Anesthesiology
V 57, No 3, Sept 1982

Title: MAZE RUN TIME OF MICE FOLLOWING HALOTHANE, ENFLURANE AND ISOFLURANE ANESTHESIA

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Introduction: Isoflurane has a low blood/gas partition coefficient and it produces rapid induction with quick recovery (1). Theoretically, therefore, psychomotor function should return to normal faster following isoflurane anesthesia than following other volatile anesthetic agents with higher blood/gas partition coefficients. In this study we compared the effect of equipotent concentrations of halothane (H), enflurane (E), and isoflurane (I) on maze run time (MRT) of mice during recovery from anesthesia.

Method: Eighteen Swiss Webster mice were randomly divided into three equal groups. After 24 hours of starvation, the mice were trained to find food at the end of a six compartment maze, alternately open at right and left by concealed exits. At the completion of 30 day training period all groups had achieved statistically similar MRT. The ED 50% in N2O 50% for halothane, enflurane, and isoflurane were then determined. Finally, each group was anesthetized with 1.5 ED 50% in N2O 50% of one of the volatile agents for one hour and then allowed to breathe room air. After 20, 40, and 60 minutes of recovery the MRT of each mouse was determined. The experiments were repeated three times on three different days. The results were analyzed statistically using Student's t-test. p values less than 0.05 were considered significant.

Results: The results are shown in the Table. The ED 50% in N2O 50% for H, E, and I were 0.7%, 1.6%, and 1.3%, respectively. The mice in the H group were incapacitated and could not run the maze during the first hour of recovery. The mice in the E group had siginificantly shorter MRT than the mice in the I group after 20 and 40 minutes of recovery.

Agent	n	After 20' MRT%	After 40' MRT%	After 60' MRT%
E	6	152 ±13	103± 2	119 ± 8
I	6	324 ±75*	134±10*	114 ± 4

Table: MRT (mean SD) expressed as percent of preanesthesia values after 20, 40, and 60 minutes of recovery. *p<0.05 when compared to the E group.

Conclusions: This study suggests that the ability of mice to search and find food is most compromised following halothane anesthesia and least following enflurane anestheia. The effect of isoflurane is in between halothane and enflurane.

Reference:
1. Cromwel TH, Eger EI II, Stevens WC, Dolan WM: Forane uptake, excretion, and blood solubility in man. Anesthesiology 35:401-408, 1971