Clonidine as a Local Anesthetic Adjuvant for Brachial Plexus Blockade: Meta-analysis of Randomized Controlled Trials

Gurolen Sidhu, M.D., R. Seth Baker, M.D., Sailesh Arulkumar, M.D., Craig Hamilton, M.D., J. Arthur Saus, M.D.
Department of Anesthesiology, LSU Health Sciences Center, Shreveport LA

Introduction

- Clonidine has been investigated as an adjuvant to local anaesthetics (LA) with the goal of improving surgical anesthesia and prolonging postoperative analgesia in general and regional blocks.
- Whether due to the conflicting results of multiple small-scale randomized controlled trials or concerns regarding side effect profile, the use of clonidine as a local anaesthetic adjuvant has declined in many institutions over time.
- The goal of our study was to review the available literature and use meta-analysis to quantitatively assess utility of clonidine as an adjuvant in brachial plexus blockade.

Materials and Methods

- A literature search was conducted on the use of clonidine in brachial plexus blockade for upper extremity surgery using PubMed, Ovid, & Cochrane databases.
- Inclusion Criteria:
  - Only prospective/randomized trials of adults undergoing brachial plexus blockade were included.
  - Studies must directly compare use of LA plus clonidine (LA+C) to LA alone (LA).
- Outcomes data must be presented in a format suitable for comparative analysis.
- Primary outcome of interest was duration of anesthesia.
- Random effects meta-analysis was used. Statistical significance was accepted when P<0.05.
- Analysis of publication bias was performed for all outcomes.

Results

- 15 studies, 835 patients included (Table 1).
- Significant prolongation of duration of anesthesia in favor of LA+C (all outcomes presented in Table 2).
- Difference in means 117.267 min (95% CI 82.11 to 152.42, P<0.001).
- No evidence of publication bias was noted for this effect.
- Sensitivity analysis found no additional benefit to doses of clonidine ≥100mcg over doses <100mcg.
- Duration of surgical anesthesia and motor blockade were similarly prolonged with LA+C compared to LA alone approaches 2.5 across included studies. However, there is evidence of publication bias for this effect, with an adjusted point estimate of 1.497 (0.658-3.407) when including imputed data.

Discussion

- Previous randomized controlled trials assessing use of clonidine in brachial plexus blockade reached disparate conclusions.
- Random effects meta-analysis of available data from these trials reveals:
  - Statistically and clinically significant prolongation of:
    - Onset surgical anesthesia
    - Duration surgical anesthesia
- No significant increase in risk of block failure, bradycardia or desaturation
- Lower doses of clonidine appear to mitigate the relative risk of hypotension, without compromising its adjunctive anaesthetic and analgesic effects.
- Analysis of bias suggests underreporting of studies that demonstrate a lower risk of hypotension.

Table 1: individual study details

Table 2: Effect size data for outcomes of interest

Table 3: Odds ratios comparing clonidine use to no clonidine use (1), and studies using ≥150 mcg clonidine (2).

Clonidine has been shown to be an effective adjuvant to local anaesthetics for brachial plexus blockade. Meta-analysis of randomised controlled trials has shown a significant prolongation in duration of anaesthesia and analgesia, as well as a reduction in the risk of hypotension. These findings support the use of clonidine as an adjuvant to local anaesthetics in brachial plexus blockade for upper extremity surgery, particularly when using doses ≥100mcg.

References


Disclosures

The authors have nothing to disclose.