University of Mosul
Lecture No.: 1
College of Veterinary Medicine
Date:
Unit of Scientific Affairs
Website:

Lecture title: **Assist. Prof. Dr. Fouad Muyad Mohammed**

Lecturer Affiliation: **Department of surgery and Theriogenology, College of Veterinary Medicine, University of Mosul, Iraq**

Summary: **Local anesthesia**:

Define as the use of chemical agents on sensory neurons to produce disruption of neuron impulses transmission leading to a temporary loss of sensation in a small area of body where a minor procedure is to be done.

Characteristics of the local anesthetic agent include:

1. Good penetrating qualities and spreading properties in the body tissues, mean that specific nerve blocks need less accuracy.
2. High potency so low concentration can be used.
3. Rapid onset of action.
4. Long duration of action.
5. Effects on the local blood vessels. Vasodilatation (therefore epinephrine is often added to cause Vasoconstriction, thus delay removal and lengthen action) except cocaine only is Vasoconstriction.
6. Low systemic reaction.
7. Reversible action.
8. No irritation to nerve nor local irritation and swelling (particularly in horses).
9. Easy of sterilization.
10. Has no toxicity.

Aims for the uses of local anesthesia:

1. Many surgical procedures can be carried out satisfactorily under local anesthesia such as cesarean section, neoplasm, laparotomy and docking in ewe or cows.
2. In some situations with extremely depressed animals when they will tolerate, performing a surgical procedure under local anesthesia may be safer as well as more economical.
3. It is effectively used for differential diagnosis of lameness especially in equine.
4. Local anesthesia has useful role in obstetrics maneuvers.

5. The sedation is often employed to facilitate cooperation from animals by reducing fear and anxiety. The sedation also reduces the likelihood of sudden movement in animals.

Important Notes:
Always draw back on syringe to check not in vein before injecting local anesthetics.

Local anesthetic drugs:

Cocaine, Procaine, Proparacaine, Amethocaine, Ropivacaine or Lovobupivacaine.

Local anesthetics common used in veterinary medicine:

Lidocaine:
The first modern local anesthetic agent was (trade name **Xylocaine®**).
1.This is the most widely used general-purpose local anesthetic in veterinary use. It possesses reasonably rapid onset of action, with good spreading properties, being a good 'all round' useful local anesthetic.
2.It may cause some local irritation and swelling, which is particularly a problem in the horse. It is available in a variety of concentrations or injection; with and without epinephrine; and in the form of solutions, creams, jellies, sprays etc.

3.Duration of action is variable (depending on uptake) but will be around 1 hour without epinephrine, and 2 hours with epinephrine.
4.It sets quickly and when combined with a small amount of epinephrine (adrenalin), it produces profound anesthesia for several hours.
Bupivacaine, Mepivacaine, Prilocaine.

Techniques of Local Anesthesia in Animals:

Advantages:
1.Minimal equipment needed.
2.Minimal systemic effects.
Disadvantages:
1.Requires cooperative patient with or without significant restraint.
2.May require sedation.

Types of Local Anesthesia Techniques:

1. Topical or Surface Anesthesia:

This technique is primarily used for the desensitization of the superficial layers of the skin and mucous membrane and this refers to the use of local anesthetics in solution sprays as well as in various creams and ointments on mucous membranes, drops into the eyes, sprays or brush in laryngeal area ، infuse into the nostrils, urethra, rectum, vulvar region, glans penis .

The simplest way to achieve surface analgesia is by application of the ice. The other methods are :

A. Using Volatile Agents: Ethyl chloride, ether etc. These agents

evaporate instantly thereby decreasing the surface temperature and so causing desensitization of the area.

B. Using local analgesia drugs :

a) 2% or 4% Lignocaine HCl can be used for the relief of pain in

abrasions or eczematous areas. Soak a piece of cotton or gauge in the

local anesthetic solution and then put on the affected area for 5

minutes. The analgesia is seen for 30-45 minutes .

b) 4% Lignocaine HCl as spray is used for the surface analgesia of

mucous membranes like vulva, glans penis, pharynx, larynx etc .

c) For eyes 4% Cocaine or Lignocaine can be used .

d) Lignocaine or Amethocaine jelly can be used for desensitization of

abrasions and eczematous areas .

e) In horses and cattle intrasynovial injection of 2% Lignocaine HCl is

used for the surface anesthesia of the hygromatous areas at the joints .

2 .Infiltration Anesthesia :

In this technique the nerve endings are blocked at the actual site of the operation. Most minor surgery can be done by this technique. The volume used will depend on the size of the animal and the area to be blocked .

Advantages:

Requires no greater skill or the knowledge of the anatomy of the site .

Disadvantages :

a) Large volume of anesthetic in the tissues to be incised and

sutured .

b) Epinephrine in the anesthetic solution may also interfere with the

blood supply and retard healing .

c) If a flank laparotomy is being done local anesthetic must not only

be infiltrated subcutaneously but into the muscles and fascia as

well .

d) There is multiple problems may occur by this method such as

irritation, distortion of the wound, swelling and some delay in

post-operative healing. (Never inject local analgesic through infected tissues).

2 .Extra-vascular Infiltration Techniques :

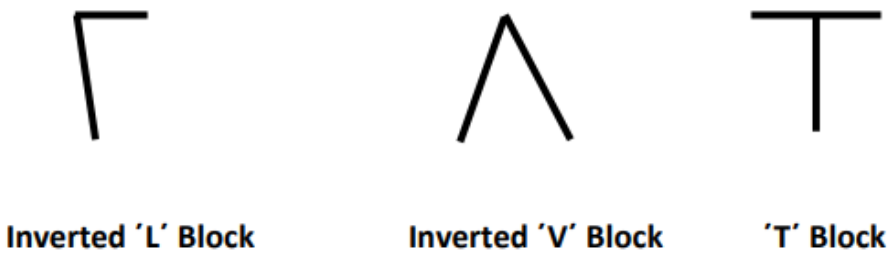
I. Linear Infiltration:

The infiltration of the local anesthetic is done on the line of the incision or just parallel to the line of the incision. The amount to be infiltrated is 1 ml/cm in small animals and 2ml/cm in case of large animals. The anesthetic is to be

infiltrated into the subcutaneous area as well as into the muscles. The technique can be used for any type of the surgical operation like rumenotomy ،cystotomy etc. However in this technique the amount used is quite large; the anatomy of the site is also disturbed; the healing of the wound is normally delayed.

II. Inverted ´L´ or ´T´ or inverted ´V´ block:

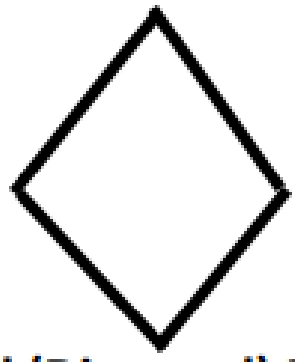
This technique (done for flank laparotomies) is a nonspecific regional analgesic technique in which all the nerves entering the surgical field are desensitized from two sides. 2 % Lignocaine HCl is injected into the tissues bordering the dorsocaudal aspect of the last rib and ventrolateral aspect of the lumber transverse processes. Advantages include deposition of the anesthesia way from the surgical site thus decreasing edema and hematoma formation from the block. The site anatomy is not disturbed and therefore there is normal healing of the surgical wound. Disadvantages include incomplete analgesia and muscle relaxation of the deeper layers of the abdominal wall. Inverted ´V´ block technique is primarily used for teat surgery or management of accidental wounds of the limbs.



Inverted ´L´ Block Inverted ´V´ Block ´T´ Block

III. Field Block or Cup shape (Diamond) Block :

In this technique a wall of the local anesthetic is formed around the site of the operation. The advantages and the disadvantages are the same as for the inverted ´L´ or ´T´ block.



Field (Diamond) Block

IV. Ring Block :

In this technique a wall of the local anesthetic is formed around the site of the operation e.g. teat surgery. The advantages and the disadvantages are the same as for the inverted ´L´ or ´T´ block.

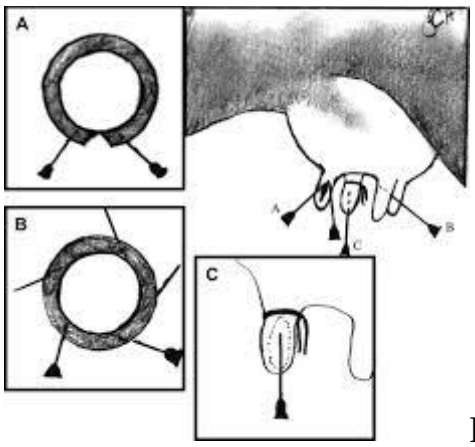
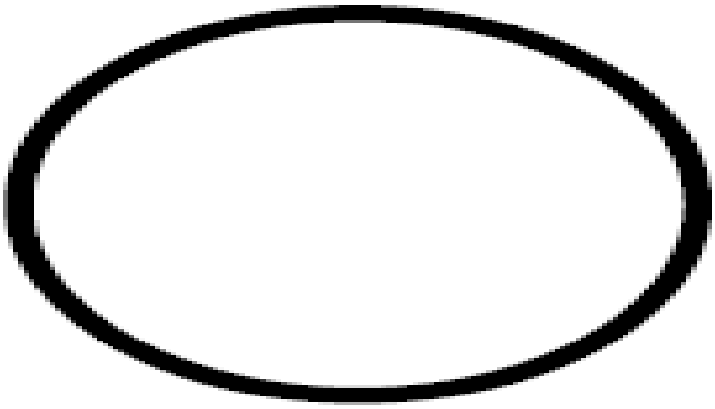


Figure :Ring block in teat surgery



Ring Block

4 .Intrasynovial anesthesia :

•In joints, bursa, and tendon sheaths .

•Useful for both diagnosis of lameness, and for general pain relief .

•The local anesthetic chosen must cause minimal irritation, and great care in sterility is necessary as infecti