

Pharmacokinetics of isoflurane in human blood

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Abstract

Investigation of isoflurane washout from the human body and brain provides more precise information about elimination in anesthesia. The elimination pattern of isoflurane remains poorly quantified, and therefore this study tried to clarify the pharmacokinetic pattern of isoflurane elimination. Sixteen patients (aged 48-78 years), undergoing coronary arterial bypass grafting surgery were enrolled in this study. Sixty minutes prior to the end of surgery, we kept a fixed 2% inspired isoflurane in 6,000 ml min⁽⁻¹⁾ oxygen flow. Isoflurane supplement was then discontinued to study the 20-min isoflurane elimination. An infrared analyzer was used to determine both inspired isoflurane and end-tidal isoflurane. The isoflurane concentration in the internal jugular bulb blood, arterial blood and pulmonary arterial blood were analyzed by gas chromatography. Biexponential decay function was the best fitted for the end-tidal isoflurane- and arterial blood isoflurane-time curves. There were two distinct components, including initial 5-min fast component and the next 15-min slow component. Monoexponential decay function was the best fitted for the pulmonary arterial blood- and jugular bulb blood-time curves. During elimination, the initial washout of isoflurane from functional residual capacity of lungs is reflected in the fast component of the isoflurane concentration time curves. The later slow component is dominated by the tangible manifestation of physiological membrane barriers, including the existence of alveoli-pulmonary capillary, blood-brain barriers.