A comparison of ultrasound-guided interscalene block and combined suprascapular nerve and costoclavicular brachial plexus block for arthroscopic shoulder surgery: a non-inferiority trial

Yoon Jung Kim, MD^a. Hyunzu Kim, MD, PhD^a. Na Eun Kim, MD^a. Chunwoo Yang, MD^a.

^aDepartment of Anesthesiology and Pain Medicine, Inha University College of Medicine, Incheon, South Korea

Background

Several diaphragm sparing nerve blocks were evaluated. In this study, we compared ultrasound guided interscalene block(ISB) with combined proximal suprascapular nerve block(SSNB) and costoclavicular block(CCB) for arthroscopic shoulder surgery.

Hypotheses

We hypothesized that combined SSNB-CCB was non-inferior to ISB in terms of immediate postoperative analgesia for arthroscopic shoulder surgery with a reduced risk of hemidiaphragmatic paralysis(HDP).

Methods

Adult inpatients (20 – 80 years of age, American Society of Anesthesiologists physical status I – 3) scheduled for arthroscopic shoulder surgery were included. Patients were randomly assigned to receive either ISB (group I) or combined SSNB-CCB (group SC).

- The primary outcome : pain score at 30 min in the PACU
- The secondary outcomes: pain score (6hr, 24hr), worst pain score(WP), supplemental analgesia (IV morphine equivalents), incidence of HDP, block related outcomes (performance time, patient discomfort, motor block, block duration), adverse events (vascular puncture, LA toxicity, and unintentional paresthesia)

Figure 2. Postoperative pain scores

Table I. Supplemental analgesia

	Group I (n=22)	Group SC (n=24)	P value
at PACU (mg)	0 (0-0)	0 (0-0)	.344
24 hr (mg)	3.3 (0-3.3)	3.3 (0-6.7)	.990

Amount of supplemental opioids were expressed as a IV morphine equivalent dose.

Complete or partial HDP occurred in a higher incidence in group I than group SC (73% vs 8%; $P < 0.001$).

Block-procedure time was longer in combined block compared to ISB. Other secondary outcomes were comparable in both groups(Table 3).

Table2. Block performance characteristics

	Group I (n = 22)	Group SC (n = 24)	P value
Procedure time (min)	2.3 (1.0)	5.9 (3.0)	< 0.001
Patient discomfort (NRS)	3 (2-3)	2 (1-3)	0.417
Paresthesia (n)	2	1	0.497
Block duration (hr)	14 (10-16)	14 (11-19)	0.627
Patient satisfaction (NRS)	10 (8-10)	10 (10-10)	0.156

Table 3. Block related adverse events

	Group I (n = 22)	Group SC (n = 24)	P value
Dyspnea (n)			
at PACU	1	1	.733
24 hr	0	0	
Handgrip weakness (n)			
(no/partial/complete)			
at PACU	0/11/10	0/14/10	.657
24 hr	20/2/0	22/2/0	.407
Paresthesia (n)			
at PACU	2	0	.223
24 hr	6	9	.337

Figure 1. . CONSORT E-flow chart

Results

Group SC was not inferior to the group I in terms of the primary outcome ($P = 0.987$, the difference of the medians, 0; 95% CI 0 - 0). The pain scores at other time points were not significantly different between the groups (Fig. 2). Supplemental analgesia was not significantly different in both groups at PACU and 24 hr (Table 2).

Discussion

This study shows that combined SSNB-CCB was non-inferior to ISB in terms of pain score at 30 min in PACU, the primary outcome, and subsequent pain scores were similar in both groups. The overall incidence of HDP with combined block was lower than that with ISB.