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— Abstract —

Continuous intra-lesional Infusion Combined with Interscalene Block for Effective Postoperative Analgesia after Arthroscopic Shoulder Surgery

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Purpose: The purpose of this study was to compare the effectiveness of postoperative pain control by intravenous patient-controlled analgesia (IV) to the effectiveness of postoperative pain control by continuous intra-lesional infusion of local anesthetics (IL) with or without an interscalene brachial plexus block (ISB) after arthroscopic shoulder surgery.

Materials and Methods: We designed this prospective randomized case-controlled double-blind study, and allocated 84 consecutive patients to four groups according to postoperative analgesic method, i.e., Group IV, Group ISB-IV, Group IL, and Group ISB-IL after arthroscopic shoulder surgery. Postoperative pain, side effects and supplemental analgesics were recorded at 1 hour and then at every 8 hours for 2 days.

Result: The demographic and clinical characteristics of four groups were identical statistically. Interscalene block (Group ISB-IV, Group ISB-IL) was found to be effective at relieving pain and at reducing supplemental analgesic amounts at 1 and 8 hours postoperatively ($p<0.05$). Patients in the Group ISB-IL had less pain at 16 and 48 hours postoperatively than the other groups ($p<0.05$). Continuous intra-lesional infusion (Group IL, Group ISB-IL) was superior in reducing analgesic-related side effects ($p<0.05$).

Conclusion: This study suggests that a combination of an interscalene brachial plexus block and continuous intra-

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1~2 mg mida-
zolam
50 mm
22 guage (Stimuplex, B ANOVA
Braun, Melsungen, Germany)
(Stimuplex-DIG, B Braun, Melsun- 가
gen, Germany)
, 0.5 mA Chi-square
p<0.05 가

, 20 ml
0.25% ropivacaine 30

Group IV Group ISB-IV VAS,
가 (Table 1). Group ISB-IV 1 가
50~100 µg ketorolac 30 mg IL 1 가
fentanyl 0.3~0.5 µg/kg/ml, ketorolac 가
0.03~0.05 mg/kg/ml ondansetron Group ISB-IV Group ISB-IL
0.08 mg/ml 1ml 1 8 VAS
1 ml 15 Group ISB-IL 16 48
. Group IL Group ISB-IL VAS (p<0.05, Fig. 1, Table
2). Group ISB-IV Group ISB-IL
20 guage Group-IV Group IL 8
가
(p<0.05, Fig. 2).
44.0% (Group IV; 9/21, Group
IL; 9/20)가 1 가
4.8%

0.75% ropivacaine 10 ml 1 가
(Automed 3200, Ace medical, VAS(visual analog scale, 0-
Seoul, Korea) 96 ml 0.5% ropi- (Fig. 2)
vacaine 2 ml 8
100) 1 , 22.0% (Group IV; 5/21, Group
IL; 4/20)
가 , 10% 가 가
가 70 , 가 16 Group ISB-IV
, ketoro- 30% 가 가
lac 30 mg, Demerol 50 mg

(Fig. 2).

Group ISB-IL
 Fig. 3). Group IV Group ISB-IV
 Group IL (p<0.05,
 2

가 가
 Group IV 1

Table 1. Demographic Data

Group	IV	ISB-IV	IL	ISB-IL
Numbers	21	20	20	21
Disease RCT*	8	8	8	8
Combined	2	2	3	2
SLAP**	6	5	5	6
Instability	4	3	4	4
Others	1	2	0	1
Age (yr)***	48 ± 18	44 ± 16	50 ± 16	43 ± 14
Sex (M/F)	13/8	12/8	12/8	14/7
Height (cm)***	165 ± 9	164 ± 10	163 ± 10	169 ± 10
Preop. VAS***	58 ± 26	57 ± 23	58 ± 29	56 ± 21
Duration of Surgery (min)***	120 ± 36	110 ± 49	110 ± 48	106 ± 32
Length of hospital stay (days)***	9 ± 4	8 ± 3	8 ± 3	8 ± 3

* RCT: Rotator cuff tear

** SLAP: Superior labrum anterior to posterior lesion

*** Values are presented as means ± SD, unless otherwise indicated.

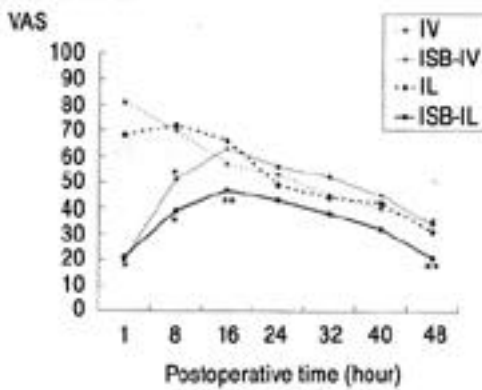


Fig. 1. The graph showed the changes of pain VAS after arthroscopic shoulder surgery. Group ISB-IV and Group ISB-IL showed lower VAS for 8 hour after surgery*, whereas Group ISB-IL had the lowest VAS at 16 hour and 48 hour after surgery** (p<0.05).

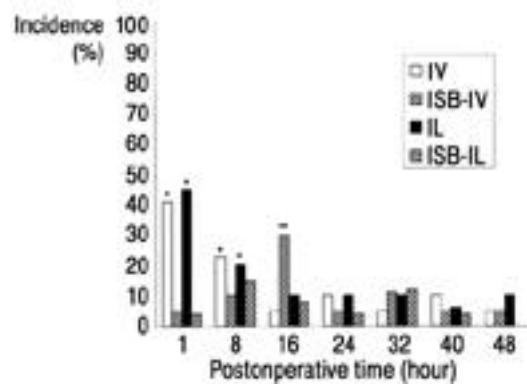


Fig. 2. Group ISB-IV and Group ISB-IL showed lower incidences of supplement NSAIDs injection than Groups IV and Group IL at 1 hour postoperatively* (p<0.05). After the effect of the interscalene block had diminished (at 16 hour postoperatively), Group ISB-IV showed a higher incidence of supplement NSAIDs injection than the other groups** (p<0.05).

Singelyn 가
 14)
 24
 (suprascapular nerve block)

가 ropivacaine

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ropivacaine

2)

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2)

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7)

ropivacaine

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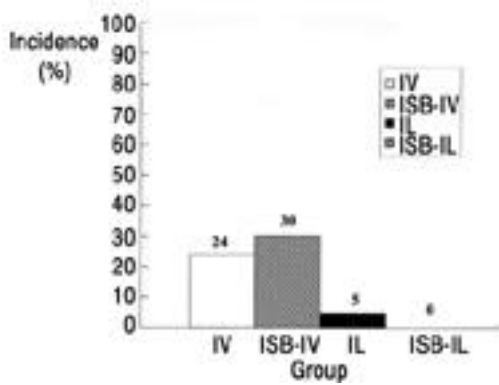


Fig. 3. Incidences of postoperative nausea and vomiting were lower in Groups IL and Group ISB-IL ($p < 0.05$)

Table 2. The changes of pain VAS after arthroscopic shoulder surgery

Postop time Group	1 h	8 h	16 h	24 h	32 h	40 h	48 h
IV	81	70	57	53	45	40	35
ISB-IV	20*	51*	63	56	52	45	34
IA	68	72	66	49	44	42	31
ISB-IA	21*	39*	47*	43	38	32	21*

* $p < 0.05$

¹³⁾ Klein ⁸⁾

ropivacaine

^{1,3,6,10,11)}

ropivacaine

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ropivacaine

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Group ISB-IV

Group ISB-IL

1

8

가

8

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