The impact of the addition dexmedetomidine to local anaesthetic for intravenous regional anaesthesia: a systematic review

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Background

Intravenous Regional Anaesthesia (IVRA) is a simple and reliable method of providing anaesthesia for minor surgical procedures of the extremities (1,2). Short duration is a major limitation. Various adjuvants have been used in an effort to overcome this. Dexmedetomidine, a selective alpha-2 receptor agonist has been extensively studied in recent years with variable results (3). Our aim is to determine the duration of analgesia, onset time of sensory and motor block and incidence of tourniquet pain.

Materials and methods

We conducted systematic searches for randomised controlled trials (RCTs) for articles in English published between January 1990 and December 2018. We used a combination of the MeSH and text search terms “dexmedetomidine” and/or “adjuvant”, “IVRA” and “Bier block” in all possible combinations. We used the Cochrane ‘Risk of bias’ tool in RevMan 5 to evaluate the studies included.

Results

Of the 115 citations identified by the search, 7 satisfied the selection criteria and were included in this review. In total 318 patients were randomised to dexmedetomidine and 159 to the control group. Intraoperative analgesia duration was significantly longer in the dexmedetomidine group (MD 11.08 minutes; 95% CI 5.42, 16.75; $P < 0.0001$)(Fig.1). Incidence of tourniquet pain was lower with dexmedetomidine. Sensory block onset time was shorter in the dexmedetomidine group compared to the control group (MD -2.10 minutes; 95% CI -3.345, -0.86; $P = 0.00009$) (Fig.2). No difference in motor block onset between groups was found(Fig. 3).

Conclusion

Dexmedetomidine enhances the onset of sensory block and increases the duration of the block with no effect on the onset of motor block.

Forest plot of comparison: onset time of sensory block (minutes)
dexmedetomidine vs no dexmedetomidine.

Forest plot of comparison: onset time of motor block (minutes)
dexmedetomidine vs no dexmedetomidine

References

1. Ramadhyani U, Park JL, Carollo DS, Waterman RS, Nossaman BD. Dexmedetomidine: clinical application as an adjunct for intravenous regional anesthesia. *Anesthesiol Clin*. 2010 Dec;28(4):709-22.
2. Flamer D, Peng P. Intravenous regional anesthesia: a review of common local anesthetic options and the use of opioids and muscle relaxants as adjuncts. *Local Reg Anesth*. 2011; 4: 57–76.
3. Bajwa S, Kulshrestha A. Dexmedetomidine: an adjuvant making large inroads into clinical practice. *Ann Med Health Sci Res*. 2013 Oct;3(4):475-83.