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Bupivacaine Cardiotoxicity in a Pregnant Patient with Mitral Valve Prolapse: An Example of Improperly Administered Epidural Block

To the Editor:—The authors are to be congratulated in avoiding a catastrophe.[1] It is commendable that they unveiled some of the facts in this mini case report. Others have not done so, but merely cite bupivacaine and etidocaine as being cardiotoxic.[2] Nonetheless, what was presented is an example of some errors that frequently are made when an epidural block is administered, particularly for an *elective* cesarean section. Also, the animal references cited do not necessarily support the authors' theory.

When 0.75% bupivacaine is used, a single-injection epidural block should be administered. The *Physicians' Desk Reference* states that 0.75% bupivacaine is "for single dose use; not for intermittent technique."[3] When plastic tubing is inserted, which permits the dose of the drug to be repeated, bupivacaine 0.5%, which establishes abdominal muscle relaxation in over 95% of cesarean sections, is indicated. If it does not produce the required relaxation, a reinforcing dose will do so in 1–5 min.

While a test dose is advisable prior to an epidural block, 2 ml chloroprocaine 3% (60 mg) is a worthless test dose.[1] In this patient, so was the 5 ml test dose of chloroprocaine (150 mg). Nonetheless, these doses are stated to be adequate test doses.[3] This confirms that a test dose that can rule out an intravascular injection must contain a minimum of 15 μg of epinephrine and be monitored with an electrocardiograph.[4]

The seven animal references (five abstracts, thus no peer review) cannot be extrapolated to humans to support the thesis of cardiotoxicity.[1] Theorizing has proven misleading; for example, in humans and contrary to a proposed theory,[2] hypoxia occurs concomitantly with convulsions induced by bupivacaine, regardless of whether cardiotoxicity follows the convlusions.[5,6,*] Other facts that are known or will be documented in humans that are contrary to animal data include: 1) small doses of epinephrine such as those in a test dose are not contraindicated in pregnant patients[7]; 2) unless pathology is present, succinylcholine does not cause a significant rise in potassium[8] nor does the treatment of convulsions with it produce hyperkalemia†; 3) prompt correct treatment of convulsions avoids cardiac arrest[5,*]; 4) prolonged cardiac arrest is likewise avoided by such treatment[6]; and, 5) hyperkalemia does not result from bupivacaine or bupivacaine-induced convulsions.†

The assumption that this case[1] and others of cardiac arrest[2,‡] represent cardiotoxicity from bupivacaine and etidocaine, prompts the following remarks. Cardiac arrest or fibrillation following their administration, which goes unrecognized or untreated for 1 or more minutes, may be more resistant to treatment than the same complication following the injection of lidocaine, mepivacaine, or prilocaine. However, regardless of the drug, these complications have been avoided by: 1) selecting the right regional block technique and appropriate drug concentration to be used with it; 2) executing the block properly, *e.g.*, administering an effective test dose; 3) monitoring correctly; 4) promptly recognizing the onset of systemic toxicity; and 5) treating it correctly within 60 s.[5,*] Finally, if cardiac arrest occurs, treatment within 15 s of onset with iv epinephrine (0.1–0.2 mg) and calcium chloride (500 mg) along with manual systole has prevented sequelae.[6]

To conclude, the rebirth of regional anesthesia, that has occurred during the past 15 years may be short lived if anesthesiologists persist in creating iatrogenic complications by using the wrong regional block and/or dosage of the local anesthetic drug, improperly executing the block, and not being prepared to institute the right treatment within 60 s when a potentially catastrophic complication results.

> . . . Life is easier when our problems, especially the serious ones, can be blamed on the tools of our trade, our patients, the gods, . . . on anything that has the aura of unavoidability.[9]

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Potential Deficiencies in Modifying the Dinamap® for Use in the Neonate

To the Editor:—Zmyslowski and Lena describe a "simple modification of the Dinamap®" for monitoring blood pressure in the neonate.[1] Although they cite Showman and Betts' article[2] relating to the hazards of automatic noninvasive blood pressure monitoring, I believe they fail to appreciate these hazards in children. The Dinamap® 845 is an *adult* monitoring device capable of generating cuff inflation pressures of 160 mmHg. (If cuff inflation is greater than 275 mmHg, the overpressure switch automatically will deflate the cuff.) These pressures are too high to be tolerated in the neonate. Alternatively, the Dinamap® 845XT measures arterial blood pressure, noninvasively, along with heart rate and mean pressure in the neonate and infants weighing less than 6.8 kg. Initially the monitor will inflate the cuff to 125 mmHg. If cuff inflation pressure is greater than 235 mmHg, the overpressure switch will deflate the cuff. With the Dinamap® 845, after the artery is occluded, the cuff will begin to deflate in increments of 4 mmHg. This would not be sufficient to detect small changes that occur at lower pressures as in the neonate. On the other hand, using the 845XT, if cuff pressures drop below 35 mmHg, cuff deflation will occur in increments of 2 mmHg. Does the described adaptation outweigh the hazards and the accuracy of using the appropriate monitor?

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Airway Emergency in a Patient during CO_2 Arthroscopy

To the Editor:—Insufflation of the intraarticular space with CO_2 has improved visualization and identification of internal structures during arthroscopic examination of the knee. The use of this technique is not without hazard to the patient, however. We wish to report a serious complication that developed during elective arthroscopic knee examination.

REPORT OF A CASE

A young healthy female was anesthetized with thiopental iv and a combination of nitrous oxide, oxygen, and enflurane by mask while breathing spontaneously. A thigh tourniquet was applied to the lower extremity, but its inflation was omitted electively. Trochars for insufflation of CO_2 and examination were positioned in the knee after multiple insertions. After 10 min, the patient became tachypenic. Sys-