

Effects of changes in alveolar ventilation on isoflurane arterial blood concentration and its uptake into the human body

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摘要

Abstract

We investigated whether minute alveolar ventilation affects isoflurane concentration in arterial blood and uptake of isoflurane into the body. Thirty female patients scheduled to undergo elective gynecological surgery were randomly assigned to one of three groups: i.e. hyperventilation, normal ventilation and hypoventilation. Inspiratory (Cliso) and end-tidal (CEiso) concentrations of isoflurane were measured by infrared analysis, and arterial blood isoflurane concentration (Aiso) was analyzed by gas chromatography. Cardiac index was measured by Doppler ultrasonography. The body uptake of isoflurane was determined by multiplying alveolar ventilation by the gradient of Cliso-CEiso. Aiso was highest in the hyperventilation group (significant), followed by the normal ventilation and hypoventilation groups, during the 40-min study. During the first 10 min of the study, the slope of the Aiso-over-time curve was highest in the hyperventilation group, followed by the normal ventilation group and the hypoventilation group. During the second half of the study (20-40 min), the slope Aiso-over-time curve did not differ among the three groups. Changes in ventilation affected the concentration of isoflurane in arterial blood but did not significantly alter the uptake of it during the last 20 min of the study. The change of alveolar ventilation altered the speed of functional residual capacity wash-in by isoflurane, which was the integral factor influencing Aiso and body uptake of isoflurane. 2009 S. Karger AG, Basel.