FRESENIUS KABI

PrISOFLURANE, USP

DESCRIPTION

Isoflurane is 1-chloro-2,2,2-trifluoroethyl difluoro-methyl ether; it is not flammable in air or oxygen. Vapour pressure of isoflurane is high, that is 250 mm Hg at 20°C, as compared to 243 mm Hg for halothane and 22.5 mm Hg for methoxyflurane. The blood:gas partition coefficient of isoflurane is 1.4.

INDICATIONS AND CLINICAL USE

Isoflurane, USP may be used for induction and maintenance of general anesthesia in horses and dogs.

CONTRAINDICATIONS

Isoflurane, USP is contraindicated in horses and dogs with known sensitivity to isoflurane or to other halogenated agents.

Usage in Pregnancy
Reproduction studies have been performed in mice and rats with no evidence of fetal malformation attributable to isoflurane. Adequate data concerning the use of isoflurane in pregnant and breeding horses and dogs have not been obtained to establish its safe use during pregnancy.

DOSAGE AND ADMINISTRATION

Premedication
A premedication regimen, which may be employed depending upon the patient status, to avert excitement during induction, might include an anticholinergic, a tranquillizer, a muscle relaxant and a short acting barbiturate.

Inspired Concentration
The delivered concentration of isoflurane should be known. Isoflurane may be vaporized from a flow-through vaporizer specifically calibrated for isoflurane. Vaporizers delivering a saturated vapour which then is diluted (e.g., Verni-trol® vaporizer) also may be used. The delivered concentration from such a vaporizer may be calculated using the formula:

$$\% \text{ isoflurane} = \frac{100\ P_v\ F_v}{F_T\ (P_A - P_v)}$$

where: P_A= Pressure of atmosphere
P_v = Vapour pressure of isoflurane
F_v = Flow of gas through vaporizer (mL/min)
F_T = Total gas flow used (mL/min)

Isoflurane contains no stabilizer. Nothing in the agent alters the calibration or the operation of these vaporizers.

Induction

Inspired concentrations of 3 to 5% isoflurane alone with oxygen are usually employed to induce surgical anesthesia in the horse. Inspired concentrations of 2.0 to 2.5% isoflurane alone with oxygen following a barbiturate anesthetic induction are usually employed to induce surgical anesthesia in the dog. These concentrations can be expected to produce surgical anesthesia in 5 to 10 minutes.

Although mask inductions have been employed, horses over three hundred pounds should not be mask induced. Isoflurane is compatible with injectable anesthetics and sedatives, and these drugs may be used as indicated in larger horses.

Body temperature should be monitored during anesthesia and anesthesia flow adjusted to compensate for changes in anesthetic requirements associated with increased or decreased body temperatures.

Maintenance

The concentration of vapour necessary to maintain anesthesia is much less than that required to induce it. Surgical levels of anesthesia in the horse may be sustained with a 1.5 to 2.0% concentration of isoflurane in oxygen, and surgical levels of anesthesia in the dog may be sustained with a 1.5 to 1.8% concentration of isoflurane in oxygen.

The level of blood pressure during maintenance is an inverse function of isoflurane concentration in the absence of other complicating problems. Excessive decreases, unless related to hypovolemia, may be due to depth of anesthesia and in such instances may be corrected by lightening the level of anesthesia.

Following isoflurane anesthesia, variability exists in the time until standing. Older horses appear to be slower to achieve sternal recumbency than younger horses. However, in comparison with other general anesthetics, recovery is quiet and horses have excellent coordination upon standing.

ADVERSE REACTIONS AND OVERDOSAGE

Hypotension, respiratory depression and arrhythmias have been reported. An isoflurane overdose produces a marked hypotension. In that case, or in the presence of signs of overdosage, stop administration of isoflurane, make sure that respiratory pathways are patent, and start assisted or controlled ventilation with pure oxygen, if needed.

PRECAUTIONS

The action of nondepolarizing relaxants is augmented by isoflurane. Less than the usual amounts of these drugs should be used. If the usual amounts of nondepolarizing relaxants are given, the time for recovery from myoneural blockade will be longer in the presence of isoflurane than for other commonly used anesthetics.

Increasing depth of anesthesia with isoflurane may increase hypotension and respiratory depression, and the possibility of overdosing is increased with controlled ventilation.

The electroencephalographic pattern associated with deep anesthesia is characterized by burst suppression, spiking and isoelectric periods.

Care should be exercised to insure maintenance of the airway during general anesthesia. Other factors such as age, pre-existing disease and surgical sites should also be considered when using isoflurane.

Isoflurane, like other halogenated agents, should be used with care in animals with an anemic condition.

Extreme caution should be used with horses suffering from chronic obstructive pulmonary disease. Isoflurane is as suitable as any other inhalation anesthetic but blood/gas analysis should be used to evaluate the adequacy of ventilation.

Since levels of anesthesia may be altered easily and rapidly, only vaporizers producing predictable percentage concentrations of isoflurane should be used (see **DOSAGE AND ADMINISTRATION**).

No surgical stimulation investigations have been done with isoflurane in horses or in dogs. The following has been extrapolated from human data: Surgical stimulation partially reverses the respiratory depression produced by anesthetic depth. Blood pressure decreases with induction of anesthesia but returns towards normal when surgically stimulated.

Extrapolating from human data, patients suffering from hepatic or renal dysfunction may have impaired ability to deal with muscle relaxants. During isoflurane anesthesia, the amount of muscle relaxant is reduced, thereby decreasing the risk of residual muscle relaxant affecting the postoperative period. Similar considerations should be observed when administering muscle relaxant in the horse and dog. It can also be extrapolated from human data that when

using isoflurane to minimize changes in intra-cranial pressure, under controlled ventilation, isoflurane is the best currently available choice of inhalation anesthetic.

WARNINGS

This drug must not be used in horses that are to be slaughtered for use in food.

CONTAINS

Isoflurane, USP (minimum 99.9%)

AVAILABILITY OF DOSAGE FORMS

Isoflurane, USP (Isoflurane, 99.9%) is packaged in 250 mL amber-coloured bottles.

STORAGE

Store at room temperature, between 15°C and 30°C.

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