

Popular Article

Incomplete Dilation of Cervix

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Introduction

Incomplete dilation of cervix also called a cervical insufficiency, occurs when weak cervical tissue. Incomplete cervical dilation occurs very occasionally in heifers but the true incidence is difficult to determine because in most situations the onset of first stage labor has not been noted.

Incomplete cervical dilatation is an important cause Dystocia is a common obstetrical disorder in buffaloes. Both maternal and fetal causes predispose the condition in the species. Like cow and ewe all domestic animals, cattle and buffalo are considered the species in which the incidence of dystocia appears to be highest.

In cows the cervix is relatively more cartilaginous than in the other farm animal species. In sheep and goat, incomplete cervical dilatation is cause for maternal type of dystocia and an indication for caesarean section. It has to be sufficiently dilated at the time of parturition for easy vaginal delivery, for this cervical tissue undergoes a number of changes during the first stage of parturition

Various predisposing or causative factors responsible for developing this condition are season, breed, first parturition, hormonal and mineral imbalance. Incomplete cervical dilatation occurs as important etiology in various forms of dystocia like uterine torsion, twin pregnancy, monsters etc. and severe dystocia can result if it is not dilated properly at the time of parturition in cow.

Parturition or “Calving”

- The process by which the (fetus) baby is expelled from the mother is called birth or parturition or calving.
- It is also called as labour or delivery.
- There are following hormone which are regulate in parturition.
 - (A) Oestrogen Hormone.
 - (B) Progesterone Hormone.
 - (C) Oxytocin Hormone.
 - (D) Relaxin Hormone

Stages of parturition

1. Dilation of birth canal
2. Expulsion of fetus
3. Expulsion of placenta

Average length of gestation

Species	Length in days	Avg. in months
Cattle	279-292	9
Buffalo	280-300	10
Goats	145- 155	5
Sheep	144-151	5
Swine	112-115	3mo., 3wks.,3 days
Horse	330-342	11

Anatomy of Cervix

- The lumen of the cervix is the cervical canal.
- The canal is formed by, often almost mucosal folds.
- The cervical canal opens cranially into the body of the uterus at the internal uterine ostium.
- The cervical canal opens caudally into the vagina at the external uterine ostium.
- Single fold and smooth surface in the queen and bitch.
- Multiple folds protruding into the cervical canal in the cow, ewe, sow and mare.

Cow and Ewe

- High volume of mucous production.
- Multiple fold.
- Cervical rings interlocking finger like projection known as interdigitating prominence.
- Elaborate system of folds provides a site of storage where sperm are protected from the spermicidal environment of the vagina and uterus in the ewe.
- Allows semen to be ejaculated directly into the uterus for rapid transport to the oviducts in the cow.

Mare

- Less mucous secretion.
- Multiple folds.
- Simple cervix with the most caudal part bulging into the vagina to form a distinct recess (vaginal fornix).
- Many longitudinal fold of mucosa that protrude into the vagina (fornix vagina).
- Cervix soft during estrus.

Sow

- Less mucous secretion.
- Multiple folds
- Mounds or cushions known as pulvini interdigitate with each other to close the cervical canal.
- Ensures a tight coupling of the penis with the cervix to ensure that the large volume of semen produced by the boar is deposited in uterus.

Queen

- External ostium opens on a small hillock projecting into the vagina.
- Single fold, Smooth surface.

Bitch

- External ostium caudal part bulging into the vagina to form a distinct recess (vaginal fornix). Single fold, smooth surface.

Cross Section of cervix

- 1:- Cervical lumen with annular ring
- 2:- superficial stromal layer
- 3:- deep stromal layer
- 4:- outer muscular layer
- 5:- serosa layer

Function of cervix

- Isolating uterus and fetus from external environment, close via the mucosal folds.
- Cervical mucosa produces a mucous secretion which forms a mucous plug that helps close the cervical canal. This is easily expelled during estrus and parturition.
- Barrier to sperm transport in the ewe, cow, bitch and queen, but not in the sow and mare.
- Passage for sperm, sperm filter, sperm reservoir.

Process of cervical dilation

There are different types of collagen fibrils within cervix of non-pregnant and early pregnant cow such as type I, III or IV Collagen fibrils strongly bind to anionic group of GAGs (glycosaminoglycans) that act as well as cement or binding substances.

Functional properties of cervix depend upon the biochemical interactions of molecules present in the extracellular matrix of cervical connective tissue.

This interaction is regulated by several endocrine factors that mediate dynamics of cervical remodeling.

Phase of cervical remodeling.

Softening of cervix	Ripening/dilation of cervix	Postpartum repair
<ul style="list-style-type: none"> • Progesterone • Oestrogen • change in collagen structure (cross linking, increasing solubility) • Tissue growth Epithelial repair tensile strength 	<ul style="list-style-type: none"> • Progesterone • Oestrogen • Tissue hydration • high MW hyaluronan • tissue monocyte • vascularization 	<ul style="list-style-type: none"> • Synthesis of ECM • Metabolism high MW HA to low MW HA • Metric cellular protein • Proinflammatory gene expression Neutrophils macrophage

At parturition, changes start to occur in collagen & GAGs (glycosaminoglycan) concentration.

There are also changes in GAGs concentration at parturition as they increase markedly in the cervix during late pregnancy.

Matrix Matello Proteinases (MMPs) secreted by stromal cells, fibroblast and smooth muscle cells plays an important role during this period.

prostaglandin act on chemokine (IL8) after neutrophils degranulation then MMPs increase start collagen degradation

- Proteoglycans activity
- decorin- modulate the collagen fibrile & spacing vercican- it influence structural disorganization of ECM
- Hyaluronic acid association with proteoglycan
- hyaluronidase activation
- disruption of HA-proteoglycan cross links going to breakdown
- loss of cervical tensile strength
- cervical ripening & dilation

Etiological factors for cervical dilatation

- Myometrial contraction plays an important role in dilatation of cervix.
- A weak myometrial contraction may be a factor for incomplete cervical dilatation that may be either because of uterine inertia.

- Cervical fibrosis, a condition affecting many animals have cervical tear in previous parturitions will experience poor cervical ripening process at the term due to overgrowth of collagen fiber that will be poorly digested.

Uterine inertia

- hypocalcaemia, hypoglycemia, old age
- failure of sufficient hormones secretion that control uterine contraction like estrogen, relaxin and prostaglandin or their imbalance.

Management of incomplete cervical dilation

- The patients are examined to ensure that signs of imminent birth including ligament relaxation and colostrum in udder are present.
- If the cervix is closed and fetus is live and fetal membranes are intact , than patient may be left for 30 minutes and re-examined.
- When the legs of a putrefied dead fetus are present in the birth canal and the fetus cannot come out because of incompletely dilated cervix, partial cervicotomy is suggested instead of caesarean section.
- In this technique cuts are made at 1 or more places in cervical rim to dilate the cervix at the point. But there is a potential risk of sever hemorrhage in ventral quadrant and uncontrolled.

Treatment

Use of β -adrenergic agonist

- B- adrenergic drugs have been used in heifers, so that calving can be delayed sufficiently to allow better relaxation of the birth canal.
- Isoxsuprine at the doses of 200-300 mg IV or 0.3 mg IV or 60microgram/100 kg Clenbuterol have been suggested but their results are not promising always. Moreover, they also delay the parturition process.

Use of Oestradiol

- Estrogen is very essential for cervical ripening process induces collagenase activity and involved in collagen remodelling.
- It stimulates oxytocin receptor expression in endometrium as well as in cervical epithelial cell, and hence cause release of prostaglandins.

- Responsible for strong myometrial contraction & used in case where cervix is partially dilated.
- Dose 5-10mg/ml

Use of prostaglandins

- Analogue of, PGE2 has capacity to change the GAGs content of cervix in sheep during estrus cycle.
- The cervix of ewes and heifers undergo softening after endocervical administration of PGE2.
- Misoprostol is a cervical relaxant if introduced 1mg in partially dilated cervical canal.
- Use of dinoprost good as compared to misoprostol in ewes.
- Dinoprost dose 25mg or 5ml IM

Use of Valethamate (anti cholinergic drugs)

- It is ammonium compound with peripheral action & it is a potent rapidly acting cervical dilator by parasympathetic stimulation & Musculo tropic action on uterine muscles.
- Used in inadequate cervical dilation in parturition
- Should not be used during gestation period except for inducing cervical dilation
- Dose rate in cattle, mare 40-50mg, sheep, goat 10-20mg dog, cat 5-10mg

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