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Recovery from General Anesthesia in Obese Patients

To the Editor:—It is commonly stated that highly lipid soluble volatile anesthetics—especially halothane—are best avoided in morbidly obese patients. Cork, Vaughan, and Bentley have recently tested this.[1]

But why should problems (*i.e.*, prolonged recovery) be expected? The fat tissue capacity[2] for halothane [fat/blood partition coefficient (about 60) × tissue volume] is about 60,000 ml/kg of fat tissue, and the blood flow[3] about 20 $ml \cdot min^{-1} \cdot kg^{-1}$. Thus, the mean transit time ($\bar{t}$) for halothane is about 3,000 min or 50 h. The venous concentration (C_v) will approach the arterial concentration (C_a) according to the equation

$$C_v = C_a(1 - e^{-1/\bar{t} \times t})$$

if C_a is constant. After three hours, most operations are completed. It may be calculated from the equation, that C_v for halothane in the blood from the fat tissue would be about 6 per cent of C_a. If it is assumed that the arterial concentration is equivalent to 0.8 MAC when the halothane is discontinued, and that the perfusion of the fat tissue in these patients is as much as 20 per cent of cardiac output, then the contribution of halothane from the fat tissue to the mixed venous blood would be in the order of 1 per cent of a MAC!

Thus, it is not surprising that Cork, Vaughan, and Bentley found the same recovery time for fentanyl, enflurane, and halothane. Lipid soluble volatile anesthetics may be used safely in obese patients—if you don't prolong the operations for days, of course!

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A New Value for the Solubility of Nitrous Oxide in Olive Oil

To the Editor:—Every discussion of the mechanism of action of anesthetics includes a description of the correlation between anesthetic potency and anesthetic solubility in lipids, specifically in olive oil. Oil/gas partition coefficients have been measured for all anesthetics and, for most, the measurement has been duplicated by more than one investigator. In the course of developing a new sensing technique for monitoring anesthetic gas concentrations,[1] we have uncovered an apparent error in the accepted value of the olive-oil solubility of nitrous oxide.

The anesthetic sensor is based on the piezoelectric sorption technique. It employs an inexpensive quartz crystal oscillator coated with a small amount (approximately 30 μg) of material in which anesthetics are soluble. The natural frequency of oscillation of the crystal decreases linearly as the mass of the coating increases. The mass of anesthetic absorbed is a function of the solubility and the partial pressure of the anesthetic. Details of how this technique is used for measuring anesthetic concentration are described in reference 1. Olive oil is not an optimal coating for that application because of its long-term instability. However, we did examine anesthetic response of olive-oil coated crystals to test our understanding of the sensor's performance, since olive oil is the only material for which the solubilities of all anesthetics have been measured. Our method for determining the Ostwald solubility coefficient is also described in reference 1.

Experimentally determined Ostwald solubility coefficients are listed in table 1. Accepted literature values are shown for comparison.

With the exception of that of nitrous oxide, Ostwald