Effect of epinephrine as an additive during ultrasound guided interscalene brachial plexus block: A randomized controlled trial

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Background

- Interscalene brachial plexus block (ISBPB) is widely used in patients under shoulder arthroscopy for the purpose of postoperative analgesia.
- Epinephrine, when used as part of a test solution in regional analgesia is a useful indicator of inadvertent intravascular injection of local anesthetics.
- In addition, it is also known to prolong the block duration combined with 1% mepivacaine during infraclavicular BPB.
- However, there was no research comparing the duration of ISBPB in accordance with epinephrine as an adjunct to ropivacaine.
- This study aims to evaluate the efficacy of 1mcg/ml of epinephrine added to reduced amount of ropivacaine during ISBPB on postoperative analgesic effect in patients undergoing shoulder arthroscopy.

Methods

- A randomized controlled study was conducted in 43 patients with ASA class I-II, undergoing shoulder arthroscopy under ISBPB and general anesthesia.
- The patients were randomly allocated into two groups.
  Group 1 (n = 21, US-guided ISBPB with 10ml of 0.5 % ropivacaine + epinephrine 5 mcg/ml) and
  Group 2 (n = 22, US-guided ISBPB with 20ml of 0.5 % ropivacaine + epinephrine 5 mcg/ml)
- Ultrasound-guided ISBPB was performed before the induction of general anesthesia at APS.
- Onset time of sensory block, duration of sensory and motor block, consumption of opioid (fentanyl) delivered via intravenous PCA and rescue analgesics in the first 24 hours following surgery were recorded.

Table 1. Duration of sensory and motor blockade

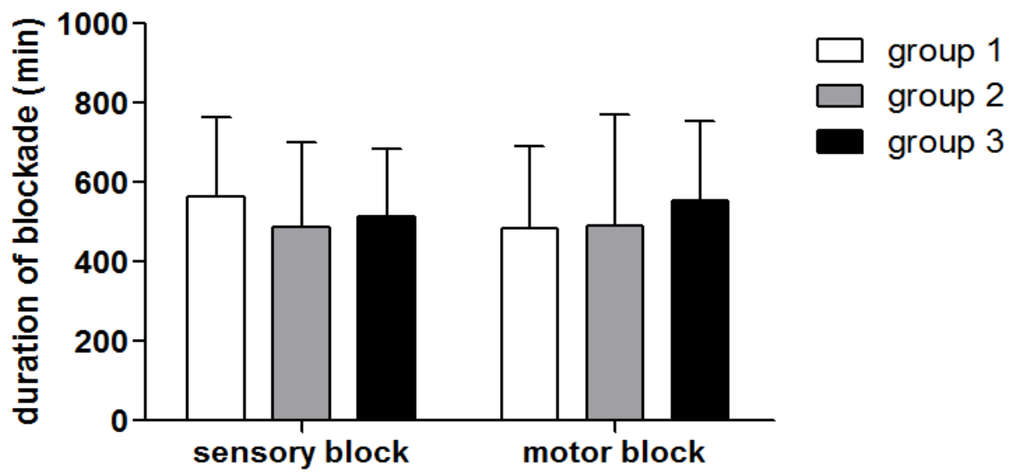
	Block duration (min)	
	Sensory	Motor
Group 1 (n=21)	525.95 ± 128.44	462.86 ± 146.96
Group 2 (n=22)	532.86 ± 122.81	442.41 ± 136.39
p value	0.858	0.639
Values are expressed as mean ± SD.		

Group 1: 0.5 % ropivacaine 10 ml + epinephrine 5 mcg/ml
Group 2: 0.5 % ropivacaine 20 ml + epinephrine 5 mcg/ml

Results

- Onset of the sensory block was not significantly different between study groups (P=0.41).
- Sensory and motor block duration were comparable in both groups (Table 1).
  (sensory: P=0.858, motor: P=0.639, respectively)

Fig 1. Duration of sensory & motor nerve block after ISBPB



Group 1: 0.5 % ropivacaine 20 ml + normal saline
Group 2: 0.5 % ropivacaine 10 ml + epinephrine 5 mcg/ml
Group 3: 0.5 % ropivacaine 20 ml + epinephrine 5 mcg/ml

- There were no significant differences in consumption of fentanyl via IV PCA and cumulative amount of rescue analgesics within 24 h following surgery (Table 2).
  (IV PCA: 8 h, P=0.580; 24 h, P=0.588; rescue analgesics: 8 h, P=0.329; 12 h, P=0.396; 24 h, P=0.381, respectively)

Table 2. Cumulative amount of IV PCA following surgery

	IV PCA (fentanyl, mcg)	
	8 h	24 h
Group 1 (n=21)	33.48±55.65	336.14±299.69
Group 2 (n=22)	42.73±53.09	299.69±167.52
p value	0.580	0.588
Values are expressed as mean ± SD.		

- No participants experienced any adverse effect including neurologic sequelae.

Conclusion

- This randomized controlled trial demonstrated that epinephrine, when combined with reduced dose of ropivacaine equally provided the postoperative analgesic effect by showing no statistical difference in sensory and motor block duration after ISBPB.
- We suggested that perineural administration of epinephrine combined with ropivacaine may reduce total amount of local anesthetics and provide analgesic effect of ISBPB without adverse events.

<References>
1. Song JH, Shim HY, Lee TJ, et al. Comparison of dexmedetomidine and epinephrine as an adjuvant to 1% mepivacaine in brachial plexus block. *Korean journal of anesthesiology* 2014; 66(4): 283-9.