Given the limitations of sample size in this study resulting from the low rate of cord prolapse, even small improvements are welcome. With pari passu ancillary improvements in maternal and neonatal care over time, small shifts in outcome assume clinical significance. Such comprehensive and thorough analyses of the data associated with the adoption of training drills and critical performance assessment would be expected to assume greater impact in less sophisticated obstetric settings.

Comment by Daphne Gatt, MD, Carl Tua, MD, and Stephen Gatt, MD

Recovery From Ropivacaine-induced or LevoBupivacaine-induced Cardiac Arrest in Rats: Comparison of Lipid Emulsion Effects

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Topics: Pharmacology, Maternal Morbidity and Mortality, Anesthetic Complications

LevoBupivacaine and ropivacaine are 2 pure left-handed enantiomers that have less potential for central nervous system and cardiovascular system toxicity than bupivacaine. However, the potential for systemic toxicity still exists; comparative studies have found that a larger dose of ropivacaine than levobupivacaine is required to produce cardiac collapse in animal models. Intravenous lipid emulsion is a potential rescue therapy. As comparisons of lipid emulsion therapy between levobupivacaine-induced and ropivacaine-induced cardiac arrest have not been reported, the authors of the present study evaluated the difference in efficacy of this rescue therapy to treat cardiac arrest induced by these local anesthetics in awake rats.

The authors hypothesized that lipid therapy would be more effective in the resuscitation of levobupivacaine-induced cardiac arrest than ropivacaine-induced arrest. A total of 28 healthy, nonpregnant Sprague-Dawley rats (200 to 284 g) were randomized into either a levobupivacaine 0.2% or ropivacaine 0.2% group (n = 14 in each group). Each group was then divided into a lipid emulsion and control group (n = 7 in each group). Local anesthetic was given to rats at a rate of 2 mg/kg/min. When pulse pressure decreased to 0 mm Hg, the infusion of local anesthetic was discontinued. Mechanical ventilation with 100% oxygen through a tracheostomy tube and chest compressions to achieve a rate-pressure product of at least 20% of baseline were started immediately. After commencing mechanical ventilation and chest compressions, the lipid emulsion group received an intravenous infusion of 20% lipid emulsion as a 5 mL/kg bolus, followed by a continuous infusion of 0.5 mL/kg/min for 10 minutes. Rate-pressure product was evaluated every minute. Compressions and ventilation were stopped at 10 minutes and arterial blood gas analysis was then performed.

The levobupivacaine and ropivacaine groups showed no significant difference in terms of the cumulative amount of drug that induced the first seizure and brought pulse pressure to 0 mm Hg. After the start of the lipid infusion, mean arterial pressure (MAP) values were higher in the levobupivacaine group than in the ropivacaine group at 2, 3, 4, 5, and 10 minutes (P < 0.05). Heart rate was also higher in the levobupivacaine group than the ropivacaine group at 5 minutes after the start of the lipid infusion (P < 0.05). In terms of within drug groups, MAP was higher in the lipid group than the control group at 2, 3, 4, 5, and 10 min after the start of resuscitation from levobupivacaine-induced cardiac arrest (P < 0.05), as was heart rate from 4 to 10 minutes (P < 0.05). In ropivacaine-induced cardiac arrest, no significant differences in heart rate and MAP between the lipid and control groups from the start of resuscitation to 10 minutes was found. For the levobupivacaine-induced cardiac arrest group, all rats in the lipid group achieved spontaneous circulation whereas only 2 of 7 rats in the control group achieved this outcome. In the ropivacaine-induced cardiac arrest group, 6 of 7 rats in the lipid group achieved spontaneous circulation, whereas only 2 of 7 rats achieved this result at 10 minutes.

In this study, lipid emulsion therapy was more effective for resuscitation of levobupivacaine-induced cardiac arrest than that induced by ropivacaine; successful resuscitation from ropivacaine-induced cardiac arrest took more time compared with levobupivacaine. Limitations of this study were the lack of local anesthetic serum concentration measurements, incremental increase of local anesthetic doses that does not reflect clinical cardiac collapse conditions (usually accidental injection) and the use of only female rats.

Committee Opinion No. 726: Hospital Disaster Preparedness for Obstetricians and Facilities Providing Maternity Care

This Committee Opinion was developed by the American College of Obstetricians and Gynecologists’ Committee on Obstetric Practice in collaboration with committee member Alfred G. Robichaux, MD; the American Academy of Pediatrics’ Council on Environmental Health, liaison member Nathaniel DeNicola, MD, MSc; and Richard H. Beigi, MD

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