

## HORMONAL CONTROL OF GESTATION

- trophoblast presence causes persistence of the corpus luteum
- gonadotropin (mother) necessary for the persistence of the CL
- **ewe, mare, woman - ovaries or CL may be removed** in the latter half of the gestation **without interrupting pregnancy** (due to placental hormones)

duration of gestation is genetically determined, although it can be **modified by maternal, fetal and environmental factors**

- Young heifers slightly shorter period than older heifers
- **In polytocous species with exception of pig** there is an **inverse relation between the duration of gestation and litter size**

**Teratology** -Teratology is the branch of **embryology** and **pathology** that deals with the abnormal development and malformations of an individual during the antenatal period.

**Mosaicism** - The occurrence in an **individual of two or more cell populations or tissues** each with a **different chromosome complement** derived from **a single zygote**.

**Chimerism** - The occurrence in an **individual of two or more cell populations or tissues** each with a **different chromosome complement** derived from **different zygotes**,

**Anomaly** - It refers to the **malformation** involving **only an organ or part of the body**.

**Monster** • It refers to an animal with **extensive deformity**.

## INHERITED LETHAL AND SEMI LETHAL CHARACTERS IN CATTLE

### Achondroplasia or bull dog calves or dwarf - **simple autosomal recessive**

- Hereford, Ayrshire, Angus breeds
- brachycephalic snorter dwarf - a short, broad head, malocclusion of the jaw, prognathism of mandible, pot belly, low viability

### Epitheliogenesis imperfecta – **autosomal recessive**

- skin fails to form.

### Hypotrichosis congenita or alopecia is a **recessive defect**

Ichthyosia congenita - lack of hair and a thick scaly, horny epidermis

### Cerebellar hypoplasia and degeneration - **autosomal recessive**

- Herefords and Holsteins
- **BVD MD virus can produce this defect in fetuses**

## INHERITED AND GENERALLY NONLETHAL DEFECTS IN CATTLE

- Polydactylism - **autosomal dominant**
- Syndactylism or mule-foot - **autosomal recessive**
- Muscular hypertrophy or “double” muscling – reduced fat deposits, light bone, thin skin, and **large muscles**
  - Herfords, Holstein, Angus - **incomplete dominant**
  - Charolais- **recessive with incomplete penetrance**
- Umbilical hernia - **probable sex-limited dominant character in male** and **uncertain in female**

## SCHISTOSOMUS REFLEXUS

- mostly in cattle, but in rare cases in sheep, goats, and swine.
- **ventral curvature of the spine** so head lies near the sacrum.
- **thoracic and the abdominal viscera are exposed.**
- The pelvis is deformed.
- The liver is abnormal in shape and cystic.
- The limbs are usually ankylosed and rigid.



## CAMPYLORRACHIS SCOLIOSA

- **lateral curvature of the spine.**
- limbs - deformed and ankylosed.

**Note:** kyphosis (excessive outward curvature) and scoliosis (lateral curvature)

OBSERVATION

# *Posture*



**SCOLIOSIS**



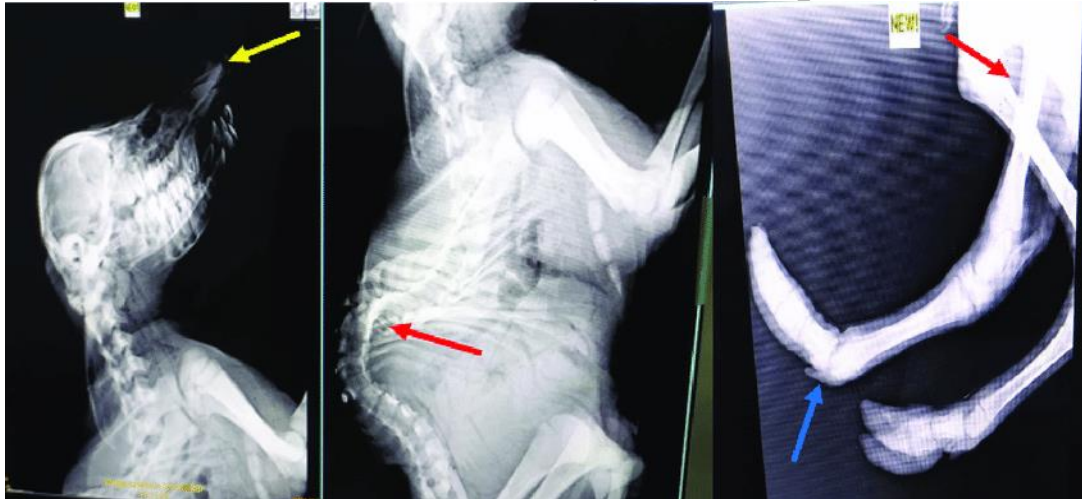
**LORDOSIS**



**KYPHOSIS**

## PEROSOMUS HORRIDUS

- **lack of vertebrae and spinal cord caudal to the thoracic region**
- strongly ankylosed and flexed hind limbs
- **general ankylosis** and muscle contractures
- marked **double S-shaped lateral twisting of the vertebrae**
- characterized on external examination by a short spine.



## **AMORPHUS GLOBOSUS**

**imperfect zygote of dizygotic twins**

Usually appears as a **round or oval, edematous structure**

Covered with skin and hair and containing connective tissue



# CONJOINED TWINS

- Definition: Conjoined twins are twins that are physically connected at some part of their bodies due to incomplete separation during early embryonic development.
- Types of Conjoined Twins
  1. **Diplopagus:** Symmetrical "Siamese" twins with similar body parts.
  2. **Thoracopagus:** Joined at the chest; often share a heart and other organs.
  3. **Omphalopagus:** Joined at the abdomen; may share liver and digestive organs.
  4. **Pygopagus:** Connected at the sacrum, back-to-back configuration.
  5. **Craniopagus:** United at the heads; may share some brain tissue.
  6. **Ischiopagus:** Joined at the lower pelvic region, bodies extend in opposite directions.
  7. **Diprosopus:** Partial duplication of facial features (double face).
  8. **Dicephalus:** Two heads on a single body; variations include: **Dipus dibrachius:** Two heads, two arms, two legs.
  9. **Tibrachius:** Three forelimbs.
  10. **Tetrabrachius:** Four forelimbs.
  11. **Tripus dibrachius:** Three rear limbs.
  12. **Tetrapus dibrachius:** Four rear limbs.
  13. **Cephalothoracopagus:** Fusion of upper body (head and thorax) with separate lower limbs.
  14. **Syncephalus:** One face with multiple ears and a single or partially doubled brain.
  15. **Janiceps:** Two faces on opposite sides of the head.

## Fetal Mummification

Fetal death - during the middle or last third of gestation that **does not result in involution of the corpus luteum and abortion** and is followed by:

- autolytic changes in the fetus
- absorption of placental and fetal fluids
- involution of the maternal placenta – **no cotyledons**
- mummification of the fetus - stops autolysis/ decomposition - tissue water decreases - Tissue becomes dessicated - Body shrivels to a dry, leathery mass of skin, tendons and bones.
- **Must events**
  - fetus must die after the development of bones is complete.
  - Uterine and fetal fluids must be resorbed relatively rapidly.
  - no oxygen in the uterus until the mummification process is complete.
  - There must be **no bacteria** in the uterus.

## prevalence.

Swine > Small ruminants (Goats and Sheep) > Cattle > Cats and Dogs > Horses

Two types:

### 1. The hematic or chocolate mummification (in cattle)

- Occurs after 70 days of gestation.
- Most often between 3<sup>rd</sup> and 8<sup>th</sup> month of pregnancy.
- Bovine viral diarrhea (BVD), Leptospirosis, Mould (*Neospora caninum*), Compression/torsion of umbilical cord, Uterine torsion

### 2. The papyraceous (in other species)

- Produces a dry, stiff fetoplacental unit with no exudate.
- Shriveled and dried fetal membranes resemble a **parchment paper**.
- *Toxoplasma gondii*, *Chlamydia abortus*, Border / hairy shaker disease, *Coxiella burnetii*

## Clinical findings and Diagnosis

- Cow's abdomen to be unusually small for the given stage of pregnancy.
- **Transrectal palpation** – compact, firm and immobile mass without placental fluid or placentomes and no fremitus.
- **USG** – absence of heartbeat and fetal fluids.
- **Prognosis** is guarded.
- **Termination of pregnancy with** oestrogen and prostaglandin
- **MUMMECTOMY** - **colpotomy** approach when expulsion with the aid of prostaglandin fails - incision at fornix - 2 O'clock position in relationship to the cervix – remove uterus

## Treatment

PGF<sub>2</sub>α or an analogue - **Therapeutic agent of choice** - Excellent prognosis for return to fertility within 1-3 months.

- Can we administer corticosteroids to terminate pregnancy in bovine fetal mummification?
- **No.** Use of corticosteroids will be effective only when the fetus is alive.
- Since the time of fetal death is unknown and due to autolysis and mummification of fetus and membranes, **it is often difficult or impossible to ascertain the cause.**
- **early pregnancy** - following fetal death **total resorption or abortion** usually occurs

## **Fetal maceration**

- at any stage of gestation.
- fetus dies and undergoes **microbial digestion or putrefaction**

**CLINICAL SIGNS** - Intermittent straining accompanied by **foul, fetid, reddish-grey vulvar discharge.**

- Elevated pulse and temperature.
- Anorexia, Drop in milk production

**DIAGNOSIS** - Per rectal examination,

- **Metallic sound/gritty feeling due to sliding of bones**
- No fremitus in middle uterine artery

**PROGNOSIS** - Poor

Response to treatment with **PGF<sub>2</sub>α** or **oestrogen** is **unrewarding.**

glucocorticoids are ineffective because an intact feto-placental unit is necessary for their mode of action

## Mummification

## Maceration

CL present

CL generally absent

No invasion of putrefying bacteria

Invasion of putrefying bacteria

Cervix closed

Cervix remains dilated

No vaginal discharge

Foul, fetid, reddish-grey discharge

No straining

Straining present

Temperature and pulse normal

Temperature and pulse elevated

Appetite normal

Anorexia

No drop in milk production

Drop in milk production

P/r exam. reveals uterus shriveled over fetus

Metallic sound/gritty feeling

**Extra uterine pregnancies** - two types

**True extra uterine pregnancy** - fertilized ovum, embryo or fetus that has established **nutritive relations with organs or tissues other than the endometrium**

- has undergone in this location a **degree of embryological development.**
- **In humans**, ovarian and tubal pregnancies, not in animals

**False extra uterine pregnancy** - in all domestic animals, and very rarely in mares

- **After recognizable size** – escapes from the uterine cavity

**PROGNOSIS** - Guarded.



## DROPSY OF FETAL MEMBRANES/FETUS

**Oedema of the placenta** - Bacterial (*Brucella* spp.), Fungus, Virus, Protozoa etc.

- Leads to placentitis
- Generally not causes dystocia
- Abortion and still birth

**Hydro-allantois** - sudden and excessive fluid accumulation in the allantoic cavity

- Etiology:- Cystic, hydronephrosis or dysfunction of fetal kidneys, Vit. A deficiency
- Mild case – 40- 80lit in one month, severe – 80 – 120lit in 5 – 10days
- **Bloated bull frog appearance** (In cow) - Dislocation of the hips or backward extension of the rear limbs may occur and cow lies on her sternum

## Hydro-amnion

- Excessive accumulation of amniotic fluid in the amniotic cavity (20-120 lit.)
- **Genetic or hereditary causes** or prolonged gestation - hydrocephalus fetus

### Sign and Symptoms

- slowly in several months
- abdominal enlargement (**pear shape** and less tense)
- Syrupy viscid fluid etc.

Rectal examination- uterine horn palpable and not very tense, placentomes may be palpated

### Treatment in both

administration of PGF<sub>2</sub>α and dexamethasone

## Hydroallantois

- Occurs in 85-90% cases of uterine dropsy
- Rapidly develops
- Abdominal wall is round and distended & tense
- Placentome and fetus not generally palpated
- Fluid is clear, watery and amber colour
- Fetus is generally normal
- Degenerated placentomes
- After removing of fluid regeneration of fluid occurs
- RFM and metritis is common sequelae
- Prognosis is poor

## Hydroamnion

- Occurs in 05-10% cases of uterine dropsy
- Develops slowly
- Abdominal wall is pear shape and less tense
- Placentomes and fetus palpated generally
- Fluid is syrupy and viscid
- Defective fetus generally
- Placentomes are normal
- Refilling of fluid not occurs after removal
- RFM and metritis generally not develops
- Prognosis is fair to good

## **Dropsical conditions affecting the fetus**

### **HYDROCEPHALUS** - pigs, puppies and calves

- swelling of the cranium due to an accumulation of fluid
- dietary deficiency (Vitamin A in lab animals), infectious agents (Swine fever vaccine in pigs) and genetic factors

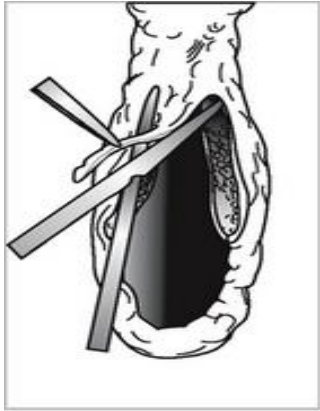
**MENINGOCELE** - primary defect of neural tube leading to local failure of development of the skeletal encasement

**FETAL ASCITES** - Ascites or dropsy of the peritoneum is a common accompaniment of **infectious diseases** of the fetus

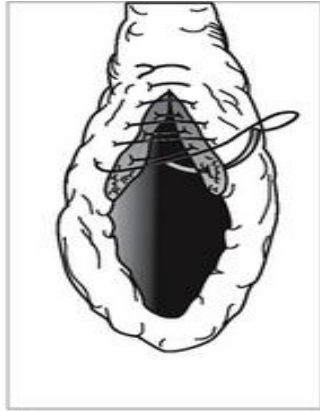
**FETAL ANASARCA** - hereditary condition and is determined by **autosomal recessive genes** result in excess of fluid in the **subcutaneous tissues**

## vagino-cervical prolapse

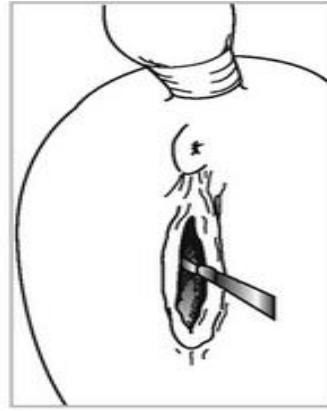
- MANUAL REDUCTION
- Buried or "hidden" purse string type suture, Buhner's method.
- Caslick operation
- **Minchev's Method:** Surgically fastens the cranial portion of the vaginal wall to the sacrosciatic ligament through the lesser sciatic foramen.
- **Winkler's Method:** Fixes the cervix to the prepubic tendon to prevent prolapse.
- **Farquharson Method:** Involves submucous resection of edematous and devitalized vaginal mucosa.
- **Guard and Frank Technique:** Removes large amounts of perivaginal fat by incising the dorsal wall of the vagina.



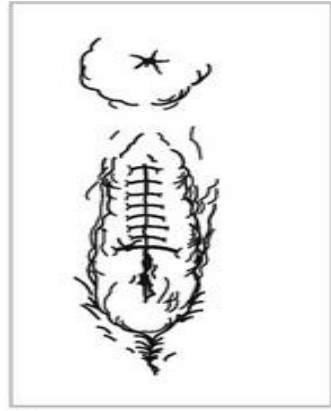
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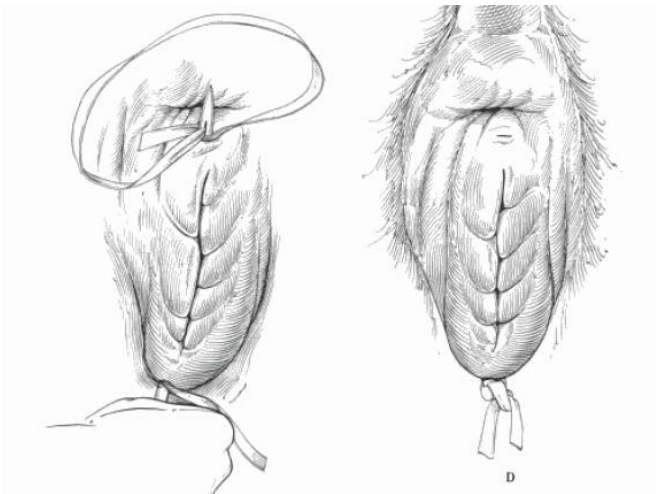
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**UTERINE TORSION** - twisting or revolving of the gravid uterus on its **longitudinal axis**.

- **Most commonly** -during the late first stage or early second stage of labour
- In **uniparous animals**, both **gravid and nongravid horns** are involved in torsion because of the **strong intercornual ligament** and the distension of the uterine horns and body with placenta and fluid
- In **multiparous animals**, only a **portion of one uterine horn** containing usually only one fetus may be twisted or rotated (at the point of its junction with the body, the horn entire rotates)

### **Clinical Signs -**

- Torsion with degree of 45-90 lacks clinical symptoms; if 180° or more definite clinical symptoms are noticed - Colicky pain, Teeth grinding, Restless, Anorexia, Lack of rumination, Rapid pulse, Tachycardia

per rectal and per vaginum examinations to arrive at a

- Direction of torsion
- Degree of torsion, and
- Position of torsion.

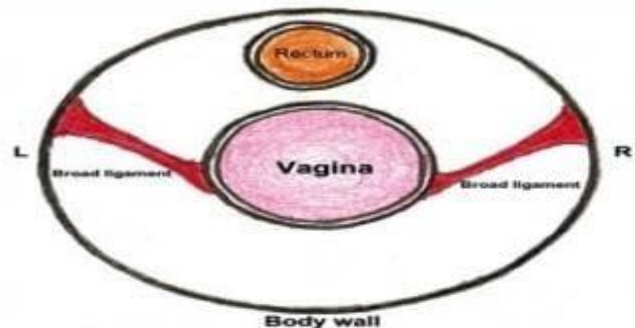
### **Per Vaginum examination**

**In Post cervical uterine torsion: Cervix is not palpable** with abrupt closing of the vagina

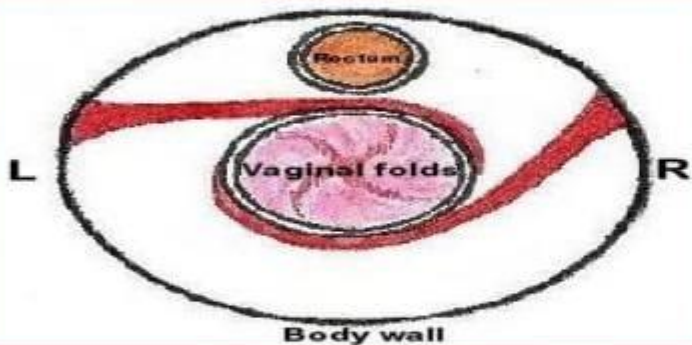
- In less than  $90^\circ$ : palpate the external Os of the cervix with some resistance.
- In  $90 - 180^\circ$ : One or two fingers can be passed.
- In more than  $360^\circ$ : Abrupt stenosis.

**Pre cervical uterine torsion : Cervix is palpable and fetus is not palpable.**

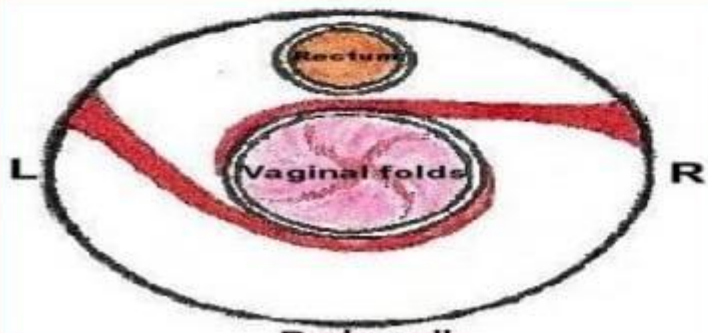




- *Normal Position of Broad ligaments and vagina.*



- *Clockwise (Right side torsion).*
- *On rectal examination:* The ligament and middle uterine artery (MUA) on the right side is stretched and pulled vertically downward under the uterus, whereas the ligament on the left side is stretched and pulled tightly across the top of the uterine body.



- *Counter clockwise (Left side torsion).*
- *On rectal examination:* The ligament and MUA on the left side is stretched and pulled vertically downward under the uterus, whereas the ligament on the right side is stretched and pulled tightly across the top of the uterine body.

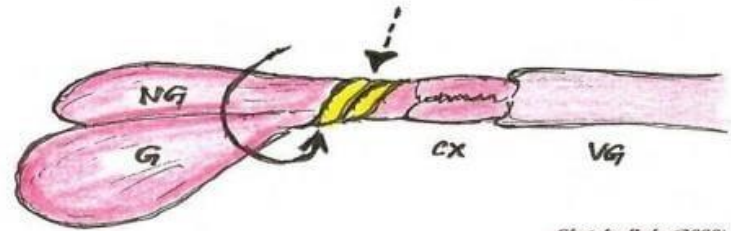
## POSITION OF UTERINE TORSION

Based on the site of occurrence it is either

*Post cervical:* Involvement of vagina



*Pre cervical:* Involvement of uterus



**DETORSION BY SIMPLE ROTATION** - Oldest and simplest method

- **cast the animal on the same side as the direction of torsion**
- Rotate the body of the animal in the same direction as the torsion of the uterus, rapidly enough to rotate the body around or faster than the inert uterus and fetus.

**SCHAFFER'S METHOD (Modified rolling technique)**

- plank (9 - 12 feet length and 8 - 12 inches wide)

**Pyometra** – **progressive accumulation** of purulent exudates within the lumen of the uterus and associated with the **presence of persistent corpus luteum (PCL)** in one of the ovaries.

- **Postcoital pyometra** is **pathognomonic** for **trichomoniasis in cattle**.

#### DIFFERENTIATION OF PYOMETRA AND NORMAL PREGNANCY

- **Uterine Characteristics**
  - **In Pyometra:** Uterine wall: thick, flaccid, atonic.
  - **Texture of uterus:** doughy due to fluid accumulation.
  - **In Pregnancy:** Uterine wall: thinner, more resilient.
- **Transrectal Ultrasonography**
  - Shows a **speckled echotexture** in pyometra, indicating fluid and infection.

#### PROGNOSIS

- In early cases: **Fair to good**, Pyometra associated with perimetritis: **poor**