



# **ELECTROANAESTHESIA**

**Dr. ADARSH KUMAR**

A commercial instrument is available that produces generalized rigidity of voluntary muscles when an electrical current is passed through the animal from electrodes placed at the head and tail. The animal is thus unable to stand or move.

- ◆ The technique provides convenience and safety for the vet and removes the danger of an accident during surgery due to sudden movement of the patient.
- ◆ It is used in combination with local analgesia
- ◆ The electrical stimulation of the brain can activate either opiate or non opiate pain control pathways.
- ◆ Most instruments deliver current through needle electrodes applied to the head. Direct pulsating current, alternating current has been used to produce electronarcosis. AC of 700 cycles, 35-50 mA, app. 40 volt has been employed.
- ◆ Major disadvantages are that continuous electrode contact is important to maintain anesthesia and individual variation among animals requires that the current be adjusted for each according to the response observed.
- ◆ Electrical anesthesia is characterized by convulsions on induction unless a muscle relaxant is first administered.
- ◆ Profuse salivation develops on induction and continues throughout and can be counteracted by use of atropine, endotracheal intubation should also be done.
- ◆ Hypothermia probably due to disturbances of thermoregulatory center in the hypothalamus is commonly seen.
- ◆ There is increased stress, which leads to increased blood cortisol levels.
- ◆ For assessing the depth of anesthesia photopupillary reflex is taken as an index.
  - **Advantages are:**
    - A. Economical
    - B. Immediate recovery
    - K. Useful in experiments where no drug is supposed to be given.



## **HYPOTHERMIA**

**Dr. ADARSH KUMAR**

Hypothermic anesthesia is a form of general anesthesia

To produce hypothermia in a dog the protocol mentioned *ut infra* is followed.

12. A phenothiazine derivative is given
13. A thiobarbiturate is given for general anesthesia.
14. Endotracheal tube is inserted and animal is kept on inhalant anesthetics.
15. A 5% dextrose is given as a drip[
16. Muscle relaxant is given and animal is put on controlled respiration.
17. Unless a cooling mattress is available, the animal is positioned in a sink, bathtub or other container with its head above the water.
18. Ice water is used for rapid cooling and the dog is removed from the bath before the desired temperature is reached.
19. Then it is dried and performed upon surgery.
20. Rewarming can then be started when skin closure is started.
21. Atropine and neostigmine is given to reverse the muscle relaxation.

Hypothermia is defined in homeotherms as the reduction of body temperature below 35<sup>0</sup>c

The combination of hypothermia and anesthesia is used to achieve

- v) Loss of consciousness
- w) Loss of sensory response
- x) Depressing the motor activity
- y) Loss of reflex response

And collectively it is called **Modified hypothermia**

<b>METHOD</b>	<b>TEMPERATURE</b>	<b>CONSCIOUSNESS</b>	<b>REFLEX</b>	<b>MOTOR</b>	<b>SENSORY</b>
Anesthesia	37 <sup>0</sup> c	Depressed	Depressed	Depressed	Depressed
Hypothermia	37-32 <sup>0</sup> c	Stimulated or unchanged	stimulated	stimulated	Slightly depressed
Hypothermia	28 <sup>0</sup> c	Depressed	Depressed	Depressed	Depressed
Hypothermia +Anaesthesia	35-32 <sup>0</sup> c	Depressed	Depressed	Depressed	Depressed

Effect of hypothermia on metabolism:

- a) O<sub>2</sub> consumption decreases.
- b) Hyperglycemia because of reduced carbohydrate metabolism.
- c) Hypokalemia because of retention of K<sup>+</sup> within the cell and decreased urinary excretion.

◆ Effect on Cardiovascular system:



- Bradycardia
- ◆ Effect on Respiratory system :
  - Respiratory depression
- ◆ Effect on CNS:
  - Cerebral blood flow is decreased

**Lethal limits of Hypothermia--- 25<sup>o</sup>c ---below this cerebral damage can occur.**

- ◆ Complications:
  - A. Primary: Ileus and coagulation defects.
  - A. Secondary:
    - Ventricular fibrillation
    - Acidosis because of inadequate ventilation and perfusion.
    - CNS hypoxia
    - Rough palpation of abdomen cracks the frozen stomach.

Dr. Adarsh



## ACUPUNCTURE IN VETERINARY PRACTICE

**Dr. ADARSH KUMAR**

*“ A needle can cause death and also save the patient ”*

*Huang Di Nei Jing*

Acupuncture is a part of the traditional Chinese Medicine, less developed in Veterinary than in human Medicine. It is a regulative therapy using the body's own potential for healing and it is also functional therapy. The word 'ACUS' means in Latin the needle. Therapy with needles inserted at specific points on the body is called Acupuncture therapy. It is one of the most ancient forms of therapy practiced by the Chinese for over 6000 years. This form of therapy has been introduced of late, in western countries and in India for anaesthesia and therapy in man and animals. Legend has it that Acupuncture arose when some villagers noticed that a Warrior's long standing ailments were miraculously cured by spear wounds suffered during a battle. No one can verify these are historic legends'. Acupuncture has been recognised by WHO in 1978 under traditional treatment modalities.

According to Chinese concept the main applications of Acupuncture are :

1. Control of pain
2. Sedation
3. Readjustment of organ functions
4. Antipyretic and Immunological actions
5. Treatment of Paralysis, shock etc.
6. Treatment of Neuro Endocrinal disorders (Sterility etc.)
7. Acupuncture Analgesia
8. Reversal of general anaesthesia

Hau (1965) was the first to show that Acupuncture relieves pain in rats and rabbits. His animal studies dispelled any hypothesis of placebo effect in humans.

### **ACUPUNCTURE POINTS :**

These are minute areas on the body with inherent qualities that set them apart from the rest of the body. These points can be shown to be different by their physiological behavior, electrical response and therapeutic role. They are also referred to as areas of Hypersensitivity. Acupuncture points are located on imaginary horizontal lines known as meridians, which in turn have internal connections to the organs from which the meridian or the channel gets its name. There are over 360 points on these meridians, and many non meridian points i.e. trigger points, extra points etc.. All together there are 14 meridians. Chinese believe that the vital energy Ch'i flows through these path ways. These are also termed as energy path ways. Among these 12 are organ meridians and the remaining two are the non organ meridians.

<b>ORGAN MERIDIANS :</b>	<b>Maximum</b>	<b>Pathway of</b>	<b>Energy Flow</b>	<b>Direction</b>
1. Lung (Lu)	11 points	3-5 AM		Chest to fore leg
2. Large Intestine (LI)	20 points	5-7 AM		Fore leg Head
3. Stomach (St)	46 points	7-9 AM		Head to Hind leg
4. Spleen (Sp)	21 points	9-11 AM		Hind leg to Chest
5. Heart (H)	9 points	11-13 PM		Chest to Fore leg

8. Urinary Bladder (Bl)	67 points	17-19 PM	Hind leg to Chest
9. Kidney (K)	27 points	19-21 PM	Chest to Fore leg



### NON-ORGAN MERIDIAN :

1. Governor vessel (GV)	28 points	Dorsal midline
2. Conception vessel (CV)	24 points	Ventral midline

### LOCATION OF ACUPUNCTURE POINTS :

A specially designed acupuncture search probe is used to locate the acupuncture points based on the principles of L.S.C.R. (Wheeler et al. 1976). The anatomical land marks provided for the white cattle and the small ruminants help in this procedure. The search probe provides an audio visual signal when ever the probe point touches the points of least electrical impedance (L.S.C.R.). Factors to be considered while using an electronic search probe (Gillchrist 1981). (L.S.C.R. –Low skin contact resistance)

(a) **MOISTURE** : If the skin is totally wet or if it is not uniform in moisture content many false points may be found. Moreover, skin should be scratch tree.

(b) **PRESSURE** : Enough pressure has to be employed to get a positive reading of the acupuncture point. Hence a standard uniform pressure search technique is mandatory to get correct reading.

(c) **INDIVIDUAL VARIATIONS** : Variations between patients due to different ambient humidities and different skin types of the same patient.

E.g. : Ear surface is in general more thin than the skin over the back.

### NEEDLES AND NEEDLING :

Stainless steel, solid filiform, shafted with silver or silver plated spiral handles are most commonly recommended. The diameter of the needle ranges from 26 G to 34 G and the length of the needles range from 0.5" to 5.0" recommended sizes.

Dogs 32G x 0.5"

Cattle 21G to 24G x 1.0" (YHAN Li Needles)

The human needles can also be used for large animals but their thick skin and habit of flicking the skin and tails spoil the needles by bending them.

### Stimulation Techniques :

- |                       |               |
|-----------------------|---------------|
| 1. Mechanical         | 2. Thermal    |
| 3. Chemical           | 4. Electrical |
| 5. Light (Laser Beam) | 6. Injection  |
| 7. Implantation       |               |

**Needling techniques** : The acupuncturist should become proficient at point location and manipulating techniques to have desired effects as mentioned below:

	<b>Tonification</b>	<b>Sedation</b>
Type of needle	Silver	Gold
Movement	clockwise	Anticlockwise
Frequency	Less	High
Time (duration)	Short	Long
Electrode	- ve	+ ve

The acupuncture needles after being passed on the specific points are then connected to the output terminals cables of the electronic acupuncture unit through crocodile clips. The unit is switched on and adjusted to the optimum level of current of 35 to 100 MA and a frequency of 120 to 200 Hz.

**STIMULATION** : 12.6-5.4 mA at a frequency of 10-36 Hz.



**Mode of action:** Various ancient and modern theories were postulated for explaining the action of acupuncture. However, not a single theory explains the effects of acupuncture. Hence, it seems that observed effects are due to complex action of all the postulated theories.

**Ancient Theories :**

1. Yin -Yang theory (Husband- wife theory, Mother - Son theory)
1. Theory of five elements
1. Theory of energy flow
1. Theory of visceros-somatic reflex

**Modern Theory :**

1. Motor gate theory
1. Neuro-humoral theory etc.- This theory postulates that when Acu points are manipulated there is release of endorphins and encephalins and the desired result is produced.

**Advantages:**

1. Very good specially for producing analgesia in cardiopulmonary compromised patients.
1. Less cardiopulmonary, physiological changes and quickens blood clotting.
1. Immunostimulating.
4. No side effects.
5. Useful for therapy in cases where conventional allopathy fails to treat.

**Disadvantages:**

1. Long duration for producing the effects specially analgesia.
2. Unpredictable effects.
3. Less muscle relaxation

**Auriculotherapy :**

Recently, stimulation of ear points for recovery from disease ailments have been successfully reported in human beings and dogs.