

Effects of Propofol and Thiopental on Maternal and Fetal Cardiovascular and Acid-base Variables in the Pregnant Ewe

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Background: The effects of propofol on uterine blood flow are not understood well. This is a relatively new agent that is finding increased use for nonobstetric surgical procedures during pregnancy and induction of anesthesia for cesarean section.

Methods: The effects of induction and maintenance of anesthesia with propofol were studied on maternal and fetal cardiovascular and acid-base variables in a chronically instrumented pregnant sheep model. Anesthesia was induced with a 2 mg/kg bolus of propofol and maintained with one of three continuous infusions: 150, 300, and 450 $\mu\text{g} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$. The control group received thiopental for induction, and anesthesia was maintained with isoflurane.

Results: The use of propofol did not adversely affect maternal or fetal mean arterial pressure, heart rate, or base excess, fetal heart rate variability, or uterine blood flow. Uterine blood

flow transiently decreased during induction and intubation with thiopental but remained stable during induction with propofol. However, administration of succinylcholine for intubation in the presence of propofol resulted in a transient, but severe, maternal bradycardia. Continuous infusion of 300 $\mu\text{g} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$ of propofol appeared to provide satisfactory anesthesia in the ewe.

Conclusions: Assuming the applicability of ovine data to humans, these findings suggest that induction and maintenance of anesthesia with propofol and 50% nitrous oxide in oxygen has no adverse fetal effects but warrants caution because of the potential risk of severe maternal bradycardia during induction of anesthesia using the combination of propofol and succinylcholine. (Key words: Anesthesia, intravenous: propofol; thiopental. Anesthesia, obstetrics: maternal; fetal; cardiovascular effects; acid-base status. Complications: bradycardia.)

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GENERAL anesthesia often is indicated for surgery during pregnancy or for fetal or maternal indications for cesarean delivery. For example, in cases of severe fetal distress, general anesthesia must be induced rapidly to facilitate emergency cesarean section. Although there is no ideal agent for induction and/or maintenance of general anesthesia, a recently approved intravenous hypnotic, propofol, may be a good choice for the pregnant patient. In patients undergoing cesarean section, it apparently provides a rapid loss of consciousness, minimal cardiovascular and respiratory depression, rapid recovery, and potentially, no adverse neonatal effects.¹⁻⁵

Propofol has been studied extensively in both animals⁶ and humans,⁷ but little is known of its effects on uterine blood flow. In the current study, we examined propofol's effects on these factors in pregnant ewes, a conventional model for studies of maternal-fetal physiology. Our purpose was to compare the effects on maternal and fetal cardiovascular and acid-base variables of a widely used technique of anesthesia for cesarean section, *i.e.*, thiopental induction followed by isoflurane inhalation anesthesia, with propofol for

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