Pressor Choice is Unrelated to Cord Blood pH in Clinical Practice

Abstract Type: Original Research
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Introduction: The choice of vasopressor for treatment of hypotension following spinal anesthesia in obstetrics remains controversial. Several randomized trials (RCTs) have demonstrated a slight superiority of phenylephrine (PE) over ephedrine (E) as measured by newborn umbilical artery (UA), though not umbilical vein (UV) pH. However, by necessity, these RCTs require a blinded anesthesiologist to administer solely one agent on a protocolized regimen specifying the BP target and timing of doses. In actual clinical practice, most anesthesiologists use clinical judgment not only in pressor choice, but also in timing and BP target. We hypothesized that unblended anesthesiologists using either or both agents at their discretion would demonstrate equivalent neonatal outcomes.

Methods: After IRB approval and informed consent, 92 healthy term pregnant women scheduled for cesarean delivery under spinal anesthesia were recruited. Standardized spinal anesthesia (bupivacaine 12 mg, fentanyl 10 µg, morphine 200 µg) was administered and blood pressure measured every minute until delivery. E and/or PE were administered at the discretion of the anesthesiologist and the total dose of each at delivery were recorded. Apgar scores, and UV and UA blood gases were measured. Dose of each pressor and total pressor equivalent (PEq; assuming 40 µg PE = 5 mg E) and blood gas values were compared by linear regression. Dominant pressor (majority of total pressor given) was also compared by linear regression, and mean pH between dominant pressor groups was compared by ANOVA. The study was powered to detect an increment of 0.1 in R² in pH regressions with 80% power at alpha=.05, with sample size=92.

Results: E dose ranged from 0-55 mg, PE from 0-760 mcg, and PEq from 0-30 units. Among patients receiving any pressor, 69% received both; 59% received more PE and 33% more E on a potency-adjusted basis. Total PEq was inversely related to UV pH (R²=.12, P=.0007) and UA pH (R²=.16, P=.0001). E dose was inversely related to UV pH (R²=.08, P=.018) but not UA pH (P=.10). PE dose was inversely related to UV pH (R²=.10, P=.0036) and UA pH (R²=.10, P=.0027). In multivariable regression of cases with nonzero pressor use and either pressor dominance, total PEq was related to UA and UV pH but the dominant pressor (E or PE) was unrelated (P=.74 and .76, respectively). Lowest BP, episodes of BP< 100 mm Hg, and minutes of BP < 100 mm Hg were unrelated to UV or UA pH. Mean UV and UA pH, PCO₂, and PO₂ did not differ between E and PE dominant groups (P>.05). Apgar scores did not differ between dominant pressor groups. However, both 1 minute (P=.0004) and 5 minute (P=.0054) Apgars were inversely related to PEq dose by logistic regression.

Discussion: In real-world clinical practice, anesthesiologists rarely use only one pressor as they are forced to in RCTs. In unblinded actual clinical practice, neonatal blood gases and Apgar scores are unrelated to pressor choice.