GENERAL ANESTHESIA III

INHALATION ANESTHESICS

Isoflurane (Forane®): A fluorinated methylether, which was introduced in 1965 in the United States. It is an inhalation anesthetic synthesized by Ross Turrell. In 1979, its reliability was accepted by the Food and Drug Administration (FDA) and made available for clinical use. With the completion of the necessary promotional activities, it has been formally applied in humans in the USA and Canada since 1981 and replaced enflurane. It was first approved by the FDA in 1989 for use in dogs in veterinary medicine and was introduced in the United States. Since 1991, it has been practiced for anesthesia in European countries. Isoflurane is a non-flammable inhalation anesthetic. Chemically, 1-chloro-2,2,2 is an isomer of enflorane with a structure of trifloromethylethylether. Molecular weight: 184.5 g Boiling point: 48.5 C^{o} Specific gravity: (25 ° C): 1.52 g / cm3 Vapor pressure: (20 C°); 252 mmHg Evaporation temperature: 44 cal / gr. Preservative: no need. Condition at room temperature: Colorless liquid Period of use in clean bottles: 2 years. Flammability: None Explosive: None Metal: Unresponsive. Alkaline: Stable Ultraviolet rays: Stable Soda-lima response: Not decomposable. Blood-Gas Coefficient: 1.4

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This blood-gas coefficient is 2.3 in halothane, 1.9 in enflurane and 12 in methoxyflurane. Anesthesia induction and recovery cycles are very fast due to low blood gas coefficient. At the end of anesthesia, the organism is excreted quickly. Minimal metabolism leads to the formation of metabolites in the amount of work. This reduces the possibility of toxic effects. Generally, most of the inhalation anesthetics are excreted by the lungs, while a small portion of them is biotransformed and metabolized to varying degrees. Their metabolism is usually carried out by the liver microsomal enzyme oxidative system. Metabolites in the form of fluoride and brow ions can produce toxic effects. While 50% of metoxiflurane, 20% of halothane and 2.5% of Enflurane are metabolized, this ratio is 0.2% in isoflurane. This is one of the important advantages that isoflurane can be used safely in risky patients. To administer inhalation anesthesia with isoflurane, a specially calibrated, dedicated vaporizer is used which precisely controls the concentration. Induction of anesthesia with isoflurane requires a concentration of 2.5-4.5%. The continuation of anesthesia is maintained at a rate of 1-3%. However, the induction dose of isoflurane is 2-4% and the maintenance dose is 0.5-1.5% in patients with respiratory failure. In dogs, the MAC of isoflurane is 1.30. MAC for dogs:

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2.06 for Enflurane, 0.87 for Halothane, 0.29 for Methoxyfluran. Isoflurane provides a stable level of intracranial pressure. Because of this feature, it is preferred for anesthesia of patients with skull trauma and cerebral mass extirpations in neurosurgery. Airway reflexes can be stimulated until isoflurane anesthesia is sufficient, ie increased secretion, cough and laryngospasm. The use of appropriate premedication agents is essential before anesthesia against both these effects and respiratory depression. Prevention of pulmonary vasoconstriction and bronchoconstriction is a preferred anesthetic especially in patients at risk of bronchospasm. It is used safely in kidney and liver patients due to the above-mentioned properties.

Benefits

1- Well tolerated by animals,

2- Induction and recovery are fast,

3- No irritation and secretion

4- Bronchodilator,

5- Provides very good muscle relaxation,

6- Heart rhythm is extremely stable,

7- Compatible with epinephrine.

8- It has no vomiting effect.

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9- Not flammable or explosive.

Disadvantages:

1- Respiration and depressive effect on cardiovascular system is dose-dependent,

2- As the anesthesia deepens, the pulse rate remains a little high, blood pressure tends to decrease,

3- Causes trembling,

4- It may cause liver disorders.

Biotransformation: Isoflurane is metabolically converted to organic fluorides such as trifluoroacetic acid. Fluoride ion, which is a disintegration product of isoflurane, is a strong nephrotoxin, although in a lower amount than in methoxiflurane.