

4. COMPARISON OF LEVOBUPIVACAINE 0.125% AND LIDOCAINE 0.5% FOR INTRAVENOUS REGIONAL ANESTHESIA: A VOLUNTEER STUDY.

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Introduction: Intravenous regional anesthesia (IVRA) is a relatively simple anesthetic technique administered mostly for upper limb procedures. Lidocaine, the only FDA approved local anesthetic for IVRA, can produce serious systemic and central nervous system (CNS) side effects upon release of the tourniquet(1). Levobupivacaine, a pure S-enantiomer, is approved by the FDA and has been studied following intravenous injection in volunteers (2,3). The risk of CNS and cardiac toxicity were substantially less than with racemic bupivacaine. We have elected to evaluate the safety and efficacy of levobupivacaine for IVRA in volunteers.

Methods: Following IRB approval, five ASA I, unpremedicated volunteers, all medical personnel familiar with IVRA, participated in this double-blind, cross-over investigation. In random order and at least one week apart, 40 ml of either 0.5% lidocaine or 0.125% levobupivacaine was injected into the volunteers' non-dominant forearm. Participants were monitored for hemodynamic changes using non-invasive blood pressure measurements, EKG leads II and V5, and pulse oximetry. They were observed for any signs or symptoms of CNS and cardiac toxicity during double-cuff inflation and after its deflation. An 18g intravenous access was placed in the non-anesthetized arm for infusion and emergency drug administration. Loss of sensation was evaluated by pinprick in the area of radial nerve distribution. Motor function was evaluated by asking the volunteers to squeeze maximumly a blood pressure cuff preinflated to 40 mmHg. The onset of surgical anesthesia was evaluated using a verbal numeric scale (VNS), ranging from 0 = no pain to 10 = worst pain imaginable, in response to a 50 Hz tetanic stimulus administered in 2.5 mA increments up to a maximum of 60 mA. This has been shown to be an equivalent stimulus to surgical incision (3). Following exsanguination of the extremity, the proximal cuff of a double-cuff tourniquet was inflated to a pressure of 250 mmHg and the local anesthetic agent was injected over one minute. The tourniquet remained inflated for a time frame of 30-45 minutes. Measurements were performed prior to tourniquet inflation for baseline, at one minute intervals for the first 5 minutes, and at 2.5 minute intervals thereafter until a VNS of 0 for loss of sensation was obtained and a TES of 60 mA (VNS 5 or less) was tolerated.

Results: There were no significant differences between lidocaine and levobupivacaine with regard to the loss of pinprick sensation or to the onset and recovery times of surgical anesthesia. There was a significant difference with regard to the onset of motor loss which took longer with levobupivacaine. CNS side effects after tourniquet release were experienced more frequently after lidocaine(three volunteers) than after levobupivacaine (no volunteer). No cardiac side effects were seen with either local anesthetic.

Discussion: Levobupivacaine 0.125% provided the same time of surgical anesthesia onset as did lidocaine 0.5%. Though recovery times from surgical anesthesia were not significantly different between the two local anesthetics, a clinically longer duration of surgical anesthesia after tourniquet deflation was seen with levobupivacaine. Onset of motor blockade appears to take longer with levobupivacaine than with lidocaine. No CNS and cardiac side effects were seen with levobupivacaine. Thus, this new local anesthetic may be an alternative for the more commonly used lidocaine in patients undergoing intravenous regional anesthesia.

1.Chambers WA,Wildsmith JAW. *Upper Limb; In:Anaesthesia. Nimmo WS, Smith G(eds),Blackwell Scientific Publications,Oxford,1989;p 1071.*

2.*J Hand Surgery 1993;18A:206.*

3.*Drugs 1996;52:429.*

	LIDOCAINE	LEVOBUPIVACAINE	P-VALUE
Loss of pinprick sensation (min)	8±7	13±1	NS
Loss of motor function (min)	3±3	8.5±3	0.02
Onset of surg anesth (min)	21±11	24±4	NS
Recovery from surg anesth (min)	8±2.5	17±11.5	NS