Forane (isoflurane, USP)

**Liquid For Inhalation**

**INDICATIONS AND USAGE**

FORANE (isoflurane, USP) is an inhalation anesthetic. The MAC (minimum alveolar concentration) in man is as follows:

- 1.0% 100%
- 1.2% 70% N₂O
- 1.5% 50% N₂O
- 1.6% 35% N₂O

- 1.8% 30% N₂O

**Clinical pharmacology:**

Isoflurane is a clear, colorless, stable liquid containing no additives or chemical stabilizers. It has a mildly pungent, musty, ethereal odor. Samples stored in airtight containers are compatible with stainless steel. Isoflurane of low concentrations in the atmosphere is non-flammable. The vapor pressure of isoflurane is below 20°C. Isoflurane is stable at normal atmospheric pressure. Other physical constants are:

- Boiling point at 760 mm Hg: 48.5°C (uncorr.)
- Vapor pressure in mm Hg at 20°C: 238
- Specific gravity: 25°/25°C: 1.496

The concentration of isoflurane being delivered from a vaporizer may be calculated using the formula:

\[
\text{Concentration} = \frac{\text{Flow} \times \text{Pressure}}{\text{Mol} \times \text{Molecular Weight}}
\]

where:

- \( \text{Flow} \) = Pressure of atmosphere
- \( \text{Pressure} \) = Vapour pressure of isoflurane
- \( \text{Mol} \) = Flow of vapor through vaporizer pump
- \( \text{Molecular Weight} \) = 130 g/mol

Isoflurane solutions for injection: Nothing in the agent will alter calibration or operation of vaporizers.

Induction:

Induction with isoflurane in oxygen or in combination with inspiratory minute volume may produce coughing, sneezing, or laryngospasm. These difficulties may be prevented by the use of a hypnotic dose of an ultra-short-acting barbiturate, hypoglycemic concentrations of 1.5 to 2.0% isoflurane usually produce surgical anesthesia in 1 to 2 minutes.

Maintenance:

Sporadic levels of isoflurane may be maintained with 1.0 to 2.0% isoflurane in nitrogen or oxygen. An additional 0.5 to 1.0% isoflurane may be required if isoflurane is being used along with isoflurane in other settings or in the postoperative period. The use of a two-limb circuit with a reservoir bag is recommended during patients anesthetized with isoflurane.

**CLINICAL PHARMACOLOGY**

Isoflurane is rapidly absorbed and exhaled, and has a half-life of approximately 50 minutes. After a single dose, the elimination phase is complete within 60 minutes. Isoflurane is 90% excreted in the breath and 10% in the urine. Isoflurane undergoes minimal biotransformation in man. Known or suspected genetic susceptibility to malignant hyperthermia.

**CONTRAINDICATIONS**

Isoflurane is contraindicated in patients with known or suspected malignant hyperthermia.

**WARNINGS**

- Malignant Hyperthermia:
  - Use of inhaled anesthetic agents has been associated with severe (some fatal) postoperative hepatic dysfunction and hepatitis.
  - Isoflurane has also been associated with postoperative hepatic hyperesthesia (see WARNINGS).
  - With all other general anesthetic, transient elevations in serum bilirubin have been observed only in surgical controls. See WARNINGS for information regarding malignant hyperthermia and elevated blood carboxyhemoglobin levels. During anesthesia, patients have been reported with mild, moderate and severe (some fatal) postoperative hepatic dysfunction and hepatitis.
  - Under appropriate conditions, monitoring and therapeutic intervention, smooth, rapid, and controlled recovery is possible.
  - Infants and children are particularly prone to malignant hyperthermia.
  - Cardiac Disorders:
    - Patients with known or suspected malignant hyperthermia.
    - Use of inhaled anesthetic agents has been associated with severe (some fatal) postoperative hepatic dysfunction and hepatitis.
    - Isoflurane has also been associated with postoperative hepatic hyperesthesia (see WARNINGS).
  - Prevention and Treatment:
    - Anesthesia is contraindicated in patients with known or suspected malignant hyperthermia.
    - Isoflurane has also been associated with postoperative hepatic hyperesthesia (see WARNINGS).
    - Parents and all other general anesthetic, transient elevations in serum bilirubin have been observed only in surgical controls. See WARNINGS for information regarding malignant hyperthermia and elevated blood carboxyhemoglobin levels. During anesthesia, patients have been reported with mild, moderate and severe (some fatal) postoperative hepatic dysfunction and hepatitis.
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