Tikrit University
College of Veterinary Medicine

Lecture Title
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Subject name: **Inhalation Anesthesia**

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Lecturers link

Inhalation Anesthesia

-Inhalant anesthetic drugs are used to produce general anesthesia They are suitable for use in all species including reptile, birds and zoo animals.

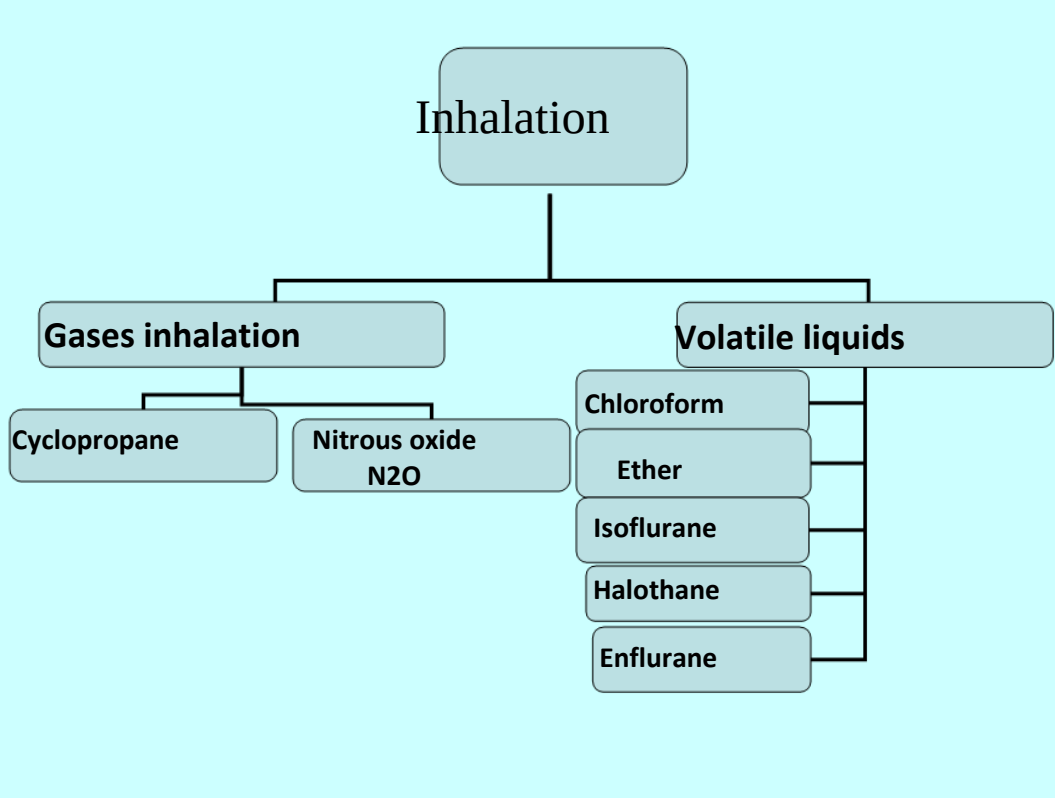
-Inhalant anesthetic drugs provide optimal control of anesthesia , rapid induction and recovery from anesthesia.

-Inhalants are inters and leave body through the lungs.

-The level of anesthesia can alter without using metabolic pathway, thus facilitating more accurate control of the depth of anesthesia

-These anesthetics are either halogenated hydrocarbone (halothan), halogenated ether (isoflrane and enoflurane) or inorganic gases (Nitrous oxide).

Inhalant anesthesia include two types:



Properties of desirable inhalant anesthetic drugs :

1-non-irritating and free from disagreeable odors

2-Easily controlled, rapid induction and recovery from anesthesia

3-Adequate analgesia and muscle relaxation

4-Not promote bleeding

5-Minimal side effect .

6-Nontoxic to the patient and environment

7-Easy to deliver

8-Inexpensive

9-Non-inflammable

advantages of Inhalation

1. Minimal cumulative action in the body.
2. Possible to operate longer in the body
3. inspiration of enriched oxygen concentration that are require by inhalant anesthesia during recovery ,provide a degree of protection against hypoxia.

4. The most important advantage of inhaled anesthetics for research is that the concentrations can be measured on a continual basis, which ensures that all animals are at a similar anesthetic depth. This is important because anesthetic effects vary with the depth of anesthesia In contrast, injectable anesthetic concentrations are difficult to measure and stable blood concentrations are not easily confirmed.

Disadvantage

required heavy equipment ,bulky and not easily portable problematic under field condition

Minimum Alveolar Concentration (MAC):

is defined as the alveolar concentration of an anesthetic that prevent muscular movement in response to a painful stimulus in 50% of the test subjects.

Mechanism of uptake anesthetic gases

1-Anesthetic gases uptake by the blood and tissue through alveolar diffusion by means of pulmonary ventilation

2-Secondary diffusion occurs across capillary membrane into the tissue

3-Elimination occurs when venous blood leave the tissue carry some agents back to the alveoli and washed out during ventilation in addition liver and kidney play a role in elimination.

1. Halothane :-

- Halothane is an inhaled anesthetic which has good potency, low blood/gas solubility, and high volatility

- Non irritating , potent analgesic ,depress CNS, increase cerebral Blood flow.

-Vapour concentrations from 2 to 4% in the inspired air produce smooth and rapid induction of anaesthesia in all species of domestic animal

- Color less liquid with Sweet pleasant odor.

- Halothane increases cerebral blood flow due to direct vasodilatation of vascular smooth muscle. This increased blood flow is not prevented by pre-anesthetic hyperventilation.

*Contraindications for halothane include patients with increased intracranial pressure or intracranial hemorrhage.

- degraded by sunlight to toxic end products so that supplied in dark colored bottle and preservative (0.01%thymol) added to increase its stability .

2-Isoflurane:-

-An advantage of isoflurane over halothane is that it is minimally metabolized due to its chemical stability and low solubility, and accordingly exhaled essentially unchanged. This characteristic makes it a particularly safe agent if the nonhuman primate has hepatic or renal deficits

-Heart rhythm is stable with isoflurane

-Generalized CNS depression

-Pungent odour, Color less liquid Produce co2 when exposed to desiccated co2 absorbent material

3-Ether:-

-Depress CNS and temperature regulating center

- Inflammable, Pungent odor ,Color less liquid it destroy in air, light so it stored in amber-colored bottle keep in dark cool place.

-Side effect present as Salivation , nausea -ether is highly irritating to the respiratory system. Increased production of respiratory secretions and increased bronco-constriction are common.

-The use of an anticholinergic, like atropine, was commonly advocated to decrease the signs of respiratory irritation

4-Chloroform:-

-Not explosive .

- longer uses may toxic to liver

- Color less ,liquid It has toxic effect on the liver and kidney, causing fatty change in the cell, sometimes causing ventricular fibrillation and sudden death**.**

5-Nitrous Oxide (N2O):-

-is a weak anesthetic gas, which should be used only where small reductions in other anesthetics are critical.

- Mild analgesic

-Pleasant odor ,colorless gas .

-Used in combination with another inhalant agent.

-To supplement analgesia during surgical procedure

-not irritant to respiratory system, not cause toxicity it has no effect on liver, kidney

- speed induction via second gas effect ;this means the rapid uptake by blood of large volume of a gas from the alveoli acts to enhance the uptake of the remaining alveolar gases this effect is most pronounced in early stages of the induction has been used to speed anesthetic induction

-50% N2O will allow completion of the surgical or diagnostic procedures without severely depressing cardiovascular function

- Once the use of N2O is discontinued, oxygen should be administered for approximately 5 minutes to ensure that the animal does not become hypoxic during the rapid exhalation of N2O.

6-Cyclopropane:-

-Cyclopropane is as inflammable as ether and mixtures with both air and oxygen are explosive

-It is fat soluble and it is potent anesthetic agent with quick acting but it produces marked respiratory depression

-Inhalation of 15- 20 % concentration with of the gas with O2 is effect to produce deep anesthesia and concentration of 35 – 40 % produce respiratory failure.

-During induction the stage of excitement is well defend in large animal

-It cause vasodilation and increase blood flow particularly to the skin and subcutaneous tissue, hence hemorrhage and capillary oozing at operation site.