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TITLE: MATERNAL AND FETAL EFFECTS OF PROPOFOL ANESTHESIA IN THE EWES
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This study was undertaken to evaluate the effects of maternally administered propofol on uterine blood flow and maternal and fetal cardiovascular and acid-base variables. Anesthetic induction and maintenance with propofol was compared with induction with thiopental and maintenance with isoflurane anesthesia in pregnant ewes.

With approval from the Committee on Animal Research, we prepared 16 ewes near term gestation for study by placing vascular catheters and a uterine artery flow probe. 48 h later, animals were anesthetized using one of four techniques: Group 1 (n=10) received thiopental, 5 mg/kg, for anesthetic induction and isoflurane, 1% inspired concentration, for anesthetic maintenance. The remaining three groups were given propofol, 2 mg/kg, for induction of anesthesia, but received 150 $\mu\text{g}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$ (Group 2; n=5), 300 $\mu\text{g}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$ (Group 3; n=5), and 450 $\mu\text{g}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$ (Group 4; n=5) for anesthetic maintenance. Twenty-five studies were performed, 9 animals receiving both thiopental/isoflurane and propofol, 150 or 300 $\mu\text{g}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$, with 24 h between each study. All ewes received succinylcholine, 1.5 mg/kg, to facilitate tracheal intubation, 50% nitrous oxide in oxygen after tracheal intubation to supplement anesthetic maintenance, and mechanical ventilation to maintain normocarbida during the 2-h period of anesthetic maintenance. Maternal mean arterial pressure (M-MAP), maternal heart rate (M-HR), uterine blood flow (UBF), fetal mean arterial pressure (F-MAP) and fetal heart rate (F-HR) were continuously monitored; fetal and maternal arterial blood samples were obtained every 5 min for 15 min after induction, then every 15 min thereafter to evaluate blood-gas and acid-base status. Maternal anesthetic depth was assessed by evaluation of eyelash reflex, spontaneous swallowing and chewing, and response to noxious stimuli (nerve stimulator and tail clamp). Control values were obtained before induction of anesthesia. Data were analyzed using Student's t-test and ANOVA, with $p < 0.05$ considered significant, and results expressed as means \pm SD or % change.

Compared to preinduction control values, there were no significant differences in F-HR, F-MAP, fetal acid-base status, paO_2 or SaO_2 in any of the four groups. M-MAP decreased after anesthetic induction with both propofol (from 97 ± 15 to 85 ± 20 mmHg) and thiopental (from 101 ± 14 to 85 ± 18 mmHg), increased significantly in all four groups during laryngoscopy and endotracheal intubation then rapidly returned to control values during anesthetic maintenance. M-HR increased significantly before laryngoscopy (from 90 ± 7 to 110 ± 23 bpm) after induction with thiopental and succinylcholine, but decreased significantly (from 84 ± 11 to 61 ± 13 bpm, range 36-90 bpm) after induction with propofol and succinylcholine, resulting in sinus arrest (45s) in one animal. M-HR increased significantly during intubation in all groups, but remained elevated ($\sim 25\%$ control) during anesthetic maintenance only in those given propofol, 150 and 300 $\mu\text{g}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$. UBF was not affected by propofol induction and maintenance, but decreased significantly ($40\% < \text{control}$) in response to thiopental induction and intubation, increasing rapidly above control during maintenance with isoflurane. Maternal anesthesia with propofol, 150 $\mu\text{g}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$, resulted in significantly more spontaneous movement, positive eyelash reflex and noxious stimuli response than the other three regimens.

Our results indicate that anesthetic induction and maintenance with propofol has no direct adverse effects on ovine UBF or fetal well-being. However, propofol exaggerated the effects of succinylcholine on maternal heart rate, causing severe bradycardia during induction. This effect suggests that combining propofol with succinylcholine conveys potential maternal risk, which may limit the usefulness of propofol. In contrast, the effects of laryngoscopy and intubation on uterine blood flow were not accentuated by propofol, but were exacerbated significantly with thiopental. Maintenance of anesthesia with propofol in the pregnant ewe appears to require a dose of 300-450 $\mu\text{g}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$.

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TITLE: PROPOFOL AS AN INDUCTION AND MAINTENANCE AGENT FOR CESAREAN SECTION: MATERNAL AND NEONATAL EFFECTS
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Propofol, a new intravenous anesthetic agent, appears to possess properties that might make it suitable for obstetric anesthesia. These include rapid awakening time which allows early maternal infant bonding and minimal side effects which include nausea, vomiting, respiratory and cardiovascular depression. The purpose of this study is to compare maternal and neonatal effects of general anesthesia with propofol to those with thiamylal/isoflurane during cesarean section.

After approval by the Institutional Review Board and informed consents, thirty-nine patients scheduled for cesarean section were studied in a randomized manner. Group I (n=19) received propofol 2 mg/kg induction followed by 0.05-0.2 mg/kg/min maintenance infusion. Group II (n=20) received thiamylal 3-4 mg/kg induction followed by isoflurane 0.25-0.75% maintenance. Both groups received 50-70% $\text{N}_2\text{O}/\text{O}_2$ and succinylcholine. Maternal hemodynamic values were continuously recorded. Neonates were evaluated by Apgar Scores, cord acid base status and the Neonatal Neurologic and Adaptive Capacity Scores (NACS). Maternal blood loss, awareness and overall quality of recovery were noted. Data were analyzed for statistical significance using Student's t-test or chi-square when appropriate. Significance was accepted as $P < 0.05$.

Maternal hemodynamic values and blood loss were similar in both groups. Neonatal outcome, as ascertained by Apgar Scores, cord acid base status and the NACS were similar in both groups with the exception of 1 min Apgar Scores which were significantly better for the propofol group. None of the patients in any of the groups experienced any significant side effects.

Data from the present study indicate that propofol compares favorably to thiamylal/isoflurane anesthesia for cesarean section. The rapid recovery, lack of neonatal depression, lack of excessive uterine bleeding indicate that propofol may provide significant clinical benefits in obstetrical patients.