



ISOFLURANE HIKMA®
(Isoflurane)

ACTION

Isoflurane is a (non flammable) inhalational general anaesthetic agent. It acts on the brain centrally, causing progressive depression of the central nervous system and leading to a state of unconsciousness. This depression is reversible and like all general anaesthetics, the mode of action of Isoflurane is unknown.

INDICATIONS

General inhalation anaesthesia in patients of all ages and for all types of surgery.

DOSAGE AND ADMINISTRATION

Both induction and particularly the recovery from Isoflurane are rapid. The use of Isoflurane specific vaporisers will facilitate accurate control of the administered concentration of the anaesthetic. MAC (minimum alveolar concentration) values for Isoflurane are the standard measure for the potency of Isoflurane. For middle aged humans it is 1.15%. An age relationship exists, and for children the MAC is significantly higher. The age -MAC (minimum alveolar concentration) relationship is as follows:

Age	MAC - Average in oxygen
0-1 mos	1.6%
1-6 mos	1.87%
6-12 mos	1.8%
1-5 years	1.6%
mid - twenties	1.28%
mid - forties	1.15%
mid - sixties	1.05%

Premedication: Premedication drugs should be selected according to the needs of the patient. The ventilatory depressant effect of Isoflurane should be taken into account. Anticholinergic drugs (e.g. Atropine) may be used for drying oral secretions.

Induction: Isoflurane has a mild pungency, therefore inhalation should usually be preceded by the use of a short-acting barbiturate to prevent coughing.

Isoflurane may be administered with oxygen or with an oxygen/nitrous oxide mixture. It is recommended that induction with Isoflurane be initiated at a concentration of 0.5%. Concentrations of 1.5 -3% usually produce surgical anaesthesia in 7-10 minutes.

Maintenance: Adequate anaesthesia for surgery may be sustained with an inspired Isoflurane concentration of 1.0%-2.5% in an oxygen and 70% nitrous oxide mixture. Additional (0.5-1%) Isoflurane may be required when given with oxygen alone or with an air /oxygen mixture. Blood pressure decreases during maintenance anaesthesia in relation to the depth of anaesthesia. Blood pressure is inversely related to Isoflurane concentrations. Cardiac rhythm remains stable. For caesarean section procedures 0.5-0.75% Isoflurane in a mixture of oxygen/nitrous oxide is suitable to maintain anaesthesia. For elderly patients, as with other anaesthetic agents, lower concentrations of Isoflurane are required to maintain anaesthesia.

Recovery: The concentration of Isoflurane can be reduced to 0.5% at the start of closing the operation wound and then to 0% at the end of the surgery. After the discontinuation of all anaesthetics, the airways of the patient should be ventilated several times with oxygen 100% until complete recovery.

CONTRAINDICATIONS

- Known sensitivity to Isoflurane or other halogenated agents.
- Isoflurane should never be given to patients with known or suspected susceptibility to malignant hyperthermia.
- Isoflurane must not be used with patients who have developed fever of unknown origin after administration of Isoflurane or halogenated anaesthetics.

PRECAUTIONS

- Caution should be exercised when administering Isoflurane to patients with pre-existing liver disease since the risk of hepatotoxicity is not fully understood. Clinical experience with Isoflurane to date has not shown evidence of liver toxicity even after prolonged administration. However, experience with repeated exposure to Isoflurane is limited.
- Isoflurane must be used with caution in patients with increased intracranial pressure as hyperventilation is required for such patients.
- Isoflurane has been reported to interact with dry carbon dioxide adsorbents during closed circuit anaesthesia, to form carbon monoxide. Inhalation of carbon monoxide may lead to formation of significant levels of carboxyhaemoglobin in exposed patients. Carboxyhaemoglobin is toxic even in low concentrations and is not easily detected by standard anaesthesia monitors such as pulse oximeters. Direct measurement of carboxyhaemoglobin should be carried out in the event that a patient on closed circuit anaesthesia with an implicated agent develops oxygen desaturation which does not respond to the usual therapeutic measures. All necessary precautions should be taken to ensure that carbon dioxide adsorbents are not allowed to dry out.

DRUG INTERACTIONS

- The effect of commonly used muscle relaxants, may be markedly potentiated by Isoflurane. The effect is most notable in non-depolarizing agents, thus lower doses should be used in the presence of Isoflurane. To counteract the muscle relaxant effect of non-depolarizing muscle relaxants, neostigmine may be administered.
- Administration of adrenaline during the use of Isoflurane may cause supraventricular or ventricular arrhythmias.
- Patients receiving calcium antagonists, (especially those of the dihydropyridine class), vasodilators, ACE inhibitors or α -adrenoceptor antagonists concurrently with Isoflurane may show unpredictable hypotension.
- Beta adrenergic blocking agents, including ophthalmic betaxolol, levobutamol, or timolol, concurrent use with hydrocarbon inhalation anaesthetics such as Isoflurane may result in prolonged severe hypotension.

SIDE EFFECTS

- As with other halogenated anaesthetics, hypotension and respiratory depression have been observed. Monitoring of blood pressure and respiration is recommended and supportive measures may be necessary.
- Shivering, nausea and vomiting are minor and comparable in incidence with those found with other anaesthetics.
- Arrhythmias have been occasionally reported.
- Minimally raised levels of serum inorganic fluoride occur during and after Isoflurane anaesthesia due to the metabolism of Isoflurane. It is unlikely that the low levels of serum inorganic fluoride observed could cause renal toxicity as these are below the proposed threshold levels for kidney toxicity.

Pregnancy

- Safety in pregnancy has not been established. However, no evidence of teratogenicity has been revealed in animal studies.
- Blood losses have been observed with Isoflurane in patients undergoing induced abortion. These blood losses are comparable with those following anaesthesia with other inhalation agents.
- Isoflurane can be used for caesarean section.

OVERDOSE

Overdosing with Isoflurane will result in marked depression of breathing and a marked decrease in blood pressure. No specific antidote exists. Drug inspiration should be stopped immediately, a clear airway should be ensured, and the patient ventilated with oxygen.

PHARMACEUTICAL PRECAUTIONS

Store away from heat. Keep container tightly closed.

PRESENTATION

Bottles

- Isoflurane 100 ml: Isoflurane 99.9% (100 ml)
- Isoflurane 250 ml: Isoflurane 99.9% (250 ml)

THIS IS A MEDICATION

- A medication is a product which affects your health, and its consumption contrary to instructions is dangerous.
- Follow the doctor's prescription strictly, the method of use and the instructions of the pharmacist who sold the medication.
- The doctor and the pharmacist are experts in medicine, its benefits and risks.
- Do not by yourself interrupt the period of treatment prescribed for you.
- Do not repeat the same prescription without consulting your doctor.

