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Does Halothane Protect Against Hypoxia?

To the Editor—Hershenson et al.1 confirmed a previous investigation2 that halothane significantly reduces cardiac output and oxygen consumption in normoxic and hypoxic newborn lambs when compared to paralyzed, ventilated controls. They conclude that halothane reduces oxygen consumption and delivery, and may be protective in hypoxic patients. One must exercise caution in interpreting these results because of two serious design flaws in this study. Hershenson et al.3 used paralyzed newborn lambs that were anesthetized with fentanyl (30 µg·kg⁻¹·hr⁻¹) as their control animals. Fentanyl may not be an “anesthetic” in newborn lambs at ten to 100 times this dose.4 Indeed, the ability of fentanyl to anesthetize other species at this dose has been questioned as well.5 We wonder how this may have affected the author’s conclusions. Were the decreases seen in oxygen consumption and delivery the result of halothane per se, or secondary to the reduction of an artificially elevated oxygen consumption and delivery caused by pain or immobilization stress?6 Perhaps any anesthetic agent would produce the same results.

Secondly, all animals were exposed to progressively lower levels of inspired oxygen (100%, 21%, 15%, 10%) in this study without either an intervening return to normoxia or randomization of the sequence of exposure. Were the decreases in oxygen consumption and delivery at the 10% F₁O₂ level unduly influenced or exaggerated by the immediately preceding hypoxic exposure?

Myron Yaster, M.D.
Assistant Professor
Anesthesiology/Critical Care Medicine and Pediatrics
The Johns Hopkins Hospital
Baltimore, Maryland 21205

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In Reply—We welcome and appreciate Dr. Yaster’s comments concerning experimental design. With regards to the use of fentanyl, we agree that fentanyl alone may not provide surgical anesthesia in the newborn lamb. We have found that unparalyzed animals given fentanyl alone at 30 µg·kg⁻¹·hr⁻¹, while able to lie on the operating table without restraint and appearing to have a blunted response to stimulation, continued