.85%)	0 (0%)	0.57	0.450

ASSB: anterior suprascapular nerve block; ISB: interscalene block.

tions were rare in both groups. Although the overall incidence of complications did not differ significantly between groups, patients in the ASSB group tended to experience less phrenic nerve involvement, hematoma formation, and nerve injury. These characteristics may have contributed to improved procedural safety, particularly in elderly patients [26, 27]. Postoperative use of adju-

Table 7. Comparison of adjuvant medication use between the two groups

Medication type	ISB group (n = 108)	ASSB group (n = 115)	χ^2	P
Non-Steroidal Anti-Inflammatory Drug (NSAID) (%)	75 (69.44%)	71 (61.74%)	1.463	0.226
Opioids (%)	41 (37.96%)	41 (35.65%)	0.128	0.721
Antiemetics (%)	21 (19.44%)	20 (17.39%)	0.156	0.692
Muscle Relaxants (%)	16 (14.81%)	11 (9.57%)	1.442	0.230
Corticosteroids (%)	7 (6.48%)	3 (2.61%)	1.151	0.283

ASSB: anterior suprascapular nerve block; ISB: interscalene block.

vant analgesic medications was comparable between groups, indicating that both techniques provided similar overall analgesic efficacy. Importantly, ASSB did not increase the use of opioids or NSAIDs. This may be partly attributable to the preservation of diaphragmatic and pulmonary function observed with ASSB, which can reduce respiratory discomfort and improve overall postoperative tolerance [28, 29]. Consequently, ASSB facilitated postoperative recovery without increasing the demand for rescue analgesics.

The clinical advantages of ASSB method may be particularly relevant for elderly patients undergoing prolonged surgery or those requiring limited mobility after surgery. Such patients are at a higher risk of pulmonary complications and blood clotting problems. By better preserving postoperative respiratory function, ASSB may support earlier mobilization and functional recovery, as well as reducing hospital stays and healthcare costs. These advantages position ASSB as a valuable nerve block strategy for enhancing recovery in elderly patients after shoulder arthroscopy, supporting its regular adoption in elderly patients undergoing shoulder surgery [30].

Several limitations of this study should be acknowledged. First, as a retrospective study, it may have involved selection and information bias and precludes the establishment of a causal relationship between the intervention and clinical outcomes. Second, this study was conducted at a single center with limited sample size, which may have reduced the statistical power to detect subtle differences between groups and limits the generalizability of our findings. Third, outcomes were assessed only during the early postoperative period; therefore, the long-term effects of ASSB remain unclear. Future prospective, multicenter studies with larger sample sizes and longer follow-up periods are warranted to confirm the present findings.

Conclusion

Ultrasound-guided ASSB may better preserve diaphragmatic and pulmonary function in elderly patients undergoing shoulder arthroscopy under general anesthesia.

Disclosure of conflict of interest

None.

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