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Ahmed Assem Abo Zaid
Department of Anesthesiology, Surgical Intensive Care and Pain Medicine, Faculty of Medicine, Tanta University, Tanta, Egypt

Atteia Gad Anwar
Department of Anesthesiology, Surgical Intensive Care and Pain Medicine, Faculty of Medicine, Tanta University, Tanta, Egypt

Reda Sobhy Abd Elrahman
Department of Anesthesiology, Surgical Intensive Care and Pain Medicine, Faculty of Medicine, Tanta University, Tanta, Egypt

Abd El-Raheem Mostafa Dowidar
Department of Anesthesiology, Surgical Intensive Care and Pain Medicine, Faculty of Medicine, Tanta University, Tanta, Egypt

Abd El Aziz Hamed Elbadwy
Department of Anesthesiology, Surgical Intensive Care and Pain Medicine, Faculty of Medicine, Tanta University, Tanta, Egypt

Corresponding Author:
Ahmed Assem Abo Zaid
Department of Anesthesiology, Surgical Intensive Care and Pain Medicine, Faculty of Medicine, Tanta University, Tanta, Egypt

Comparison between analgesic effect of ultrasound guided interscalene block versus shoulder block versus suprascapular nerve block for arthroscopic shoulder surgery: A randomized controlled trial

Ahmed Assem Abo Zaid, Atteia Gad Anwar, Reda Sobhy Abd Elrahman, Abd El-Raheem Mostafa Dowidar and Abd El Aziz Hamed Elbadwy

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Abstract

Background: Shoulder arthroscopy is associated with severe post-operative pain, which causes significant discomfort to the patient, interfering with recovery and rehabilitation. The aim of this work was to compare efficacy of intra and post operative analgesia of inter-scalene block (ISB), shoulder block (SHB) and suprascapular nerve block (SSNB) for shoulder arthroscopic surgeries.

Methods: This prospective randomized controlled double blinded research was carried out on 90 cases, with American Society of Anesthesiologists (ASA) physical status I and II, admitted for shoulder arthroscopy under general anesthesia (GA). Cases were equally randomized to: Group I: underwent ISB by 20 ml of levobupivacaine 0.5%, group II: underwent SHB by 10 ml of levobupivacaine 0.5% was injected below the supraspinatus (SS) fascia and another 10 ml was injected at axillary nerve and group III: underwent SSNB by 10 ml of levobupivacaine 0.5%. All blocks were ultrasound guided, before induction of GA.

Results: Visual Analogue Scale at 2, 4, 6, 12, 18 and 24 hr, number of cases required rescue analgesia and required fentanyl intraoperatively and intraoperative fentanyl consumption and postoperative meperidine consumption were significantly higher in SSNB versus groups ISB and SHB (P value < 0.05) and was insignificantly different between ISB and SHB. Time to first rescue analgesic requirement was significantly earlier in SSNB versus groups ISB and SHB (p<0.001) and was insignificantly different between ISB and SHB. Postoperative nausea and vomiting (PONV) were significantly higher in SSNB versus groups ISB and SHB (P= 0.031), hemi-diaphragmatic paralysis and Horner syndrome were significantly higher in ISB versus groups SHB and SSNB (p<0.001).

Conclusions: Both SHB and ISB blocks have similar efficacy in hemodynamic stability, analgesia, incidence PONV and cases' satisfaction. SSNB group showed inferior results in these parameters versus both SHB and ISB. However, ISB was associated with more complications versus groups SHB and SSNB.

Keywords: Interscalene block, shoulder block, suprascapular nerve block, analgesia, arthroscopic shoulder surgery

Introduction

Shoulder arthroscopy is an ambulatory, minimally invasive procedure that can be used to address a wide range of shoulder conditions. However, it is linked to intense discomfort in the postoperative period, which slows the patient's progress in shoulder therapy and healing [1]. The inter-scalene block (ISB) is the most frequently used block to alleviate discomfort following shoulder surgery. Phrenic nerve blocking leading to diaphragmatic paresis can cause respiratory discomfort in the patient, despite reports that it provides good post-operative analgesia.

Additional symptoms of ISB include limb stiffness, hoarseness, and Horner's syndrome [2]. This calls for investigating alternative nerve blocks that provide the same level of analgesia as the ISB without the drawbacks. Thus, specific blockade of neurons feeding the arm may prove superior to the ISB.

Approximately 25-30% of the shoulder joint is supplied by the axillary nerve (AN), while the suprascapular nerve (SSN) provides the remaining 60-70% [3].

Almost all of the superior, middle, and posterior shoulder capsule is sensory, thanks to the SSN. It also provides blood to the teres minor, the glenoid, the acromion, and the posterior scapular area [4], as well as the SS and IS muscles of the rotator cuff. The AN provides blood and nerve fibres to the deltoid muscle as well as the anterior, lateral, and posterior regions of the shoulder joint. The tissue that covers the deltoid muscle is also supplied by the AN [5].

Ultrasound and nerve stimulator use improved visualisation and localization of nerves during block procedures, allowing for more precise and less-invasive blocking [6, 7].

Therefore, simultaneous blocking of these two nerves may be preferable to the ISB for shoulder joint operations requiring analgesia [8]. In contrast to ISB, the literature is divided on whether or not blocking both SSN and AN simultaneously is more effective.

This research aimed to evaluate the similarities and differences between ISB, shoulder block (SHB), and suprascapular nerve block (SSNB) for shoulder surgery in terms of intra- and postoperative analgesic characteristics.

The aim of this work was to compare efficacy of intra and post operative analgesia of ISB, SHB and SSNB for shoulder arthroscopic surgeries.

Patients and Methods

This research was a prospective, randomised, controlled, double-blind research done on 90 cases aged from 20 to 55 years old, with American Society of Anesthesiologists (ASA) physical status I and II who were admitted for shoulder arthroscopic surgery in Tanta University Hospital from August 2020 to July 2021.

Legal clearance for the study was granted by the Institutional Review Board at Tanta University Hospitals. The cases provided documented informed permission.

Exclusion criteria were neurological deficit, bleeding disorders, uncooperative patient, infection at the block injection site and history of allergy to LAs.

Randomization and blinding

Using sealed envelope into three equal groups; 30 cases were enrolled in each group. The cases were not informed the details of the LA injection sites, and the investigators assessed the outcome variables; therefore, all participants but the anesthesiologist (who performed the blocks) were blinded to the anesthetic technique.

Eligible cases were equally randomized to receive either: Group I (n=30): Ultrasound guided Interscalene Block (ISB), brachial plexus was blocked by 20ml of levobupivacaine 0.5%, group II (n=30): Ultrasound guided Shoulder Block (SHB), 10 ml of levobupivacaine 0.5% was injected below the SS fascia and another 10 ml was injected at AN and group III (n=30): Ultrasound guided Suprascapular Nerve Block (SSNB), 10 ml of levobupivacaine 0.5% was injected below the supraspinatous fascia.

All cases were subjected to medical and surgical histories taking, clinical and routine laboratory investigations.

Intraoperative

All cases were connected to standard ASA monitors which included: electrocardiogram (ECG) for measuring heart rate; non-invasive blood pressure for measuring systolic, diastolic, and mean arterial blood pressure; pulse oximetry for measuring oxygen saturation (SpO2).

All patients received iv premedication consisting of 2 mg of midazolam and 50 g of fentanyl through an 18-gauge iv tube inserted into the upper arm on the opposite side from the surgery site.

Supplemental oxygen was applied throughout the procedure. Ultrasound machine (Phillips Cx-50, Amsterdam, Netherlands) with a linear probe (L12-3MHz) was used in the research.

All intervention was performed by the same experienced attending anesthesiologist before general anesthesia under complete aseptic technique.

Group I: Ultrasound guided interscalene block (ISB)

The lateral side of the neck, just below the cricoid cartilage, was where the US transducer was placed to look at the brachial plexus's roots and branches [9]. With 3 mL of lidocaine 2%, a cutaneous weal was opened. The block needle was inserted between the two shallow hypoechoic structures using an in-plane method, moving from the lateral to the medial aspect of the spine [10, 11]. A total of 20 mL of 0.5% levobupivacaine were administered here.

Group II: Ultrasound guided shoulder block (SHB)

In this group, suprascapular and axillary block were performed according to the method described by Harmon *et al*. [12] Peng *et al*. [13] and Price *et al*. [14].

Suprascapular nerve block

The patient was placed in a semi-recumbent posture, with the opposite shoulder supporting the surgical arm. Trapezius and SS were located by keeping the device over the vertebrae of the shoulder blade. The probe was then slid laterally to locate the SS fossa's concavity and the muscle's hyper-echoic tissue. The suprascapular artery and SSN are located in close vicinity to one another in the concavity of the fossa. The long axis view nerve block was performed with a 50-mm syringe. After using Doppler to verify extravascular needle positioning and stimulating the SS and infraspinatus (IS) muscles (maximum current of 0.4 mA, pulse breadth 0.1 ms, frequency 2 Hz), 10 ml of 0.5% levobupivacaine was administered below the SS fascia.

Axillary nerve block

Cases were positioned semi-recumbently with their arms minimally flexed and adducted at the elbow. In the short axis image, the back of the humerus was clearly visible. It was possible to see the AN and posterior circumflex artery in cross-section. Once the needle was confirmed to be outside the blood vessel and the deltoid reaction to stimulus (maximum current 0.6 mA, pulse breadth 0.1 ms, frequency 2 Hz) was observed, 10 ml of 0.5% levobupivacaine was administered.

If the SHB did not take effect 30 minutes after the LA infusion, the block was deemed unsuccessful.

Group III: Ultrasound guided suprascapular nerve block (SSNB)

SSNB only was performed as described before in group II.

All cases were given intravenous (propofol 2 mg/kg, fentanyl 1 microgram/kg, and cis-atracurium 0.15 mg/kg) general anaesthetic with endotracheal intubation after 30 minutes, regardless of the degree of sensory paralysis. Isoflurane (MAC 1.2%), a volatile anaesthetic, was used to keep patients asleep throughout the operation.

Intraoperative fentanyl boluses (25 g) were given if heart rate or blood pressure rose above 20% of baseline levels. All cases were given anti-nausea medication right before they were extubated at the end of the procedure (ondansetron 4 mg). Release of patient from post anesthesia care unit (PACU) according to Aldrete's Scoring System which depends on Before releasing a patient, it is important to evaluate their level of discomfort, level of consciousness, and blood pressure. Prior to a patient's release from the post-operative care centre, we assessed a number of other vital indicators [15]. Postoperative paracetamol 1 gram was given every 12 hours.

Measurements

Hemodynamic parameters: Mean arterial pressure (MAP) and HR were recorded before block performance (preoperative), at skin incision and intraoperatively every 10 min after skin incision till the end of the surgery and after surgery at 0, 30 min, 2 h, 4 h, 6 h, 12 h, 18 h and 24h where 0= time after surgery before discharging from the PACU.

Onset of the blocks was assessed by a blinded investigator every 5 min until 30 min using a sensorimotor composite scale.

Sensorimotor composite scale

The sensory abilities of the skin covering the collarbone (supraclavicular nerves) and the lateral aspect of the deltoid muscle were evaluated (AN). A cold test was used to assign grades to each region, with zero indicating no block, one indicating mild analgesia (the patient can sense contact but not cold), and two indicating complete anaesthesia (patient cannot feel touch). Shoulder abduction (AN) and external shoulder spin (SSN) were used to evaluate motor function on a three-point measure (0 = no block, 1 = paresis, 2 = paralysis). After 30 minutes, the blocks were finished if the world composite result was 6 or higher (out of 8) [9]. Time to onset is thus described as the amount of time required to accumulate a minimum of 6 points in the overall score.

Visual Analogue Scale (VAS) was assessed at (T 0, 2, 4, 6, 12, 18, 24 h) where 0= time after surgery before discharging from the PACU. Time to first rescue analgesic requirement after surgery in the form of intravenous meperidine (0.5 mg/kg) If VAS ≥ 4 (moderate pain). Postoperative opioid (meperidine) at the first 24 hours after surgery.

On the first postoperative day, another anesthesiologist used a 4-point vocal measure spanning from "very pleased" to "very disappointed" to gauge the patient's level of happiness with the entire experience (1, very dissatisfied; 2, dissatisfied; 3, satisfied; 4, very satisfied).

At 30 minutes after the block was performed and at 30 minutes after the patient arrived at the PACU, HDP was present. Each half of the body has an acoustic aperture, which is represented by the liver and spleen. The US instrument was oriented cranially and examined cases along the anterior axillary line. HDP is characterised by a lack of diaphragmatic movement even during regular breathing, as well as a lack of or (paradoxical) cranial diaphragmatic movement during forced sniffing.

Possible adverse events as hoarseness and Horner syndrome (30 min after the performance of the blocks), pneumothorax, (LAST), bradycardia, hypotension and failed block were recorded. Bradycardia (HR less than 50 beat/min) was treated by atropine intravenous injection (0.05 mg/kg) which was repeated if needed. Hypotension (MAP decreased by ≥ 20 mmhg from the baseline reading or decrease ≤ 65 mmHg) received intravenous saline and bolus of vasopressor (Ephedrine 10 mg) which was repeated if no response.

Sample Size Calculation

Using G power 3.1.9.2, the optimal amount of the sample was determined. The sample size (30 cases were allocated in each group) was calculated based on confidence limit of 95%, power of the research of 90%, group to group ratio of 1:1, the outcome in the groups expected to range between 60 and 95%. 2 cases were added to overcome drop out.

Statistical analysis

Statistical analysis was conducted in SPSS 25. (IBM Inc., Chicago, IL, USA). Histograms and the Shapiro-Wilks normalcy test were used to examine the distribution of numerical data. All quantifiable parameters were represented as means and standard deviations (SDs), and the F test was used to compare the three groups, with the post hoc (Tukey) test used to compare the means of the subsets of interest. The Kruskal-Wallis test was used to compare the means of non-parametric quantitative factors stated as median and IQR, and the Mann-Whitney (U) test was used to compare the two groups. The Chi-square test was used to evaluate the categorical variables, which were represented as frequencies and percentages. The cutoff for statistical significance was set at a two-tailed P value of less than 0.05.

Results

In this research, 137 cases were assessed for eligibility, 32 cases did not meet the criteria, eight cases refused to participate in the research and seven cases had failed block. A random number generator was used to divide the remaining 90 subjects into three categories (30 cases in each). We did a statistical analysis on all of the assigned subjects we followed up on.

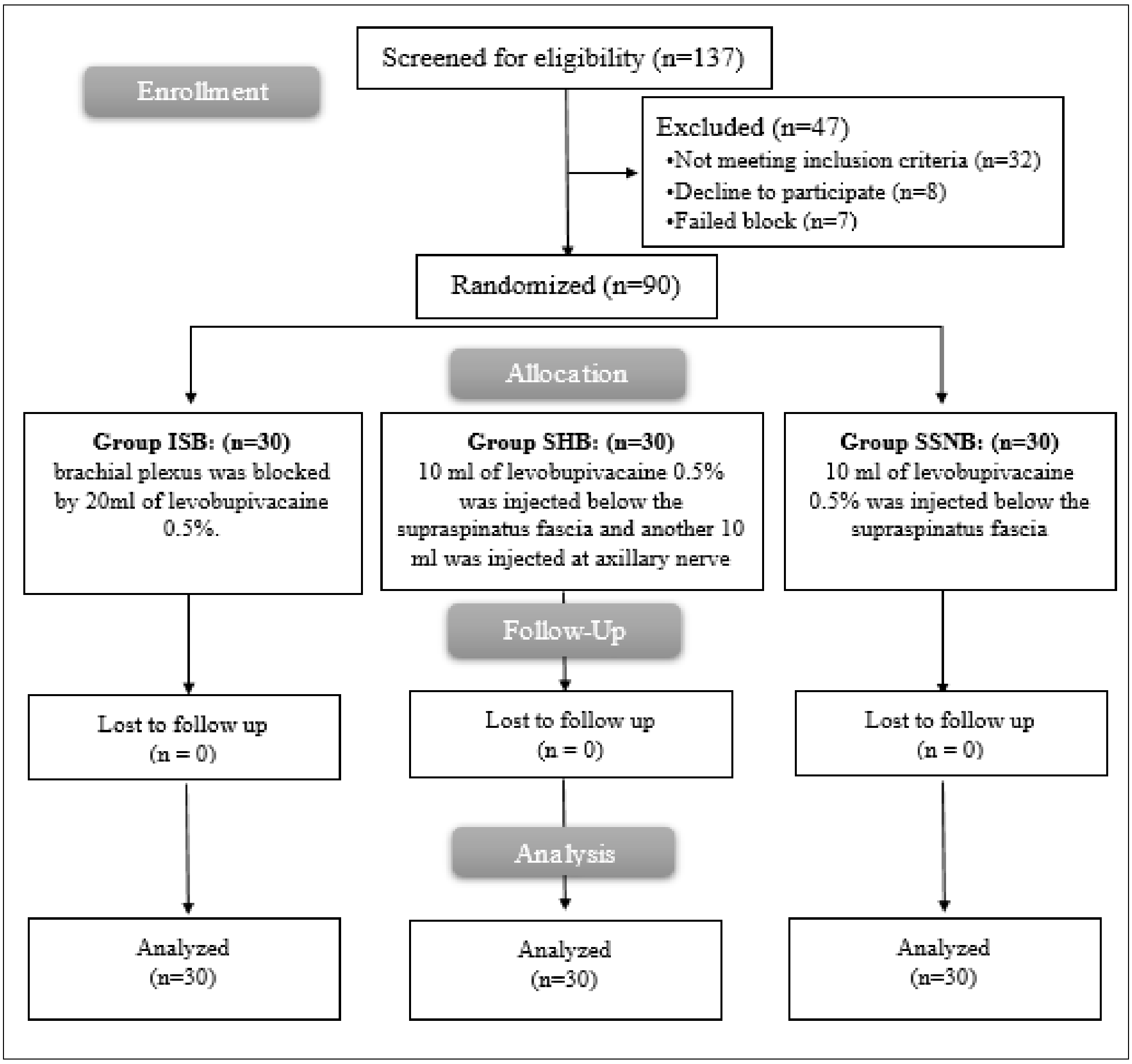

Fig 1: Consort flowchart of the enrolled cases

Patient's demographic data were insignificantly different among the studied groups. Table 1

Table 1: Patient's demographic data among the three groups (n = 90)

		ISB (n=30)	Group SHB (n=30)	SSNB (n=30)	P value
Age (years)		32.83± 10.77	32.03 ± 10.73	31.9 ± 8.38	0.927
Sex	Male	22 (73.3%)	17 (56.7%)	18 (60%)	0.366
	Female	8 (26.7%)	13 (43.3%)	12 (40%)	
BMI (kg/m^2)		26.53 ± 4.6	26.67 ± 3.75	24.56 ± 4.18	0.100
ASA physical status	ASA I	24 (80%)	20 (66.7%)	21 (70%)	0.487
	ASA II	6 (20%)	10 (33.3%)	9 (30%)	
Duration of surgery (min)		52.67 ± 6.81	51.6 ± 7.89	52.13 ± 6.55	0.845
Onset of block (min)		17.43 ± 2.01	17.73 ± 1.8	18.07 ± 1.53	0.395

Data are presented as mean ± SD or frequency (%). BMI: Body mass index, ASA: American Society of Anesthesiologists, ISB: Inter-scalene block, SHB: Shoulder block, SSNB: Suprascapular nerve block

Preoperative measurement of HR and MAP were insignificantly different. Intraoperative HR and MAP at skin incision, 20, 30, 40, 50 min and at the end of surgery were significantly higher in SSNB versus groups ISB and SHB ($p \leq 0.05$) and was insignificantly different between groups ISB and SHB. Postoperative HR and MAP were insignificantly different at preoperative, PACU and 30 min among the three groups. Postoperative HR and MAP at 2, 4, 6, 12, 18 and 24 h was significantly higher in SSNB versus groups ISB and SHB ($p<0.05$) and was insignificantly different between groups ISB and SHB. Figure 2

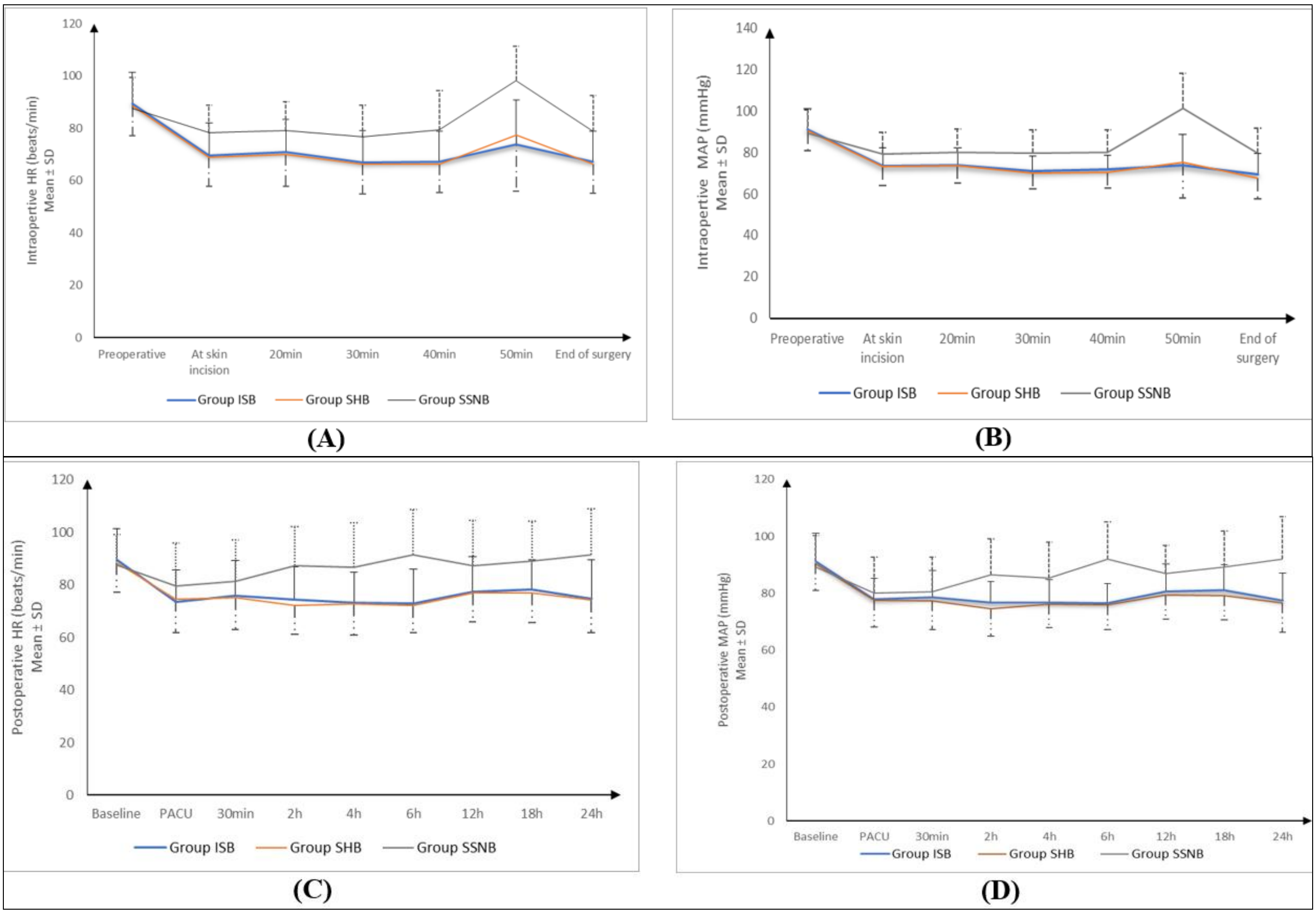

Fig 2: Intraoperative (A) HR and (B) MAP changes and Postoperative(C) HR and (D) MAP changes among the three groups

VAS was insignificantly different at PACU and 30 min among the three groups. VAS at 2, 4, 6, 12, 18 and 24 hr was significantly higher in SSNB versus groups ISB and SHB (p value < 0.05) and was insignificantly different between ISB and SHB. Figure 3.

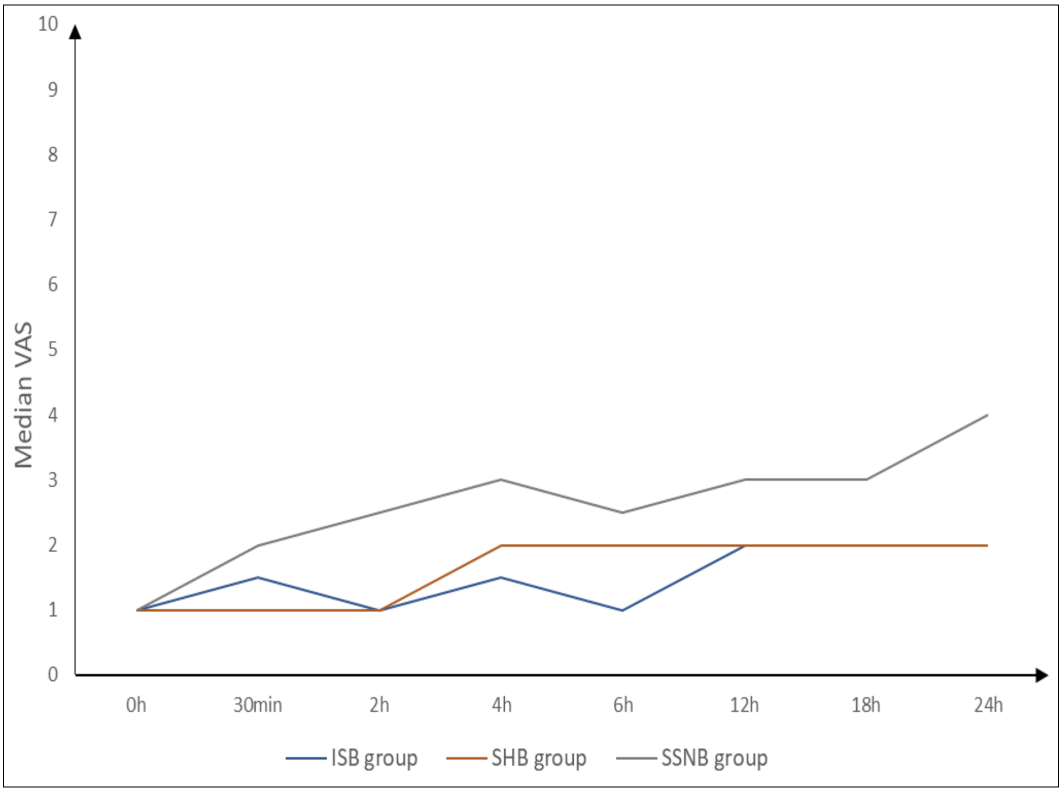

Fig 3: VAS changes among the three groups

Number of cases required rescue analgesia and required fentanyl intraoperatively was significantly higher in SSNB versus groups ISB and SHB (*p*<0.001). Time to first rescue analgesic requirement was significantly earlier in SSNB versus groups ISB and SHB (*p*<0.001). Intraoperative fentanyl consumption and postoperative meperidine consumption were significantly higher in SSNB versus groups ISB and SHB (*p*< 0.001). Number of cases required rescue analgesia and required fentanyl intraoperatively, time to first rescue analgesic requirement, intraoperative fentanyl consumption and postoperative meperidine consumption were insignificantly different between groups ISB and SHB. Table 2.

Table 2: Cases required rescue analgesia, time to first rescue analgesic, intraoperative fentanyl requirements and total opioid consumption among the three groups

		ISB (n=30)	Group SHB (n=30)	SSNB (n=30)	P value	Post hoc
Rescue analgesia		9 (30%)	10 (33.3%)	30 (100%)	< 0.001*	P1= 0.781 P2< 0.001* P3< 0.001*
Time to first rescue analgesic requirement		19.33 ± 5.00	19.20 ± 5.51	4.13 ± 1.74	<0.001*	P1=0.966 P2<0.001* P3<0.001*
Intraoperative fentanyl requirement		4 (13.3%)	5 (16.7%)	19 (63.3%)	< 0.001*	P1= 0.947 P2< 0.001* P3< 0.001*
Total opioid consumption	Intraoperative fentanyl (mcg)	3.33 ± 8.64	4.17 ± 9.48	15.83 ± 12.25	< 0 .001*	P1 = 0.947 P2 <0.001* P3 <0.001*
	Postoperative meperidine (mg)	11.00 ± 17.49	13.00 ± 18.96	90.67 ± 31.40	< 0 .001*	P1= 0.942 P2< 0.001* P3< 0.001*

Data are presented as mean ± SD or frequency (%), *significant as P value ≤ 0.05. ISB: Inter-scalene block, SHB: Shoulder block, SSNB: Suprascapular nerve block.

Postoperative nausea and vomiting (PONV) were significantly higher in SSNB versus groups ISB and SHB (P= 0.031), hemi-diaphragmatic paralysis and horner syndrome were significantly higher in ISB versus groups SHB and SSNB (*p*<0.001). Bradycardia, hypotension and hoarseness were insignificantly different among the studied groups. LAST didn't occur in any patient. Cases' satisfaction was significantly higher in ISB: very satisfied 21 (70%), satisfied 9 (30%) and SHB: very satisfied 20 (66.67%), satisfied 10 (33.33%) versus SSNB very satisfied 0 (0%), satisfied 19 (63.33%) (*p*< 0.001). Table 3

Table 3: Adverse effects and cases' satisfaction among the three groups

		ISB (n=30)	Group SHB (n=30)	SSNB (n=30)	P value
Adverse effects	Hemi-diaphragmatic paralysis	23 (76.67%)	0 (0%)	0 (0%)	< 0.001*
	Bradycardia	3 (10%)	2 (6.67%)	1 (3.33%)	0.585
	Hypotension	5 (16.67%)	3 (10%)	3 (10%)	0.661
	PONV	2 (6.67%)	2 (6.67%)	8 (26.67%)	0.031*
	Horner syndrome	3 (10%)	0 (0%)	0 (0%)	0.044*
	Hoarseness	2 (6.67%)	0 (0%)	0 (0%)	0.129
	LAST	0 (0%)	0 (0%)	0 (0%)	---
Cases' satisfaction	Very satisfied	21 (70%)	20 (66.67%)	0 (0%)	< 0.001*
	Satisfied	9 (30%)	10 (33.33%)	19 (63.33%)	
	Dissatisfied	0 (0%)	0 (0%)	6 (20%)	
	Very dissatisfied	0 (0%)	0 (0%)	5 (16.67%)	

Data are presented as mean ± SD or frequency (%), *significant as P value ≤ 0.05. ISB: Inter-scalene block, SHB: Shoulder block, SSNB: Suprascapular nerve block, PONV: Postoperative nausea and vomiting, LAST: Local anesthetic systemic toxicity.

Discussion

Regarding intraoperative MAP and HR, our results are supported by Saini *et al.* [16] who conducted a randomised trial comparing the analgesic efficacy of SHB versus ISB for postoperative analgesia in arthroscopic shoulder surgeries. Seventy adults scheduled to undergo laparoscopic Bankart repair surgery participated in their research. Cases were split into two groups and given either an interscalene nerve block (ISB; ISB; n = 35) or a sympathetic nerve block (SHB; n = 35) using ultrasonography and a nerve generator. The ISB and SHB had comparable HR and MAP fluctuations prior to and during surgery.

However, Kumara *et al.* [1] contrasted SSNB and interscalene brachial plexus block in cases having shoulder arthroscopy, and they found that SSNB was more effective. For their prospective research, they randomly assigned 60 adults having shoulder arthroscopy to one of two groups: ISB or SSB. ISB with 20 cc of 0.5% bupivacaine and 75 mg clonidine was administered to the ISB. In the SSB group, 15 cc of 0.5% bupivacaine and 75 milligrammes of clonidine were administered subcutaneously. Intra-operative HR and noninvasive blood pressure were kept same in all cases showed no significant inter-group differences. The difference from our findings may be explained as they used local anaesthetic combined with 75 mg clonidine whereas we applied only LA.

Regarding postoperative MAP and HR, our results are supported by Saini *et al.* [16] who reported that the post operative variation in HR and MAP between the ISB and SHB was similar.

Also, Aksu *et al.* [17] compared postoperative analgesia effects of the administration of USG interscalene brachial plexus block (ISPB) and intraarticular (IA) bupivacaine carried out with bupivacaine. In ISPB and IA groups, 20 mL 0.25% bupivacaine were applied after surgery. In the third group, the cases served as a reference and received no block. At 0 hours, 60 minutes, and 120 minutes postoperatively, the control group's MAP readings were all higher than the ISPB group's. The usual clinic values at 30 and 90 minutes post-op were considerably higher in the control and intra-articular groups than in the ISPB group.

Our findings regarding VAS are confirmed by a research by Pani *et al.* [18], who compared SHB and ISB for post-operative analgesia following shoulder surgery. A total of 76 cases were split into two groups of 38 cases each for shoulder arthroscopy procedures; the ISB group and the SHB group. The average visual analogue scale (VAS) ratings were taken before, during, and after operation at 1, 4, 6, 12, and 24 hours. Over a 24-hour span, there was no statistically significant variation in VAS scores between the groups ($p > 0.05$), which is in line with our own findings.

Ultrasound assisted suprascapular and costoclavicular nerve block (CCB) versus ISB for postoperative analgesia in arthroscopic shoulder surgery was compared in a randomised clinical research by Kamel *et al.* [19]. Participants were randomly assigned to the ISB or DSB groups at a 1:1 ratio (received combined SSB plus CCB blocks). In the first three hours after surgery, ISB cases reported considerably less pain on the numerical rating scale (NRS) than DSB cases did.

The difference from our finding may be explained as they compared ISB to combined SSB plus CCB blocks whereas we compared ISB to SHB which is combined suprascapular and ANBs.

Regarding required rescue analgesia and time to first rescue analgesic requirement, our results are supported by Pani *et al.* [18] who documented that time to first analgesic request was 6.2 ± 1.3 h in ISB group and 5.9 ± 1.2 h in SHB group, which was not statistically significant.

In contrast to our findings, Kamel *et al.* [19] documented that the time to rescue analgesia was significantly longer in ISB than DSB. The number of cases who required postoperative nalbuphine was significantly fewer in ISB than DSB.

Regarding number of cases required fentanyl intraoperatively and intraoperative fentanyl consumption, our results are confirmed by Saini *et al.* [16] who reported that number of cases who required intraoperative fentanyl supplement was comparable between ISB and SHB groups.

In contrast to our findings, Kumara *et al.* [1] documented that the number of cases needing fentanyl supplementations intraoperatively was comparable between groups with 6 (20%) in ISB versus 9 (30%) in group SSB required supplementation.

Postoperative meperidine consumption was comparable with Ko *et al.* [20] who reported that at all other time points, except in the recovery room, 3NB showed noninferior to ISB regarding intravenous patient-controlled analgesia.

In contrast to our findings, Hussain *et al.* [21] reported that ISB and suprascapular block were not different in 24-h morphine consumption. The deviation from our findings may be attributed to different in sample size and research design which was systematic review and meta-analysis.

Regarding the adverse effects in ISB, in agreement with our findings, Saini *et al.* [16] stated that the block complications like dyspnea, ptosis and extensive motor blockade were observed only in the ISB group.

Regarding postoperative pain in laparoscopic shoulder surgery, Waleed *et al.* [22] compared ISB to SSNB+ANB. Sixty cases, ages 18 to 40, were assigned at random to receive either ISB or SSNB+ANB prior to arthroscopy shoulder surgery. In the ISB group, four cases experienced dyspnea (13.33%), five cases experienced horner's syndrome (16.67%), two cases experienced hoarseness of voice (6.67%), 16 cases experienced major weakness of the upper arm (53.33%), three cases experienced pain during needle entry (10%), and two cases experienced PONV (6.67%).

Regarding cases' satisfaction, in agreement with our findings, Ko *et al.* [20] documented that the satisfaction was similar between AN, and the articular branch of lateral pectoral nerve block (3NB) and ISB ($p = 0.815$).

Limitations: It was a single-center research, and the results may differ elsewhere. A control group (no intervention or sham block) was not included due to ethical issues. It was not possible to do randomization due to the variety of injection locations. Since the surgeons applied a shoulder brace, VAS ratings could only be evaluated when the patient was at rest; dynamic values were unavailable. The period of follow-up was limited to just one day.

Conclusions

Both SHB and ISB blocks have similar efficacy in terms of haemodynamic stability, analgesia (postoperative pain scores, number of cases required rescue analgesia, time to first rescue analgesic requirement, number of cases required fentanyl intraoperatively and postoperative meperidine consumption), incidence PONV and cases' satisfaction. SSNB group showed inferior results in these parameters versus both SHB and ISB. However, ISB was associated with more complications (HDP and Horner syndrome) versus groups SHB and SSNB

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Conflict of Interest: Nil

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