The use of Continual Reassessment Method (CRM) for finding ED₉₅ of prilocaine 1% and lidocaine 1% with adrenaline (1:200,000) for ultrasound guided (USG) supraclavicular block

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Background and Goal of Study

The Continual Reassessment Method (CRM) is an adaptive Bayesian design used for dose finding studies. It can directly estimate the ED₉₅ dose of a drug providing precise results, generating high quality evidence. We aim to find out the ED₉₅ of prilocaine 1% and lidocaine 1% with adrenaline for USG supraclavicular block using this method filling a knowledge gap in the literature.

Materials and Methods

- All essential approvals gained (e.g. MHRA and Ethics)
- Double blind randomized prospective controlled trial
- Adult (> 18 years), ASA I-III patients, BMI< 40, presenting for an awake upper limb surgery.
- Patients randomized between 'prilocaine' or 'lidocaine with adrenaline' groups using sealed envelope method.
- Experienced (>1000 blocks) operators.
- The starting dose for both groups was 27 ml.
- Figure 1 shows schematic representation of the study design and Figure 2 shows the dose allocation sequence.
- The success of a block was assessed using the cold and the pin prick sensation in the distribution of radial, median, ulnar and musculocutaneous nerves of the brachial plexus by an independent assessor at 10 min intervals up to 30 min.
- If the ED₉₅ dose was not in the doses studied or if 40 patients were recruited the study was stopped as per statistical advice

Fig 1. Schematic representation of the study design

Results and Discussion

A total of 30 patients were recruited in the prilocaine group and 40 patients in the lidocaine with adrenaline group. For an USG supraclavicular block using our method, the ED₉₅ of prilocaine 1% lies beyond 400 mg, while for lidocaine 1% with adrenaline, the dose estimated to be closest to the ED₉₅ is 400 mgs with the attached success probability of 0.922 (95%CI: 0.824-0.976).

Fig 2. Dose allocation summary of the study for both local anaesthetic agents (blue dots indicate successful blocks and red dots are unsuccessful blocks)

Conclusion

For an ultrasound guided supraclavicular block using multiple injections technique, the ED₉₅ of prilocaine 1% and lidocaine 1% with adrenaline lies beyond 400 mg. However, 40 ml of lidocaine 1% with adrenaline could be successful in more than 92% of cases.

References:

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- Houle TT, Turner DP. Bayesian statistical inference in anesthesiology. *Anesthesiology* 2013; 119(1): 4-6