

CYSTIC ENDOMETRIAL HYPERPLASIA-PYOMETRA COMPLEX in Bitches

- **Sub-acute endometritis ---- cystic endometrial hyperplasia(CEH) ---- pyometra**
- increased incidence in **middle-aged to older bitches**
- **In diestrous phase**
- **Etiology - Hormonal therapies**
 - progestins for estrus suppression
 - estrogens for estrus induction or pregnancy termination

PATHOPHYSIOLOGY

- CL – Progesterone - abnormal uterine response (glandular tissue to become cystic, edematous, thickened and infiltrated by lymphocytes and plasma cells)
- Progesterone - inhibition of myometrial contractility interferes with the uterine drainage
- bacterial colonization to cause pyometra

The Heat Cycle Stages in Dogs

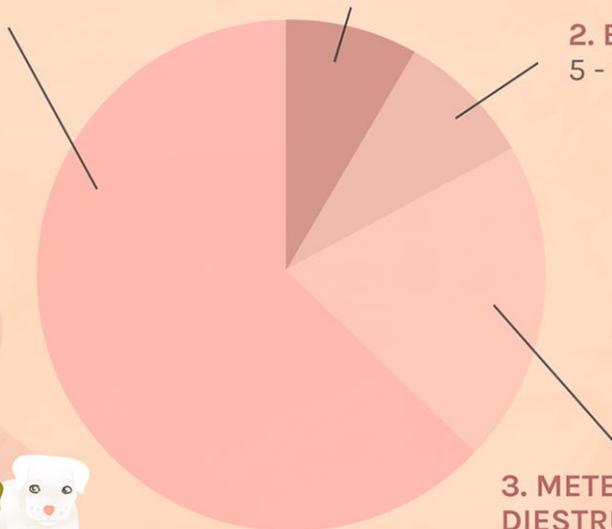


4. ANESTRUS:
2 - 3 months

1. PROESTRUS:
4 - 20 days

2. ESTRUS:
5 - 13 days

**3. METESTRUS/
DIASTRUS:**
60 - 90 days



- **open-cervix** - medical therapy - PG therapy - 0.1- 0.25 mg/kg; BID, 3-5 days
- **closed-cervix – surgery (OH)**

- **Cl Sign** - vaginal discharge, lethargy, depression, inappetance/ anorexia, polyuria, polydipsia, vomiting, and diarrhoea , Hypoglycemia is common
- common pathologic clinical finding - **leukocytosis**

Pyometra --- purulent material

Hydrometra ---- sterile fluid (watery secretions)

Mucometra --- sterile fluid (mucoid secretions). (also thin uterine wall)

BOVINE ABORTION

Bacterial

- Brucellosis (Br. abortus),
- Leptospirosis (Leptospira pomona and others)
- Listeriosis (L. monocytogenes),
- Tuberculosis (Mycobacterium bovis)
- Vibriosis (V. fetus venerealis)

Viral

- Infectious bovine rhinotrachitis (IBR-IPV),
- Epizootic bovine abortion (E.B.A. or Chlamydia)

Brucella canis:

- Gram-positive - abortion and infertility.
- **only bacterium known to be a cause of infertility** in the bitch.
- Transmission - contact with aborted fetal or placental tissue, contact with the vaginal discharge of infected bitches, **venereal transmission and congenital infection.**
- Abortion occurs most commonly between **days 45 and 55 of pregnancy**

Toxoplasma gondii: (protozoa)

- causes abortion, premature birth, stillbirth and neonatal death.
- Surviving infected pups may carry the infection.

Canine herpesvirus: infertility, abortion and stillbirths

CANINE TRANSMISSIBLE VENEREAL TUMOR

Transmissible venereal tumor (TVT), infectious sarcoma, venereal granuloma, transmissible lymphosarcoma or Sticker tumor

- **reticuloendothelial tumor**
- friable, multilobulated, haemorrhagic,
- Cytological findings - **presence of numerous discrete clear cytoplasmic vacuoles**

Treatment:

- Surgical excision
- **Vincristine** - dose of **0.5 to 0.7mg/m²** of body surface area or **0.025 mg/kg i/v**

EWES AND DOES – first, second and third most common to cause abortion

1. Enzootic abortion of ewes /Kebbing

- by *Chlamydophila abortus* (bacteria)
- **Abortion takes place in last 2 weeks of pregnancy in ewes and usually in last 4 weeks in does**

2. Toxoplasmosis in Ewes: (Parasite)

- **early embryonic mortality**, abortion, still birth

3. Campylobacteriosis: *Campylobacter fetus fetus* and *Campylobacter jejuni* (bacteria) cause abortion

- abortion usually **in the last 6 weeks of the gestation**

4. **Listeriosis:** *Listeria monocytogenes* and *Listeria ivanovii* (pathogenic bacterium)

Abortions in sheep can **occur at any stage** but most frequently in late pregnancy

5. **Border disease:** *Pestivirus*

- The **new born lambs** show tremors and a coarse fleece known as '**Hairy Shakers**' and are generally weak with **high mortality rate**. The clinical signs are typical so called '**Hairy Shakers**' or '**Fuzzy lambs**'.
- Abortion can occur **at any stage**

MARE

Contagious Equine Metritis (CEM) by *Taylorella equigenitalis* (bacterium)

Result in embryonic losses after initial infection.

Equine herpes virus (EHV) - by **EHV-1**

- is the most common cause of equine abortion.
- most commonly occur **from 8-9 months to term.**

Equine viral arteritis – **Arteritis Virus**

Venereal route is the major cause of dissemination

Equine coital Exanthema (ECE): by **equine herpes virus type-3**

benign venereal disease in both sexes caused

dourine - *Trypanosoma equiperdum* - venereal disease of both sex

- **Mares show a vaginal discharge and stallions have paraphimosis**
- low morbidity but a high mortality of 50-75%.

PARTURITION - expulsion of the **fetus** and the **fetal membranes**.

Eutokia

Dystocia refers to difficulty in birth

SIGNS OF APPROACHING PARTURITION - rotation of the fetus to birth position

SIGNS FEW DAYS PRIOR TO PARTURITION

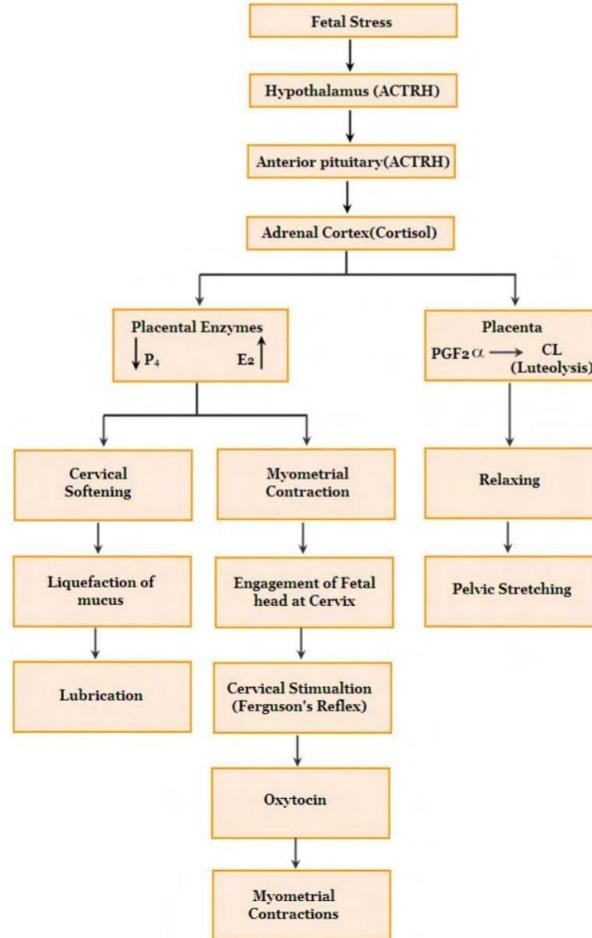
MATERNAL BEHAVIOUR - prefer solitude and calm environment

CHANGES IN PELVIS AND GENITAL ORGANS

- Relaxed sacrosciatic ligaments in a buffalo
- Vulval opening increase in size between the dorsal and ventral commissure
- mammary gland becomes distended
- In mare - **waxing** - Two days before foaling, the colostrum oozes from the teats
- during the last 7-10 days of pregnancy, a slight decrease in the temperature

INITIATION PROCESS

INITIATION OF PARTURITION IN COW AND GOAT (CL dependent Species)



- fetal and maternal mechanisms play roles in initiating parturition
- fetal endocrine system dominates in ruminants (eg. sheep, goat and cattle)
minor role in other species (eg. horse and human).
- **In sheep**
 - fetal cortisol induces the **placental 17 alpha enzyme** to catalyse the **conversion of progesterone to estrogen**.
 - The elevated levels of estrogen stimulate secretion of prostaglandin and development of oxytocin receptors
- **In CL dependent species,**
 - cortisol in addition to the synthesis of estrogen causes a release of prostaglandin from the endometrium, which in turn causes regression of the corpora lutea.
- **Cervical ripening** – closed to dilatation

STAGES OF PARTURITION

FIRST STAGE OF LABOUR (Stage of cervical dilation) -

- **Oestrogens , Adrenal corticoids, Relaxin, and Prostaglandins**
- Progressive relaxation and then dilation of the cervix
- Onset of uterine contraction
- Orientation of the fetus.

SECOND STAGE OF LABOUR (Expulsion of fetus)

- In **polytocous species**, the fetal membranes as well as fetuses are delivered during **the expulsive phase**, the **second and third stages being merged**
- Entrance of the foetus into the dilated birth canal
- Rupture of the allantoic sac
- Abdominal and uterine contractions
- Expulsion of foetus through the vulva.

Ferguson's reflex - straining forces the fetus against the cervix and anterior vagina result in release of oxytocin, which is released causes further contractions of the myometrium

in the bitch - much of the uterine discharge is dark green in colour due to the presence of pigment called **uteroverdin**

THIRD STAGE OF LABOUR (Expulsion of fetal membranes)

- separation of cotyledons from the caruncles occurs
- two phases - I - expulsion of the membranes from the non-gravid uterine horn
II - gravid horn portion of placenta

Species	Mare	Cow	Ewe	Sow	Bitch
Stage 1: Contractions and Cervical Dilation	1-4 hours	2-6 hours	2-6 hours	2-12 hours	6-12 hours
Stage 2: Foetal Expulsion	12-30 minutes	30 minutes - 4 hours	30-120 minutes	150-180 minutes	6 hours (up to 24 hours with large litters)
Stage 3: Placental Expulsion	1 hour	6-12 hours	5-8 hours	1-4 hours	Placenta Exits with Foetus

TERMINATION OF PREGNANCY IN DOMESTIC ANIMALS

- Indication - mismating and abnormal pregnancy (hydroallantois, hydroamnion, ventral hernia, rupture of the prepubic tendon, fetal mummification, pregnancy toxemia)
- methods of pregnancy termination would depend upon the **stage of gestation** and the **species**.
- primary corpus luteum (CL) – (progesterone) persists throughout pregnancy in most domestic animals **except for the horse and sheep**.
- **source of progesterone** during the latter half of pregnancy is from the **placenta in mare and ewes**

Mare

- **day 6 to 35 of pregnancy - Intrauterine infusion** - may terminate pregnancy using povidone iodine, weak Lugol's solution and lactated ringer lactate
- **Before maternal recognition of pregnancy (Approximately by days 12—14) - A single injection** of either **10mg of Dinoprost or 500µg of Cloprostenol**
- **After pregnancy recognition - Two or more consecutive injections** may be necessary to lyse diestrual, or secondary, corpora lutea.
- **Between days 35-125 of pregnancy – multiple dose of synthetic PGF2α - 2.2 mg/kg**
- **beyond 4 months – oxytocin (20 IU–120 IU)**
- **Prior to chorioallantoic attachment to the endometrium** - Intrauterine infusion or lavage it is more successful to induce abortion.

After attachment

- Manual invasion of the cervix and Rupture of the chorioallantois
- Manual extraction of the fetus and membranes are more expeditious & Saline lavage

Cattle/ Buffalo

- **oxytocin from days 2 to 7 after estrus with 100 to 200 IU** prevents pregnancy, probably by preventing normal luteal development
- **5 to 150 days - prostaglandin F2 alpha** - Natural: 25mg, Synthetic: 500-700 mcg.
- **from 150 days onwards - combination of PG** (PGF2 α : 25 mg IM, Cloprostenol: 500 μ g IM) **and dexamethasone**. (placenta -additional progesterone for maintenance of pregnancy until day 270 of gestation)

Doe: pregnancy maintenance is dependent on the luteal (CL) progesterone for the entire pregnancy, **PGF2 α or its analogues**

Sow - at any stage with PGF2 α - Natural: 10 mg , Synthetic: 175 μ g

Ewe

- **Upto day 45-55**, source of progesterone is ovary, so upto this stage pregnancy can be terminated by IM **injections of PG(prostaglandin)**
- **After day 45-55 of pregnancy - corticosteroid** 5–10 mg, i/m , **with PG** source of progesterone are ovary and placenta.

Dog

- **Oestradiol cypionate:** for the management of unwanted mating. administration of 0.25 to 1 mg total dose within 3 days of mating
- **Estradiol benzoate**

NATURAL PROSTAGLANDIN - after 30 days of gestation

DOPAMINE AGONISTS – **also in pseudo pregnancy**

Bromocriptine - after 35 days of gestation

Cabergoline - dose of 5 μ g/kg once daily cause a sharp decline in serum prolactin concentration and result in abortion

Puerperium

- **post-parturient phase including the third stage** of labour,
- during which the reproductive organs gradually return to a structurally and functionally normal non- gravid state

INVOLUTION

- reduction in the size of the genital tract
- Greatest change occurring during the first few days after calving.

LOCHIAL DISCHARGE

- during the first 7-10 days after calving
- remains of fetal fluids, blood from the ruptured umbilical vessels and shreds of fetal membranes, but mainly from the sloughed surfaces of the uterine caruncles
- **yellowish brown or reddish brown**

Day 40-60 - Caruncles become smaller and consist of small protrusions

RETURN OF CYCLICAL ACTIVITY (Ovarian rebound)

- In the immediate postpartum period: Both oestradiol and progesterone are low
- During the first few days postpartum: Anterior pituitary is capable of releasing FSH
- After about 7-10 days: Sufficient to result in the emergence of the first follicular wave
 - In dairy cattle- occurs at about 4 days
 - In beef cattle- occurs at 10 days.

Obstetrical Operations

Mutation

- process by which a fetus is **restored to normal** presentation, position, and posture
- **Repulsion** – back into uterus for more space
- **Rotation** - turning the fetus on its **longitudinal axis** to bring it from dorso-ilial or dorso-pubic position to dorso-sacral position
- **Version** - turning the fetus on **its transverse axis** into anterior or posterior presentation
- **Extension** – correction of abnormal posture usually due to flexion of one or more extremities

Force Traction - withdrawal of fetus from the dam through birth canal by application of outside force or traction

Fetotomy - operations performed on the fetus for the purpose of reducing its size

- by either its division or removal of certain of its parts.

Two ways - **Subcutaneous or intra fetal method** – amputation below skin

Percutaneous or extra fetal – amputation excluding skin

Complete fetotomy in **Anterior presentation**

- Amputation of the head
- Percutaneous amputation of the forelimb
- Transverse division of the fetal trunk
- Longitudinal division of hind quarters

Complete fetotomy in **posterior presentation**

- o Percutaneous amputation of posterior limb
- o Transverse division of fetal trunk (Lumbar area)
- o Transverse division of fetal trunk (Scapular area)
- o Diagonal - Longitudinal division of the fore part
- o Percutaneous amputation of both fore limb

ANTERIOR (NORMAL) PRESENTATION



NOT DILATED

POSTERIOR
PRESENTATION

ONE LEG BACK
PRESENTATION



HEAD BACK
PRESENTATION

BREECH
PRESENTATION



- **Caesarean Section in Cows**

1. **Standing or Recumbent Position:** Caesarean sections can be performed while the cow is standing or lying down (in sternal, lateral, or dorsal recumbency).
2. **Anesthesia Techniques:** Common anesthesia methods include paravertebral anesthesia, line block, or inverted-L block to numb the area.

Types of Incisions:

1. **Vertical Skin Incision:** A straight cut made vertically on the left flank.
2. **Slightly Oblique Incision:** A diagonal cut that allows better access to the uterus.
3. **Ventrolateral Incision:** This incision starts just above the udder and continues cranially along the ribs. It goes through several muscle layers (cutaneous, external abdominal oblique, internal abdominal oblique, and transverse abdominal muscles) to reach the uterus.
4. **Midline or Paramedian Incision:** This approach requires general anesthesia or heavy sedation. It involves a cut made along the midline of the abdomen, allowing access to the uterus.

Presentation

- The relation of the **spinal axis of the fetus to that of the dam**

longitudinal - Anterior/ Posterior longitudinal

Transverse - Dorsal/ Ventral transverse

Position

- **dorsum of the fetus in longitudinal presentation, or the head in transverse presentation, to the quadrants of the maternal pelvis.**
- The quadrants are the sacrum, the right ilium, the left ilium and the pubis.

Posture

- relation of the **extremities of the fetus or head, neck and limbs to the body of the fetus**

The normal presentation in uniparous animals –

- anterior longitudinal presentation
- dorsosacral position
- head resting on the metacarpal bones and knees of the extended fore legs.

Note: Birth can also take place without assistance, if the fetus is in the posterior longitudinal presentation, dorso- sacral position

DYSTOCIA IN POSTERIOR PRESENTATION

- Posterior presentation is considered **pathological in all except the multiparous** animals.

Both hind legs are retained (**Breech**) in the uterus

- HOCK FLEXION
- HIP FLEXION

DYSTOCIA IN ANTERIOR PRESENTATION

- LATERAL DEVIATION OF THE HEAD
 - DOWNWARD DEVIATION OF THE HEAD
 - **vertex presentation** - **mild cases**, only **the nose of the fetus is caught on the brim** of the pelvis with the **fore head entering the pelvic inlet**
 - **poll posture** - **severe** flexing of head and neck, the **ears and the poll of the head are presented**
 - **nape presentation** - **more severe** cases, the neck extends between the fore limbs and **the head is against the fetal sternum or abdomen**,
 - DEVIATIONS OF THE FORELIMBS
 - Carpal flexion, Shoulder flexion
- WRY - NECK** - in equine but rarely in bovine fetuses
- in transverse **bicornual pregnancy**

DEGREES OF INCOMPLETE CERVICAL DILATATION (ICD)

- **FIRST DEGREE** - Cervix **seems to be fully dilated** but further progress is hindered by **a tight, cuff-like constriction**
- **SECOND DEGREE** - **narrowing of the cervical canal** so that **only the fetal head or limbs** can be brought through it.
- **THIRD DEGREE** - **operator's hand** can be passed through the cervix with difficulty and **one fetal limb may** be brought into the vagina.
- **FOURTH DEGREE** - **only one to three fingers** into the cervical canal **and No fetal part with the exception of the tail** or a strand of fetal membranes can pass through

uterine inertia - expulsive deficiencies that may occur in the myometrium

Primary uterine inertia - **original deficiency** in the contractile potential of the myometrium

- **less common than secondary** uterine inertia
- most often in the **dog and sow**
- The animals in **the first stages of labour**
- Cervix may or may not be dilated
- **In large uniparous species**
 - large animals oxytocin at 20-100 IU and 10-20 units for small animals
 - 20% calcium borogluamate i/v 500 cc
- **In multiparous animals**
 - **Calcium solutions and oxytocin are the drugs of choice**
 - 10% calcium gluconate, 0.5-1.5 ml/kg BW
 - dose of oxytocin in bitch is between 1-10 IU maximum/dog. It can be repeated 2 or 3 times at 20-30 min. intervals.

Secondary uterine inertia

prolonged dystocia and is characterized by **exhaustion of the uterine muscles**. It is essentially **a result of, rather than a cause of dystocia**

- seen in all species of animals and is more common in large animals

FAILURE OF ABDOMINAL EXPULSIVE FORCE: CLINICAL SIGNS AND DIAGNOSIS

All things normal (PPP)

- Delivery by traction/ surgery

Retention of fetal Membranes

- normally expelled during the third stage of labor.
- membranes are said to be retained whenever the third stage of labor is prolonged beyond its normal duration.
- common in the dairy cow but its consequences may be **most serious in the mare.**
- In polytocous species (sow, bitch & queen), may be associated with retention of one or more fetuses.
- **Cause**
 1. Insufficient expulsive efforts by the myometrium.
 2. Failure of placenta to separate from the endometrium (may be due to inflammatory changes, placental immaturity, hormonal imbalance, immune deficiencies).
 3. Mechanical obstruction (including partial closure of the cervix).

Cattle

- Mostly cattle shed placenta within 6 hours after parturition.
- Said to be **retained if not shed even at 12-24 hours**.
- An important contributor to bovine infertility due to its role in predisposition to uterine infections.

Predisposition

- Abortion, especially associated with placentitis.
- Abnormal (prolonged or shortened) gestation length.
- Dystocia, primary uterine inertia, delivery by caesarean section
- Deficiencies of selenium/vitamin E /vitamin A
- Failure of placental maturation - Twin births and induced calvings
- Heat stress
- Abnormalities of oestrogen: progesterone ratio in late gestation

Clinical Sign

- Membranes (normally visible **hanging from vulva**) become progressively more decomposed, have fetid odour, **contaminated** with faeces and soil.
- Retention followed **by extensive obstetric interference** may be supervened by severe **metritis** and toxæmia within 2-3 days which can be fatal, if not treated timely.

Subsequent - Increased incidence of endometritis.

Treatment

- Manual removal, though commonly practised but is contraindicate.
- Oxytocin @ 40-60 IU intramuscularly, if used immediately after calving.
- PGF_α and its analogues have direct effect on the placentomes
- **Collagenase – Infusion into the umbilical arteries for correcting the lack of cotyledon proteolysis.**
- Bacterial collagenase (200,000 IU) from *Clostridium histolyticum* dissolved in 1 L of saline is infused.

Mare

- One of the most common peripartum problems in mare.
- Average time taken ~ 1 hour
- Should not exceed > 2 hours
- Should be treated as an emergency.
- Laminitis and death in later stages
- Oxytocin @ 20 – 40 IU intramuscularly, can be repeated after 1 hour if membranes are not expelled.

Mare

Septic Metritis

- Due to lesions such as Ovarobursal adhesions, Uterine adhesions, and Occluded uterine tubes
- Retained Fetal Membranes: Leads to bacterial infections, commonly caused by *Streptococcus zooepidemicus* and *Escherichia coli*.

Prognosis - Guarded

PROLAPSE OF THE INTESTINES

Differentials

- A Schistosomus reflexus or
- A ruptured umbilical hernia of the fetus

Ventrovertical or dog-sitting position – transverse ventro-oblique – all four limbs

- plants having estrogenic activity e.g. beseem
- **Sub Involution of Placental sites (SIPS)** - In bitches, chronic haemorrhagic discharge after whelping due to failure of sloughing placental masses
suspected - if a sanguineous vaginal discharge persists for longer than 6 weeks
confirmatory diagnosis - syncytial trophoblast-like cells

- **Ring womb - Incomplete dilation of the cervix of the ewe**
- **Cocking of the tail** – (method of pregnancy diagnosis in camel)
 - **characteristic behaviour** when approached by a male or a person.
 - female assumes a **stiffened posture** with the **head held high and tail curled upwards**.
 - This behaviour appears **14 to 15 days after fertile mating**
 - **95% reliable for pregnancy diagnosis**