Effects of prenatal propofol exposure on postnatal development in rats

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ABSTRACT

TITLE: Effects of prenatal propofol exposure on postnatal development in rats

BACKGROUND: Accumulating evidence indicates that the administration of volatile anesthetics during pregnancy may cause neurotoxicity in the developing brain and subsequent impairment of cognitive function in adulthood. However, the effects of prenatal exposure to intravenous anesthetics on development of the offspring are largely unknown. Recent studies suggest the immature brain is vulnerable to propofol-induced neurotoxicity during the period of rapid synaptogenesis. We hypothesize that maternal propofol exposure may affect the neuronal development of the offspring.

METHODS: Pregnant rats were randomly assigned to receive normal saline (control) or continuous propofol infusion for 1 h (1HP) or 2 h (2HP) on the gestational day 18, a time equivalent to the second trimester pregnancy in human. Pups were then tested on the appearance and progression of sensory and physical motor abilities between postnatal day 0 (P0) and P28.

RESULTS: The brain and body weights at P10 of pups from 2HP group were significantly lower than those of the control group and the 1HP group, although they were the same in all three groups at birth (P0). Pups from 1HP and 2HP groups showed slower maturation of eyes (delayed opening), several neurological reflexes (hand/limb reflex, righting reflex and gait); they also showed delayed improvement in execution on inclined board tests. The forelimb reflex was also delayed in 2HP group. All parameters examined except body weight of 2HP pups, recovered to normal levels by P28.

CONCLUSIONS: Administration of propofol to pregnant rats leads to retard in physical and neurological reflex development in their offspring.

BACKGROUND

METHODS

RESULTS

Table 1 Effect of prenatal propofol on body and brain weights of pups on postnatal day 0, 10 and 28

Table 2 Day of appearance of physical features and neurological development in control or prenatally propofol-exposed rats

CONCLUSIONS

Administration of propofol during pregnancy prolongs the maturation of some physical features and transiently hinders development of motor coordination and reflexes in the offspring.