The Median Effective Analgesic Concentration (MEAC) of Ropivacaine in Ultrasound-Guided Interscalene Brachial Plexus Block for Postoperative Analgesia after Arthroscopic Repair of Rotator Cuff: A Double-Blind Up-Down Concentration-Finding Study

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Abstract

Objectives:The median effective concentration of ropivacaine in interscalene brachial plexus block for postoperative analgesia after arthroscopic rotator cuff repair(ARCR) has not been determined. Design: this is a prospective double blinded study. Method: This study was conducted on 40 patients with ASA grade I or II who had selective ARCR. A concentration of 10mL ropivacaine administered for the Interscalene brachial plexus block(ISBPB) was determined using the up-and-down sequential. The initial concentration of ropivacaine 0.3%. After a successful or unsuccessful postoperative analgesia, the concentration of ropivacaine was decreased or increased by 0.05% in the next patient, respectively. We defined successful postoperative analgesia as a visual analogue scale(VAS)score¡4 at rest or activity within initial 8 hours after ISBPB. VAS score[?]4 was defined as unsuccessful analgesia. The analytic techniques of linear, linear-logarithmic, exponential regressions and centered isotonic regression were used to determine the EC50 of ropivacaine and the residual standard errors were calculated for the comparison of "goodness of fit" among the different models. Results: The concentration of local anesthetic ropivacaine administered ranged from 0.1% to 0.35%. The EC50 (95% confidence interval) from 4 different statistical approaches (linear, linear-logarithmic, exponential regressions and centred isotonic regression) were 0.207% (0.168%, 0.355%), 0.182% (0.165%, 0.353%), 0.196% (0.154%, 0.356%), and 0.163%, respectively. Among all of the 4 models, the exponential regression had the least residual standard error (0.0990). Conclusion: The EC50 derived from four statistical models for 10ml ropivacaine in ultrasound-guided interscalene brachial plexus block for postoperative analgesia was distributed in a narrow range of 0.163%–0.207%.

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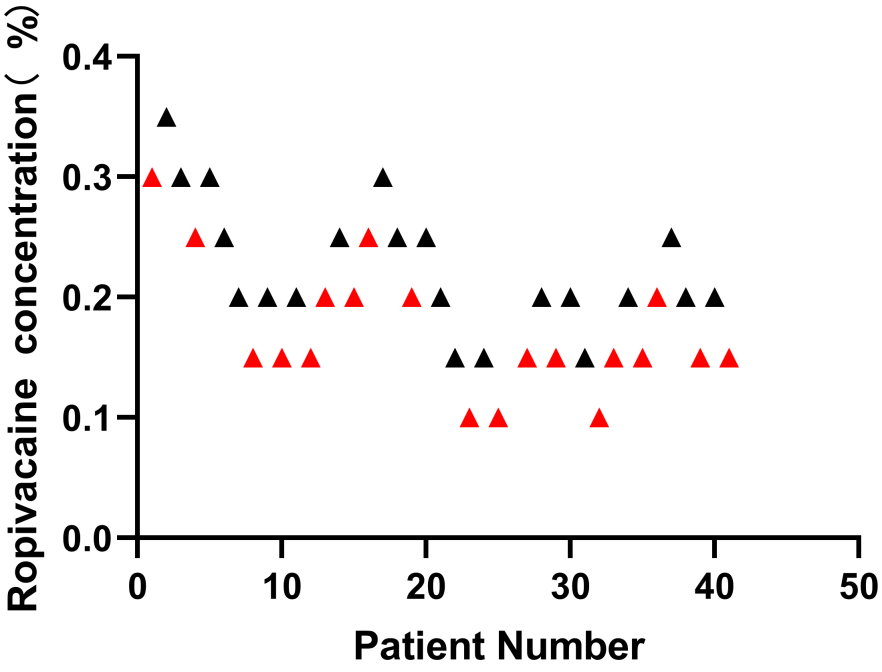
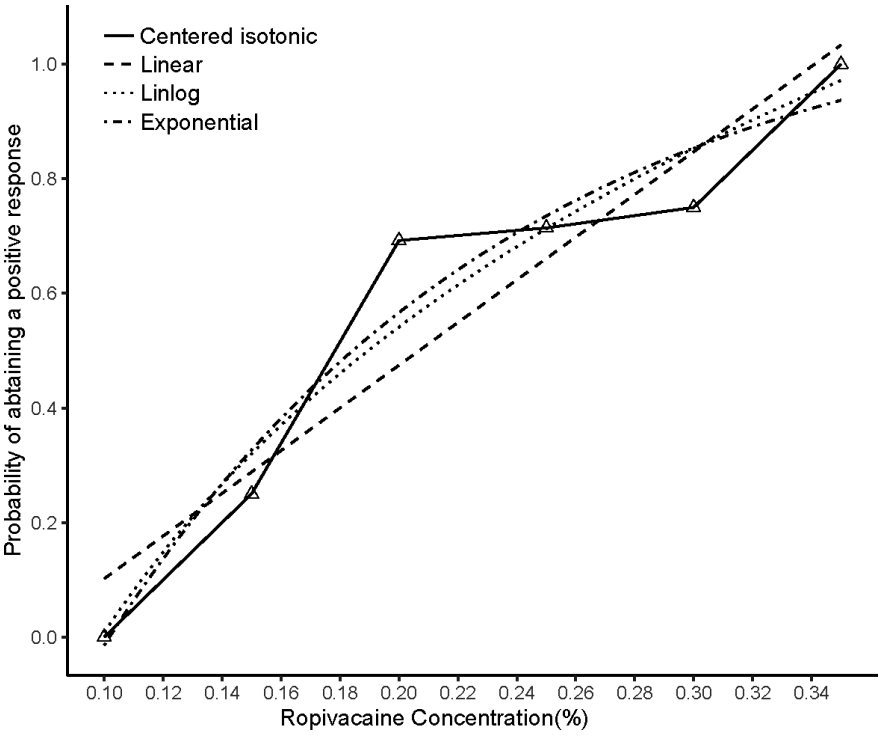
CONSORT Flow Diagram.doc available at https://authorea.com/users/732464/articles/712203-the-median-effective-analgesic-concentration-meac-of-ropivacaine-in-ultrasound-guided-interscalene-brachial-plexus-block-for-postoperative-analgesia-after-arthroscopic-repair-of-rotator-cuff-a-double-blind-up-down-concentration-finding-study





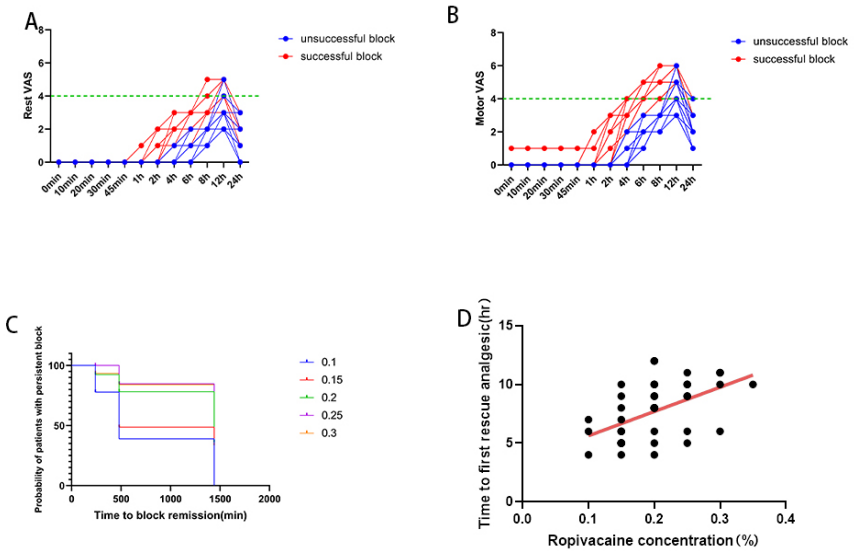


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Table1 Patient Characteristic.docx available at https://authorea.com/users/732464/articles/712203-the-median-effective-analgesic-concentration-meac-of-ropivacaine-in-ultrasound-guided-interscalene-brachial-plexus-block-for-postoperative-analgesia-after-arthroscopic-repair-of-rotator-cuff-a-double-blind-up-down-concentration-finding-study

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