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Epinephrine is Unsafe in the Preeclamptic Patient

To the Editor:—The report by Heller and Goodman[1] of four patients suggests that the use of epinephrine-containing local anesthetics for lumbar epidural analgesia (LEA) is safe in the preeclamptic parturient. We disagree with the thesis and the conclusion.

The criterion of patient "well being" in the cases presented was presumably based on indirect measurements of maternal brachial blood pressure with the frequency of determinations not described. During cesarean sections under LEA, the use of epinephrine-containing drugs was associated with markedly greater maternal hemodynamic responses than plain solutions.[2] More importantly, systemic arterial blood pressure may not be correlated with organ blood flow. During a slow, constant infusion of epinephrine in seven pregnant ewes, systemic blood pressure remained unaltered, but total uterine blood flow declined significantly.[3]

One of the basic defects in preeclampsia is generalized arteriolar vasospasm with concomitant decreased uterine blood flow. The goal of any intervention should be to increase, not decrease, uteroplacental perfusion. The overwhelming evidence of many studies is that non-epinephrine-containing anesthetics injected epidurally in gravidae, including preeclamptics, produces a small decrease in maternal blood pressure and an increase of intervillous blood flow.[4] Indirect measurements of umbilical blood flow using a velocity waveform Doppler technique have demonstrated that fetuses with normal umbilical blood flow resistances tolerate the maternal epidural administration of local anesthetics containing epinephrine 1:200,000. However, when the initial umbilical blood flow resistance was abnormally high, even the small doses of epinephrine 1:200,000 contained in 8 ml of anesthetic produced a further increase in resistance.[5]

Finally, accidental intravascular injection is not reliably preventable. In pregnant ewes, uterine blood flow fell 40% and required 5 min to recover after 20 μg of iv epinephrine, a dose associated with mild maternal hypertension and bradycardia.[6] Adverse maternal and fetal sequelae may be pronounced in preeclamptic women because of increased sensitivity to vasopressors and preexisting placental perfusion abnormalities. We are concerned that, if the use of epinephrine containing local anesthetics is adopted for preeclamptic gravidae, physiologically significant doses of exogenous epinephrine may be unintentionally injected iv or be absorbed systemically with ill effects in a subpopulation of fetuses.

MELANIA COSTIN, M.D.
Assistant Professor

RALPH A. MILLIKEN, M.D., M.B.A.
Associate Professor

Department of Anesthesiology
Albert Einstein College of Medicine
Bronx, New York 10461

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In reply:—We agree entirely with Drs. Costin and Milliken that iv administered epinephrine may cause a reduction in uterine blood flow. However, no mention is made of the fetal response to the iv administration of epinephrine in the studies quoted. Rosenfeld *et al.* make no note of this in their paper.[1] Hood *et al.* described marked dose-dependent reductions in uterine flow in pregnant ewes when given iv epinephrine, but they also noted that there was no effect on the fetal heart rate.[2] Although Drs. Costin and Milliken contend that there is increased sensitivity to vasopressors in preeclampsia, the cases we presented do not bear this out.[3] The arterial blood pressures of these patients were measured every 2 min for 20 min with a standard blood pressure cuff in