**Caudal epidural anaesthesia**

**Epidural anesthesia:**

When a local anaesthesia agent is given between the space formed by endosteum and duramater such an anaesthesia is known as epidural anaesthesia.

Site for epidural anaesthesia:

Cattle and buffalo: last sacral and first coccygeal vertebrae or in between 1st and 2nd coccygeal vertebrae

Equine: between 1st and 2nd coccygeal vertebrae

Sheep and goat: same as cattle

Pig and dog: last lumbar and first sacral vertebrae

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| Mechanism of action |
| * Epidural injection is a nerve block, not a spinal anaesthesia because the injection is given outside the durameter after the end of the spinal cord. Spinal cord containing the spinal fluid, terminates between the second to fourth sacral vertebrae in the cow and the first to third sacral vertebrae in the mare. therefore, at the site of caudal epidural anaesthesia, there is no spinal fluid present.
* Thus, it is a form of multiple spinal nerve block in which the coccygeal and posterior sacral nerves are desensitized.
* These nerves supplied to the anus, perineum, vulva and vagina only.
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**Technique of epidural injection:**

* The site is clipped and thoroughly washed with an antiseptic solution and the sacro-coccygeal region is shaved.
* The exact site is located by holding the tail below the base and moving it upward and downward in a pump handle fashion.
* Now bring the thumb of left hand near the sacro-coccygeal region and feel the depression between the last sacral and 1st coccygeal vertebrae. The site of sacro-coccygeal is easily palpable because sacrum remains fixed whereas first coccygeal vertebra moves.
* Desensitize the skin over the injection site by injection small volume of local anaesthetic.
* Hold the needle (16 guuze and 5 cm long) and insert into the above site at about 90 degree in cattle and in case of mare, 1st and 2nd coccygeal space at about 45 degree abgle.
* When needle pierces endosteum, there will be crackling sound which indicates that the needle has crossed endosteum.
* Desposit the required amount of local anaestheti (lignocaine) and remove the needle carefully.

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| Interesting facts |
| * To confirm that the needle is correctly placed or not, attach the syringe to needle and make a trial injection, if there is no resistance to flow of anaesthetic solution that means the needle point is in the epidural space.
* Other method to know the correct placement of needle is, to put a few drops of local anaesthetic in the hub of the needle. When needle is in correct position, the anaesthetic solution will be sucked as a result of the negative pressure which exist inside.
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| **Note**: |
| * With in 2 minute of injection, the tail becomes flaccid and in 10-20 minute perineum gets desensitized as well as straining reflex is completely abolished.
* Induction of anaesthesia can be tested by pricking the needle in different dependent parts.
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**Drugs and doses:**

* A heifer and small cow require a volume of 5 ml. and large cows7-10ml. 2% lignocaine hydrochloride to produce obstetrics anaesthesia lasting about 30 – 150 minutes.
* If 2% adrenaline is added, it prolongs the perod of anaesthesia.
* In adult sheep and goat, approximately 2ml of 2% lignocaine induce sperineal anaesthesia.
* In sheep and goat 3ml of 2% lignocaine may cause ataxia and recumbency.
* In general, use of higher dose than recommended causes hind limb incordination and sterna recumbency.

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| Clinical pointers |
| * Continuous caudal epidural anaesthesia can be given to the cattle and small ruminants for giving relif from tenesmus caused by chronic rectal or vaginal prolapsed. For this, place on 18-gauze and 5 cm long spinal catheter in the epidural space, remove the stylet, then place a catheter adapter on the hub of the catheter and secure the catheter to the skin. After securing the catheter in the skin, administer 3 to 5 ml. of 2% lignocaine every 1 to 3 hours or as needed.
* Bupivacaine is a safer, long – acting agent for epidural anaesthesia that provides analegesia for 4 to 6 hours after a single injection. The dose is the same as for 2% lignocaine hydrochloride.
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**Advantage**:

* Because epidural anaesthesia desensitizes anus, perineum, vulva and vagina, it resulting in painless birth.
* Outstanding advantage of epidural anaesthesia for an obstetrician is that it abolishes pelvic sensation reflex (pain) and abdominal contraction (straining), thus foetal manipulation and retropulsion becomes easier and defaecation remains suspended.
* If animal is recumbent due to pain, it often gets up after administration of epidural anaestheyic because painful pelvic sensation is abolished. Thus again makes the obstetricians task easy because the manipulation in standing condition is easy.
* The epidural anaesthesia is useful whenever straining is vigorous as in prolapsed of the uterus, vagina, rectum or urinary bladder.

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| Myometrial contraction and straining |
| Presence of foetus in the cervix and vagina leads to initiation of Fergusons reflex and initiation of pelvic reflex. Fergusons reflex causes stronger myometrial contractions while pelvic reflex leads to strong abdominal contractions or straining. The pelviv reflex is similar to that of defaecation reflex. |

**Indications**:

* Correction of maldisposition of foetus
* Vulvar suture
* Prolapsed of vagina, uterus, anus and urinary bladder
* Episistomy
* Foetotomy
* Cserean section
* Retention of fetal membrance

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| Do you know? |
| * In recent years, 2% xylazine solution (0.05 to 0.12mg/kg of body weight) diluted to a volume of 5 to 12 ml with 0.9% sterile saline has been used for epidural injection in place of lignocaine.
* The onset of perineal anaesthesia with xylazine within 10 to 20 minutes and duration of epidural anaesthesia is 3 to 4 hours.
* Thus xylazine induced analgesia lasts longer than 2% lignocaine.
* Xylazine in combination with lignocaine may be used for epidural anaesthesia in cattle.
* The recommendation doses for 450 kg cattle are 0.03 mg / kg of xylazine added to 2% lignocaine hydrochloride to a total volume of 5 ml.
* The combination of xylazine and lignocaine provides a longer duration of analgesia (about 4 to 5 hours).
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Epidural anaesthesia in mare

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| lignocaine | xylazine |
| 1-More ataxia | 1-less ataxia |
| 2-Onset is rapid (approx. 5 min) | 2-Onset is slow (approx.30 min) |
| 3-Duration of analgesia short (approx.20 min) | 3-duration of analgesia longer (approx. 210 min) |

**Note**: a combination of xylazine (0.17 mg / kg) and lignocaine (0.22 mg / kg) can also be administered with rapid onset (approx.330 min) with minor signs of ataxia in mares.

**Terminology used in epidural anaesthesia:**

1. High epidural anaesthesia: it is given at lumbro sacral vertebrae region between the last lumber and the first sacral vertebrae.
2. Low epidural anaesthesia: it is given between the last sacral and first coccygeal or between the first and second coccygeal vertebrae depending upon the species.

The low epidural anaesthesia is further subdivided into two, based on the doses of anaesthesia.

1. Anterior epidural anaesthesia – high doses of local anaesthetic are required
2. Posterior epidural anaesthesia – low doses of local anaesthetic

**Q**- **Calculate total volume of anaesthesia for caudal nerve blocking in horses by mix xylazine and lidocaine.**

**Note 1: the doses according to the manufacture is one ml equals 20 mg**

**Note2: the scientifically proven dose for each drug, it gives less ataxia sign and rapid onset is (( xylazine 0.17 mg / kg : lidocaine 0.22 mg / kg.**

**Note 3: the body weight of horse 400 kg**

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