The effects of thiopental, ketamine, and propofol on the contraction of rat uterine smooth muscle

Chang Hun Song[1], Tae Hun An[2]

Department of Obstetrics and Gynecology[1], Anesthesiology[2], College of Medicine, Chosun University, Gwangju, Korea

Background : Intravenous anesthetic agents are used for induction of general anesthesia for cesarean section. The aim of the present study was to investigate and compare the effects of thiopental, ketamine, and propofol on rat uterine contractile activity in an isolated preparation.

Methods : Uterine smooth muscle tissues were obtained from non-pregnant rats (n=60). The uterus of the rat was dissected and cut into 10 mm ring.

The uterine ring segments were suspended in organ bath filled with Krebs solution saturated by 95% O_2 and 5% CO_2. After spontaneous uterine contractile activity had been accomplished, thiopental, ketamine, and propofol in various concentrations (10^{-7} to 10^{-3} M) were added cumulatively to the bath and the effects on uterine contractility were continuously registered. The 50% effective concentration (EC50) of each drug was calculated using a probit model.

Results : Thiopental and propofol (10^{-7} to 10^{-3} M) induced a dose-dependent inhibition of spontaneous myometrial contractile activity ($P<0.05$). Ketamine in doses of 10^{-7} to 10^{-5} M increased spontaneous myometrial contractility. But ketamine in doses of 10^{-4} to 10^{-3} M induced a dose-dependent inhibition of spontaneous myometrial contractile activity ($P<0.05$). The EC50 of thiopental, ketamine, and propofol was 5.90 (2.23)×10^{-5} M, 3.41 (0.23)×10^{-4} M, 1.88 (0.03)×10^{-6} M. The potency of propofol was greater than thiopental (3.2, times) and ketamine (18.1, times). The relaxation of uterine smooth muscle was greatest in propofol and was least in ketamine ($P<0.05$).

Conclusion : Thiopental, propofol, and ketamine in high concentration (10^{-4} to 10^{-3} M) relax the uterine smooth muscle in rats. But, ketamine in dose of 10^{-7} to 10^{-5} M constricts the uterine smooth muscle in rats. Propofol is the greatest, and ketamine is the least on the relaxation of rat uterine smooth muscle among these drugs.