

Introduction

General Anesthesia: is regarded one of the miracles of medicine (Lumb and Jones 1996). Advances in the art and science of anesthesia have allowed tremendous advances in surgery and medicine.

General anesthesia is a state of unconsciousness produced by controlled, reversible drug-induced intoxication of the central nervous system resulting in absence of pain sensation over the entire body and a greater or lesser degree of muscular relaxation. Therefore, general anesthesia should ensure immobilization, unconsciousness, and loss of pain. Veterinary medicine has often lagged behind human medicine. However, modern veterinary anesthesia utilizes many of the same drugs and methods utilized in human anesthesia. Veterinary medicine depends more on anesthesia than human medicine because of the uncooperative nature of our patients (e.g. dental prophylaxis rarely requires anesthesia in humans, but requires anesthesia in dogs and cats). Unfortunately, general anesthesia accompanies adverse side effects and our goal is to minimize these so as to maintain homeostasis of physiology. Some of the key reactions to be avoided during general anesthesia include cardiovascular instability, reflex movement, vomiting, shivering, excitement, pain and convulsion.

Anesthetic techniques are subdivided into three main classes: general anesthesia, local anesthesia (topical, infiltration and specific nerve block), and regional anesthesia (epidural, spinal or intravenous regional). This course covers principles and techniques primarily related to general anesthesia in different species. One lecture will be devoted to local anesthesia.

History of Anesthesia

1540 Paracelsus reported use of ether to anesthetize fowl

1800 - Sir Humphry Davy suggested anesthetic effect of nitrous oxide

1824 Hickman produced analgesia in dogs with mixture of nitrous oxide and carbon dioxide

1842 Ether first used in human anesthesia

1844 Wells used nitrous oxide in his dental patients

1847 Chloroform used in animals and human by Fluorens and Simpson, respectively

1862 Nitrous oxide reintroduced in humans

1875 Chloral hydrate introduced 1878 Cocaine suggested for local anesthesia

1930s Barbiturates introduced

1950 Phenothiazine tranquilizers

1956 Halothane introduced

1971 Xylazine and ketamine introduced

1975 Establishment of the American College of Veterinary Anesthesia

1985 Isoflurane introduced

1989 Propofol introduced

1990s Sevoflurane and desflurane introduced

Clinical Anesthesia

- **Three major objectives**

1. Provide relief from pain
2. Provide optimal condition for surgery and other procedures
3. Ensure patient safety and survival

- **Ten fundamentals**

1. Evaluate patient history, physical status, and laboratory data
2. Optimize the condition of the patient if problems are identified prior to anesthesia
3. Minimize anesthetic time by careful planning in advance
4. Choose the best drugs and doses based on species, breed, health status, and Pre-existing complications
5. Evaluate effects of premedication before induction
6. Maintain patent airway, monitor and support ventilation, and supplement oxygen
7. Monitor and support cardiovascular function: treat with fluids, and ancillary drugs
8. Monitor and support body temperature: minimize heat loss and provide external heat sources
9. Continue monitoring and support until recovery is complete
10. Treat pain

- **Six steps**

1. Evaluation of health status
2. Provision of appropriate equipment, supplies, and personnel
3. Premedication
4. Induction
5. Maintenance
6. Recovery

Nomenclature

Anesthesia - the loss of sensation

Analgesia - freedom from or absence of pain

Local anesthesia/analgesia - loss of sensation in a prescribed body area (usually infers blockade of a specific nerve or infiltration of a small area with local anesthetic, e.g. intercostal nerve block)

Regional anesthesia/analgesia - loss of sensation in a larger, though limited body area (usually infers blockade of a large nerve or group of nerves with local anesthetic, e.g. epidural anesthesia)

General anesthesia - loss of sensation to the entire body. The state of reversible unconsciousness, muscle relaxation, and analgesia.

Tranquilization - state of reduced anxiety and relaxation, but still aware of surroundings

Sedation - state of CNS depression and drowsiness; including reduced awareness of surroundings

Narcosis - drug induced state of deep sleep, from which the patient may or may not be arousable

Surgical Anesthesia - stage/plane of general anesthesia that provides unconsciousness, muscle relaxation, and analgesia to allow surgery

Balanced Anesthesia - Combining several drugs to induce anesthesia in concentrations that are considerably smaller than those needed if one drug were to be used by itself; which typically involves the co-application of a hypnotic drug, an analgesic drug and a muscle relaxant.

Dissociative Anesthesia - the state of anesthesia produced by drugs (e.g. ketamine) that disassociate the thalamocortical and limbic systems, resulting in a cataleptoid state, characterized with open eyes and hypertonic muscles

Neuroleptanalgesia - combination of a neuroleptic agent (tranquilizer/sedative) and an analgesic agent to produce a state of heavy sedation and analgesia (e.g. - acepromazine + morphine).