

# Hernias

*By*

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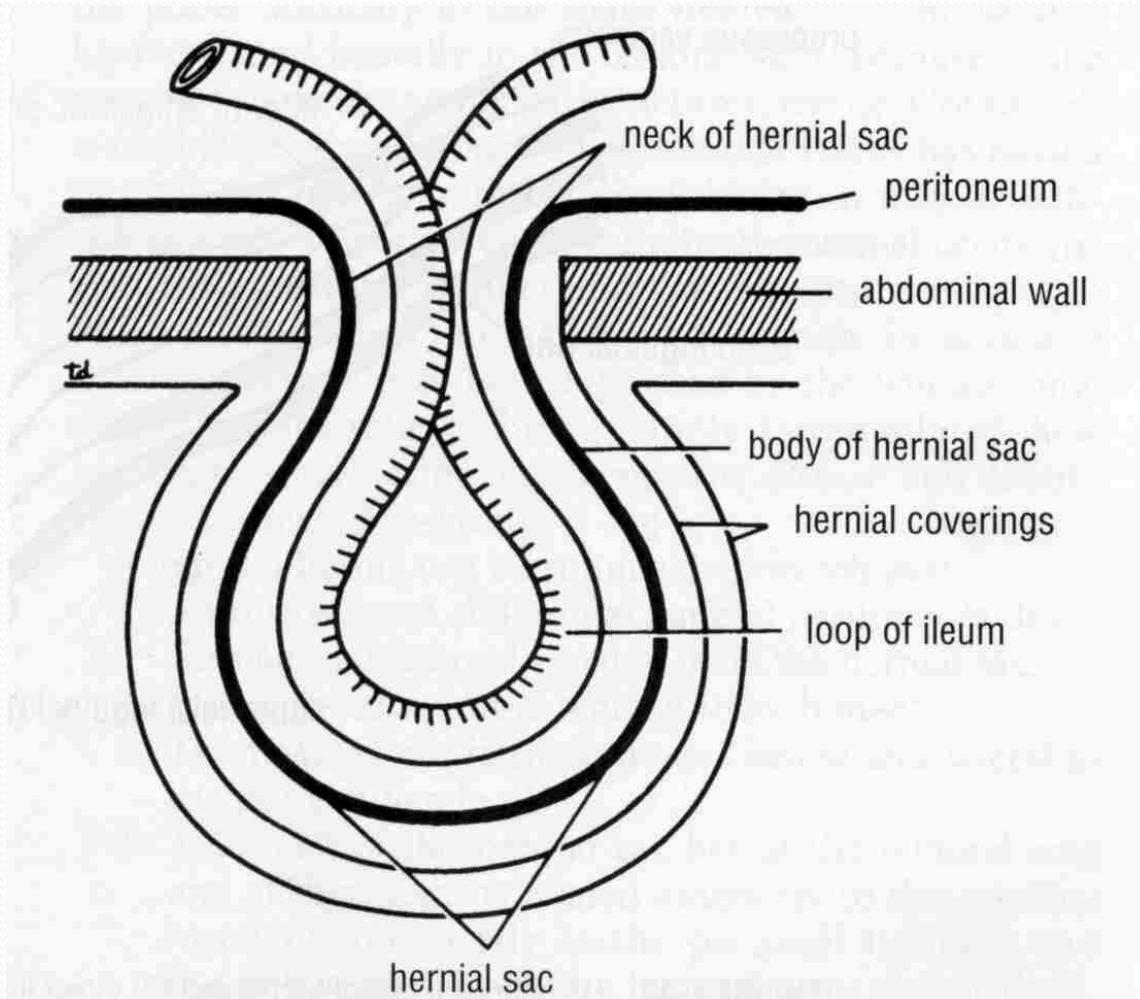
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# Definition

- Hernia is the protrusion of the viscera from its normal cavity through an acquired or congenital opening.
- The typical hernia is formed of hernia ring and hernia swelling. The hernia swelling is formed of hernia sac and hernia contents.

# Structure of hernia



# Structure of hernia

- **Hernia ring (Hernia opening):**
  - It may be an accidental opening in the abdominal wall, persistent prenatal orifice (umbilicus) or normal passage (inguinal canal).
  - Its size varies from one finger to more than hand size.
  - Its shape may be round, oval or irregular.

# Structure of hernia

- **Hernia swelling:**

- It has various sizes and shapes

- It is composed of:

- 1- Hernia sac which is formed of skin + s/c tissues + few muscle fibers + parietal peritoneum (if not ruptured).

- 2- Hernia content which is usually small intestine (called enterocele), omentum (epiplocele), stomach (gastrocele) and urinary bladder (vesicocele).

# Classification of hernias

- **According to the cause:**

- 1-Congenital hernia**

- Hernia presents at birth, such as umbilical hernia

- 2- Acquired hernia**

- Hernia occurs in later life, such as incisional hernia (a complication of laparotomy) and perineal hernia

- **According to the hernia content:**

- Such as gastrocele, enterocele, epiplocele...etc

# Classification of hernias

- **According to nature of hernia:**

- 1- Reducible hernia:**

- In which, the hernia content return to the abdomen spontaneously when the animal is recumbent or with manual pressure.

- 2- Irreducible hernia:**

- In which, the hernia content can not be returned to the abdomen due to incarceration, strangulation and adhesions

# Causes of irreducible hernias

- **Incarceration**

- Too large hernia contents to pass through the hernia ring.

- **Strangulation**

- Due to compression obstruction of the blood supply to the incarcerated content which may lead to gangrene of the strangulated part.

- **Adhesions**

- Due to local inflammation of the hernia parts which leads to fibrinous adhesions between the hernia sac and contents.

# Classification of hernias

- **According to the site:**

## **1- External hernia**

- Protrusion of the viscera outside the abdominal cavity
- Such as umbilical, inguinal, scrotal, abdominal hernias

## **2- Internal hernia**

- Protrusion of the viscera through a normal or pathological opening within the abdominal cavity (no hernia sac).
- Such as diaphragmatic hernias (DHs) as follows:

# Classification of hernias

- Both congenital and acquired DHs have been recorded.
- Most congenital DHs and all acquired DHs have no hernia sac, so they should be called ‘false hernias’, diaphragmatic ruptures or rents.
- True DH has a hernia sac composed of peritoneum and pleura and it is generally found on the right side of the diaphragm. This type of DH is called Morgagni hernia (Retrosternal hernia).

# Classification of hernias

- **Hiatal hernia (HH):**

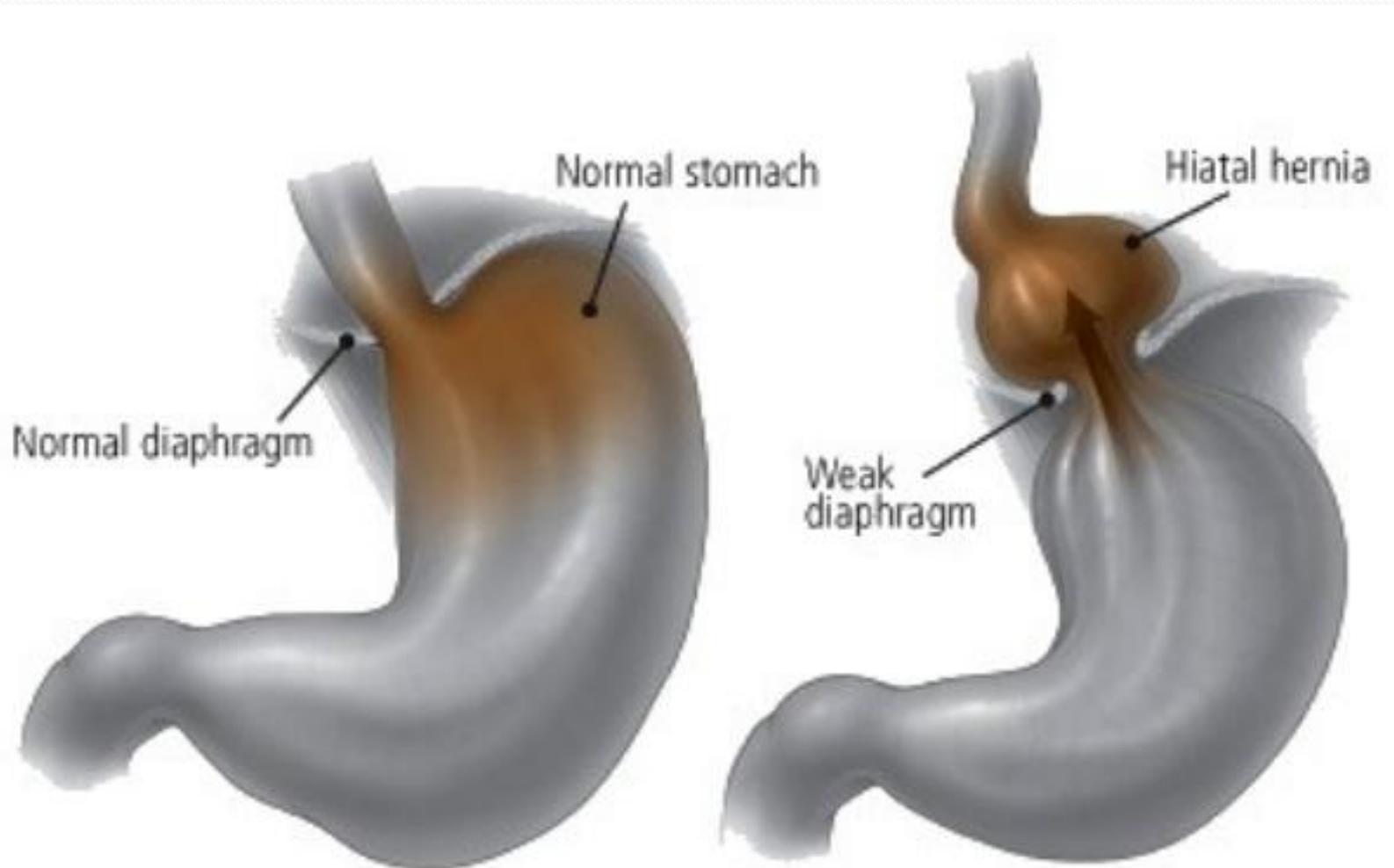
- It is one of the congenital diaphragmatic hernias (CDHs) in which a bulging of the upper part of the stomach occurs through the diaphragm.
- Unlike a typical DH, the HH maintains the barrier between the thoracic and abdominal cavities thus loss of pleural pressure and respiratory distress are not present

# Classification of hernias

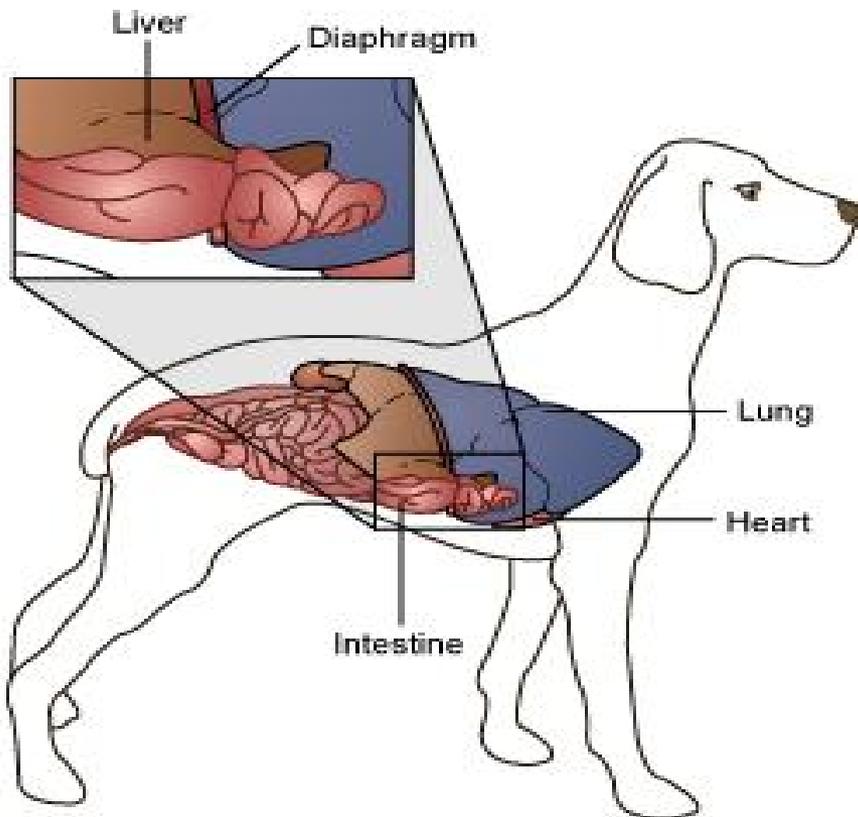
- **Morgagni hernia:**

- It is one of the CDHs.
- It is characterized by herniation through the foramen of Morgagni.
- Both unilateral (usually the right side) and bilateral Morgagni hernias have been recorded.
- It is usually associated with signs of abdominal pain due to the herniated bowel and with or without dyspnea.

# Hiatal hernia

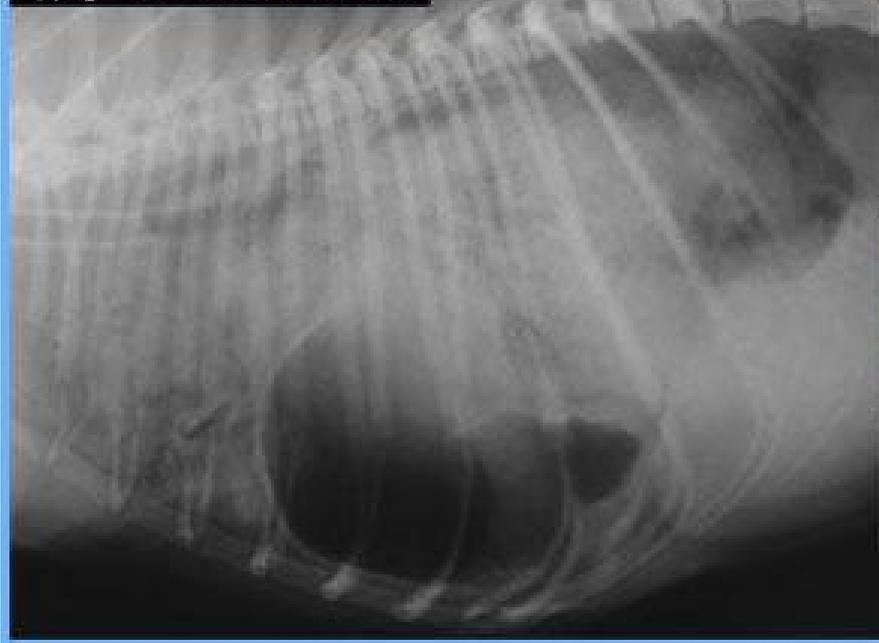


# Diaphragmatic rupture in a dog

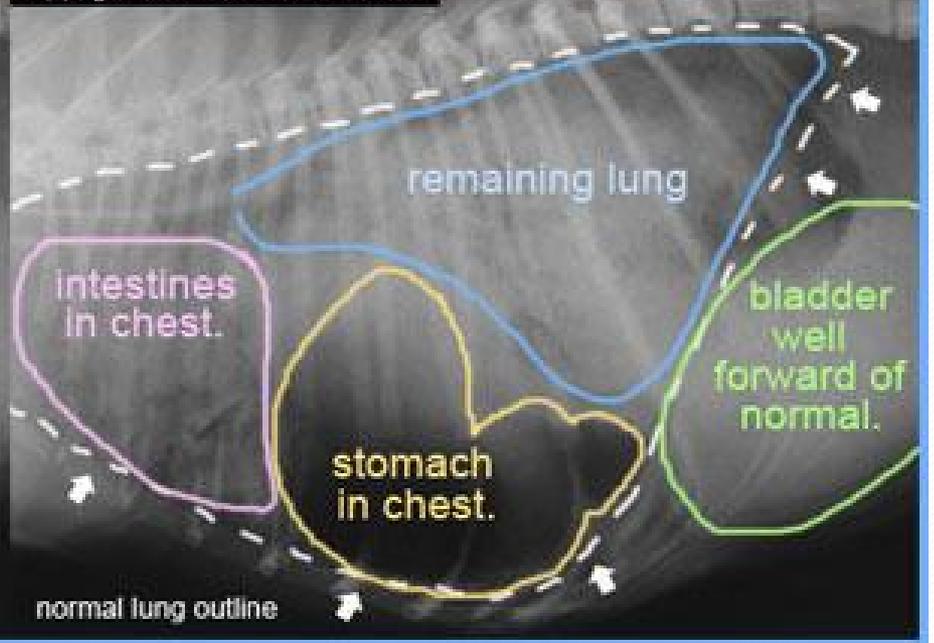


# Diaphragmatic hernia in a dog

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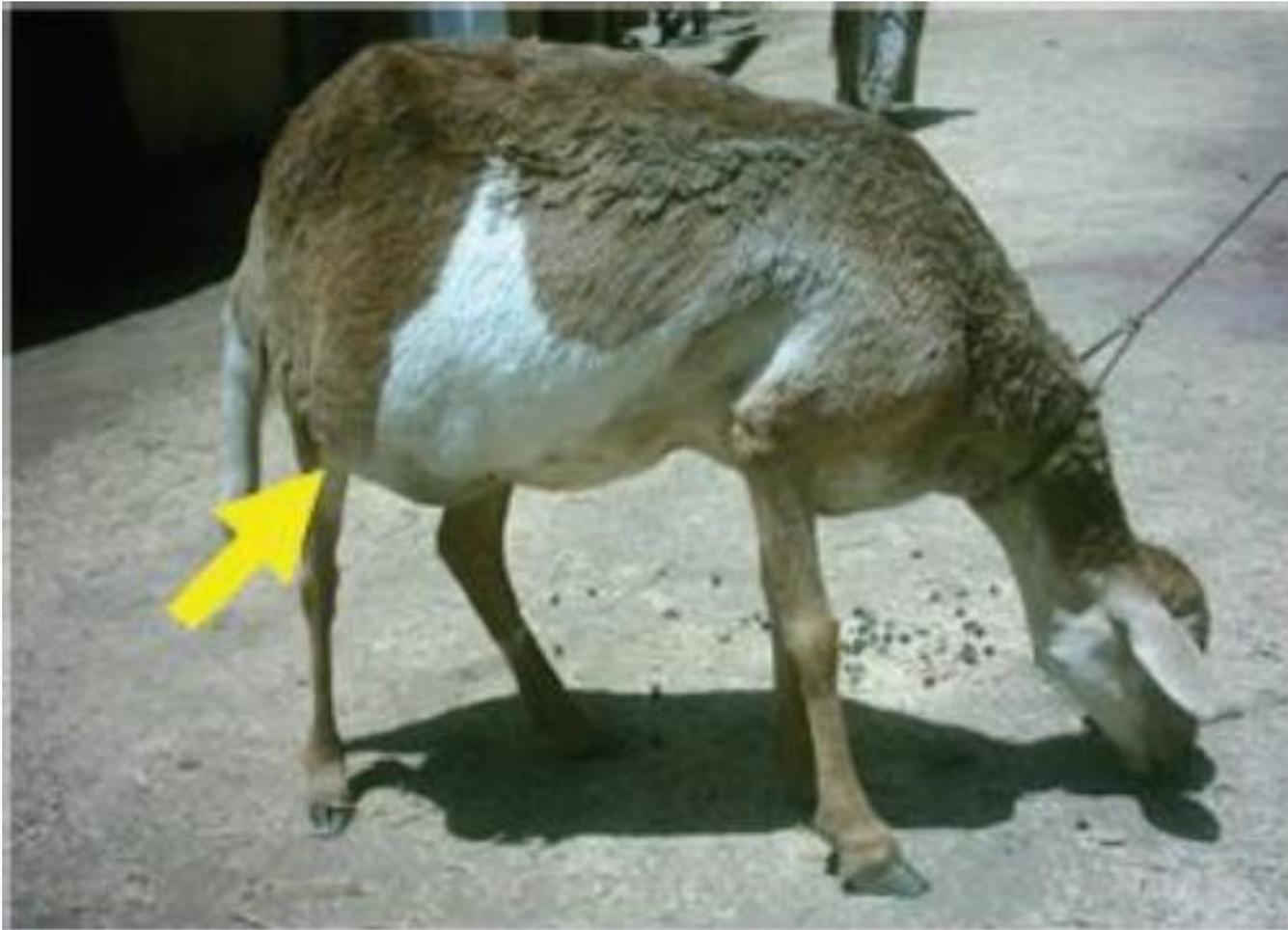
# Umbilical hernia in a calf



# Ventral abdominal hernia in a dog



# Ventro-lateral abdominal hernia in sheep



# Ventro-lateral abdominal hernia in a buffalo



# Ventro-lateral abdominal hernia in a mare



# Lateral abdominal hernia in a puppy



# Lateral abdominal hernia in a foal



# Abdominal intercostal hernia in a cat



# Scrotal hernia in a lamb



# Inguinal hernia in a female dog

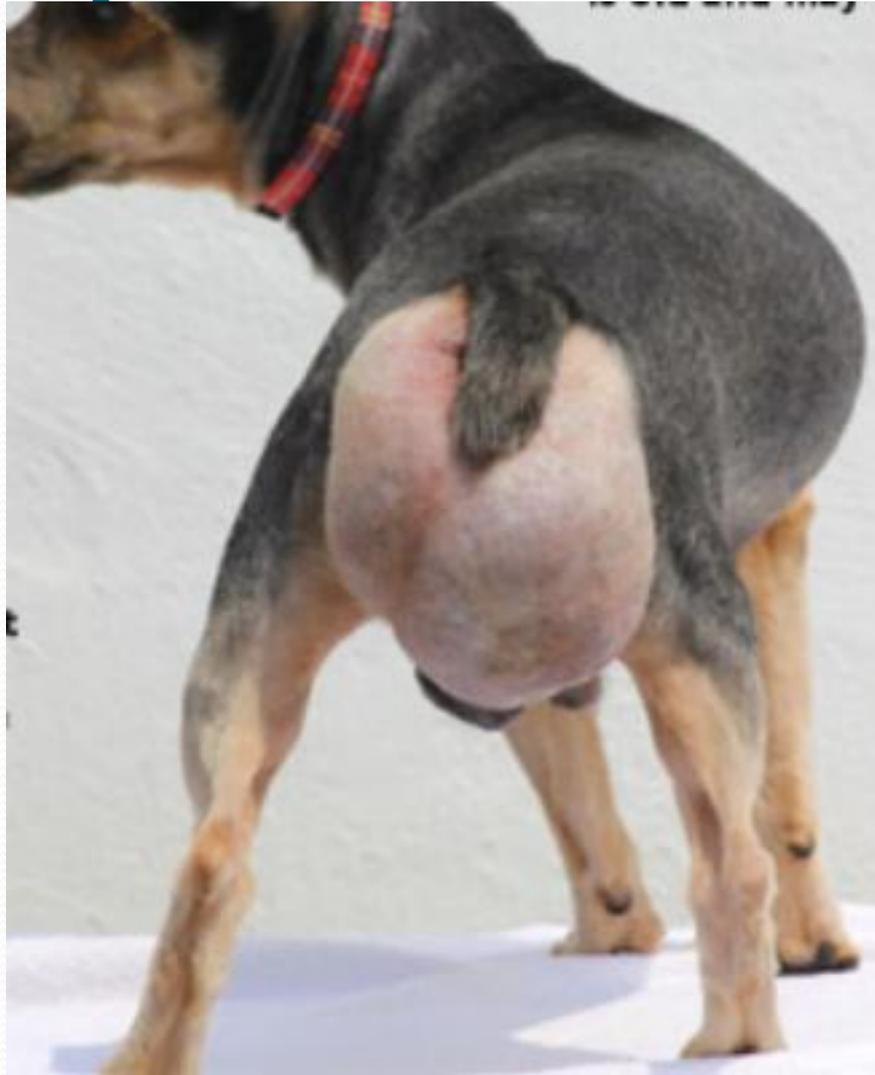
**Strangulated swollen uterus  
inside an inguinal hernia**



# Right perineal hernia in a dog



# Bilateral perineal hernias in a dog



# Causes of hernias

- **Congenital causes:**

- Inherited weakness of the muscles.
- Congenital opening in the linea alba
- Imperfect developed umbilicus
- Genetic disturbance

- **Predisposing causes:**

- Muscular weakness due to abscess or wounds
- Increased intra-abdominal pressure due to chronic cough, diarrhea, constipation and late pregnancy.

# Causes of hernias

- **Existing causes:**
  - Imperfect repair of the abdominal wall after laparotomy (Incisional hernia).
  - Blunt trauma such as kicks, blows, falling down and horn thrust

# Clinical Symptoms

- **Local Symptoms:**

- Abdominal or scrotal swelling (External hernia)
- Hernia ring
- Soft homogenous (epiplocele) or tympanic (enterocele) hernia swelling
- Reducible or irreducible hernia swelling.
- Slight pain in recent hernia.

# Clinical Symptoms

- **General Symptoms:**

- In non complicated hernia, slight colic and indigestion
  
- In complicated hernia, severe abdominal pain, colic, vomiting and depression.

# Diagnosis

- Case history
- Clinical symptoms
- Physical examination
- Ultrasonography
- Exploratory laparotomy
- Differential diagnosis from other swellings such as abscess, hematoma, neoplasm and cyst.

# General Treatment

- Small congenital hernia ( $5 < \text{cm}$ ), spontaneous healing usually occurs at 6 months of age.
- **Conservative treatment:**
  - **Trass:** A belt with a pad to support the reducible hernia.
  - **Skewers:** A too long pin to hold the ruptured muscles.

# General Treatment

- **Hernial clamp:** After reduction of the hernia contents, a plastic or wooden clamp is applied to induce strangulation and necrosis of the hernia sac within 10-21 days and the wound heals by secondary intention.
- **Injection of irritant material** around the hernia ring to induce fibrosis

# General Treatment



**Trass**

**Hernial clamp**



# General Treatment

- **Surgical treatment:**
- ***Indications:***
  - Persistent congenital hernia
  - Large hernia (>10cm)
  - Irreducible hernia

# General Treatment

- *Principle lines of treatment*
  - Reduction of the hernia contents
  - Closure of the hernia ring (herniorrhaphy) by either:
    - Sutures (Suture herniorrhaphy) or
    - Prosthetic mesh (prosthetic herniorrhaphy)

# General Treatment

- **Surgical herniorrhaphy:**
- ***Anesthesia:***
  - General anesthesia
  - Tranquilizer + local infiltration ring block
- ***Control:***
  - Dorsal recumbency (Mostly)
- ***Preoperative technique:*** As usual

# General Treatment

- **Surgical technique:**
  - Elliptical incision to open the hernia swelling.
  - Blunt dissection to excise the excessive skin from the peritoneal sac.
  - Careful dissection of peritoneal sac from the underlying tissue.
  - Reduction of the hernia content intra-abdominally.

# General Treatment

- Widening of the hernia ring in incarcerated hernia
- Careful manipulation of the strangulated bowel and excision of the necrosed parts.
- Cutting of adhesions and if not possible, reduction of the adhered parts together.
- Excision of the adhered part of the omentum (if present).
- Refreshment and closure of the hernia ring by one of the following:

# General Treatment

- **Suture herniorrhaphy:**
  - In case of small hernia ring (Easily co-optation)
  - By using horizontal mattress, simple interrupted or purse string sutures
  - Using synthetic absorbable (As Vicryl®) or non absorbable suture materials (As nylon or polyene).

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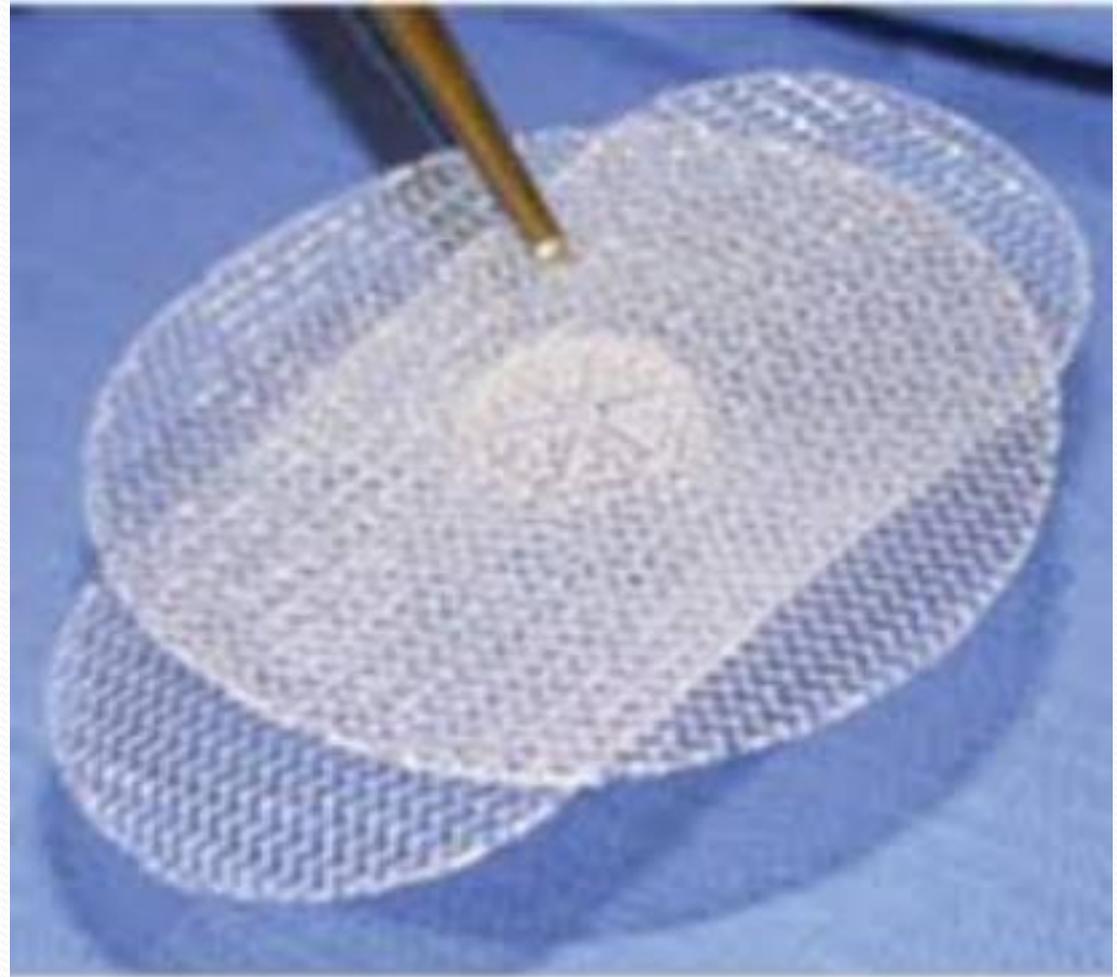
# General Treatment

- **Prosthetic herniorrhaphy (By using prosthetic mesh):**
- ***Indications:***
  - Attenuated muscles
  - Too large hernia ring
  - Hernia presents nearby bony attachment (as costal arch and pubis).
  - Long standing recurrent hernia.

# General Treatment

## Characters of a good prosthetic mesh:

- Simple material
- Durable
- Elastic
- Have graining texture
- Easily sterilized
- Induce rapid fibroplastic response



# General Treatment

- ***Aims of the mesh:***
  - To bridge the tissue gap that can not be sutured.
  - To support the newly developed granulation tissues and blood capillaries.
- ***Techniques of prosthetic herniorrhaphy:***
  - Retroperitoneal Technique
  - Intraperitoneal Technique
  - Double Sandwich Technique

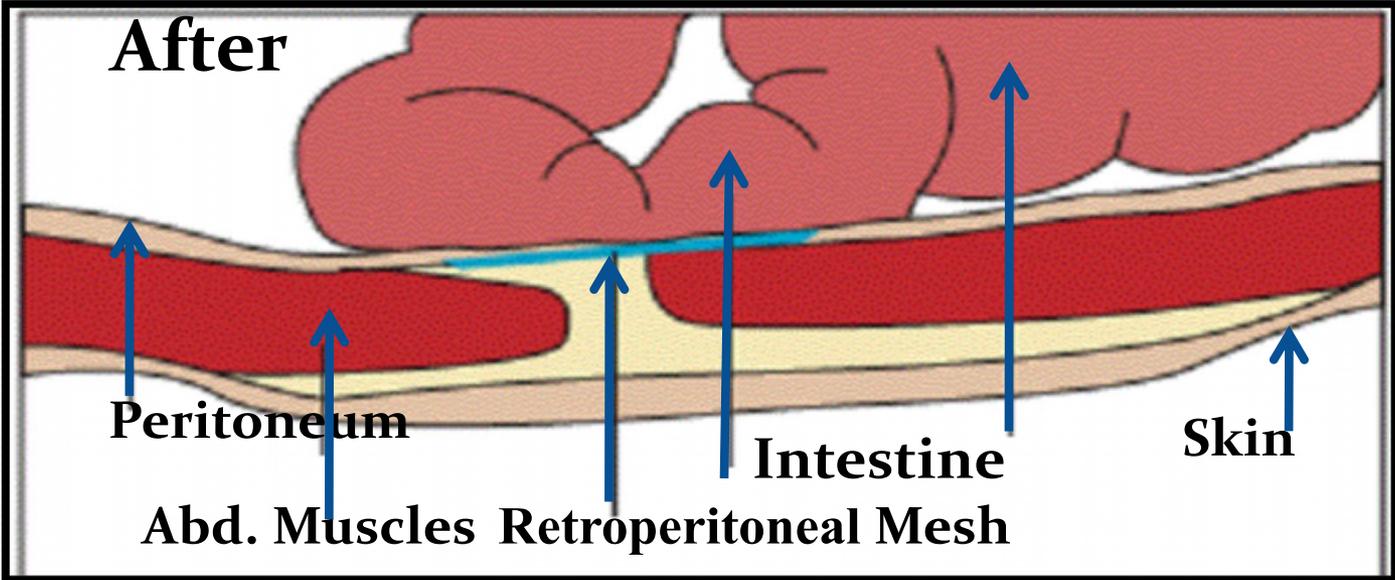
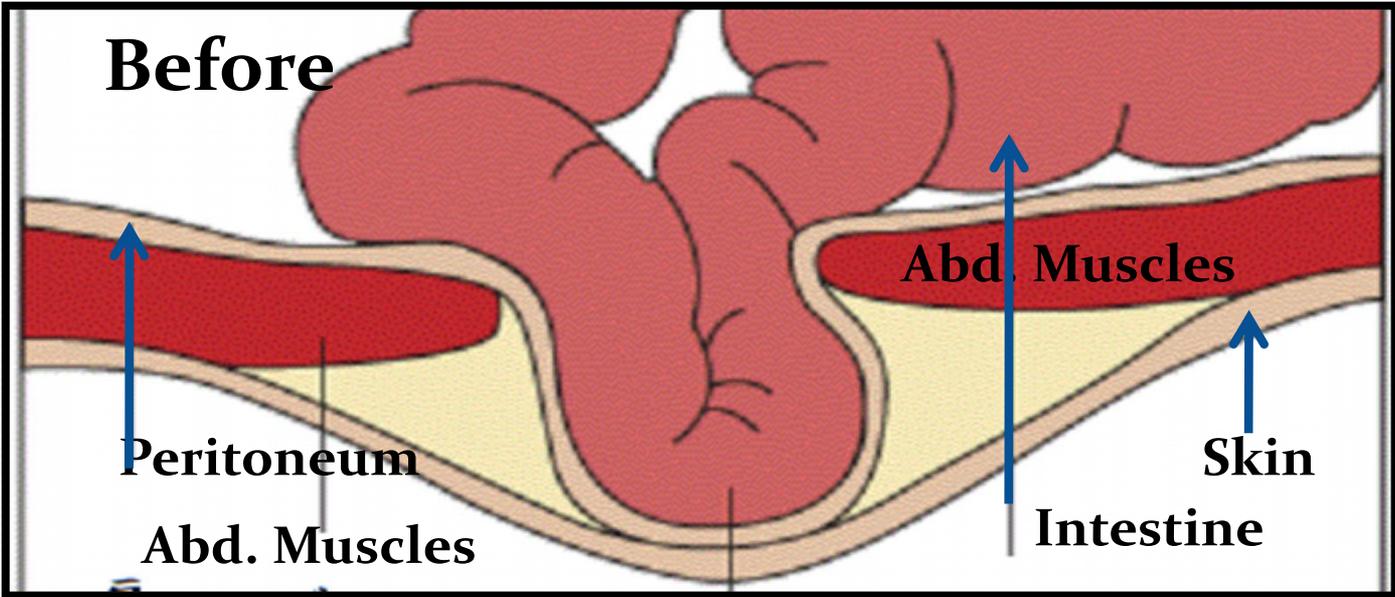
# General Treatment

- **Retroperitoneal Technique:**

The prosthetic mesh is implanted either between the internal rectal sheath and peritoneum OR between fascia transversalis and peritoneum

- **Intraperitoneal Technique:**

The prosthetic mesh is implanted in the peritoneal cavity with or without omentalization (Poor results due to adhesion).



# General Treatment

- **Double Sandwich Technique:**

Double layers of meshes are implanted, one between the internal rectal sheath and peritoneum and the second over the external rectal sheath.

- The prosthetic mesh is fixed in position with non absorbable suture materials as prolene or nylon using simple interrupted or horizontal mattress sutures.

# General Treatment

- Closure of S/C tissues with absorbable suture materials as Vicryl<sup>®</sup> using simple continuous pattern.
- Closure of the skin with non absorbable suture materials such as silk, nylon or prolene using simple interrupted or horizontal mattress patterns.

# Postoperative Care

- Using abdominal bandage
- Daily dressing of the wound with antiseptic solution
- Injection of systemic antibiotics
- Injection of antitetanic serum in equine
- Reduction of food for a week
- Removal of the stitches after 10 days of the operation

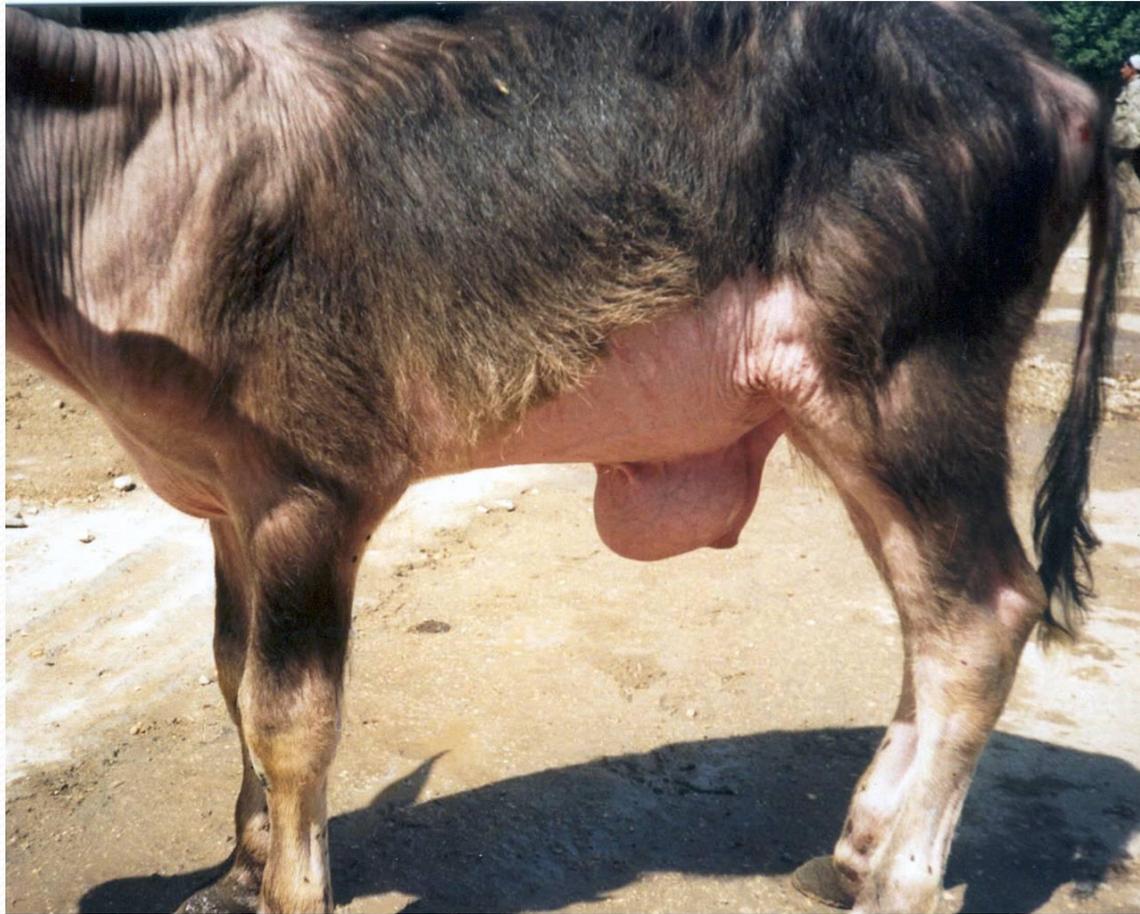
# Umbilical Hernia (Omphalocele)

- It is common in foals, calves and less in kids, lambs, puppies and kitten.
- It is common in Friesian calves.
- It is more common in females than males
- It is common in animals less than 6 months old
- Spontaneous recovery usually occurs in small umbilical hernias
- The common hernia contents are omentum, abomasum and intestines.

# Umbilical Hernia (Omphalocele)

- **Causes:**
- **Congenital causes:**
  - Developmental defect in the umbilical opening
  - Genetic factors
- **Acquired causes:**
  - Chronic omphalitis
  - Weakness of abdominal muscles.
  - Mechanical failure for natural closure of umbilicus
    - Severe straining
    - Trauma
  - Excessive traction of umbilicus during birth.

# Umbilical Hernia (Omphalocele)



**Umbilical Hernia in a 5-month-old Buffalo calf**

# Umbilical Hernia (Omphalocele)

- **Clinical symptoms:**

- General signs of hernia
- It may be alone or with omphalitis.

- **Diagnosis:**

- Case history - Clinical signs - Physical examination
- Ultrasonography to differentiate between omphalocele and omphalitis.
- Exploratory laparotomy
- Differential diagnosis from omphalitis, cysts, hematoma and tumors.

- **Treatment:** As mentioned before.

# Inguinal/ Scrotal Hernia

- It is the protrusion of viscera through the inguinal canal into the inguinal region (Inguinal hernia) or into the scrotum (scrotal hernia).
- The hernia ring is the inguinal ring
- The hernia sac is the tunica vaginalis.
- The hernia contents are usually loop of small intestine or omentum (rarely large intestine and urinary bladder).

# Inguinal/ Scrotal Hernia

- **Causes:**

- Hereditary defects in lambs and foals
- Congenital defect results in too large inguinal ring.
- Abdominal trauma
- Hard work
- Increased intra-abdominal pressure during exercise, severe straining, chronic cough or breeding.
- Hind limb slipping around and backward

# Inguinal/ Scrotal Hernia

- **Clinical Symptoms:**

- Abdominal pain and colic
- Enlarged firm testicle in acute cases
- The hernia may reach the ground
- In chronic cases, the testicle suffers from pressure atrophy.
- The hernia contents can be palpated at the anteroexternal aspect of spermatic cord.
- Abducted lameness (mechanical lameness).

# A large scrotal hernia in a kid



# Inguinal/ Scrotal Hernia

- **Diagnosis:**

- Case history
- Clinical signs
- Physical examination
- Ultrasonography to differentiate scrotal hernia from hydrocele, hematocele, testicular tumors, cysts, orchitis and scirrhous cord.

# Inguinal/ Scrotal Hernia

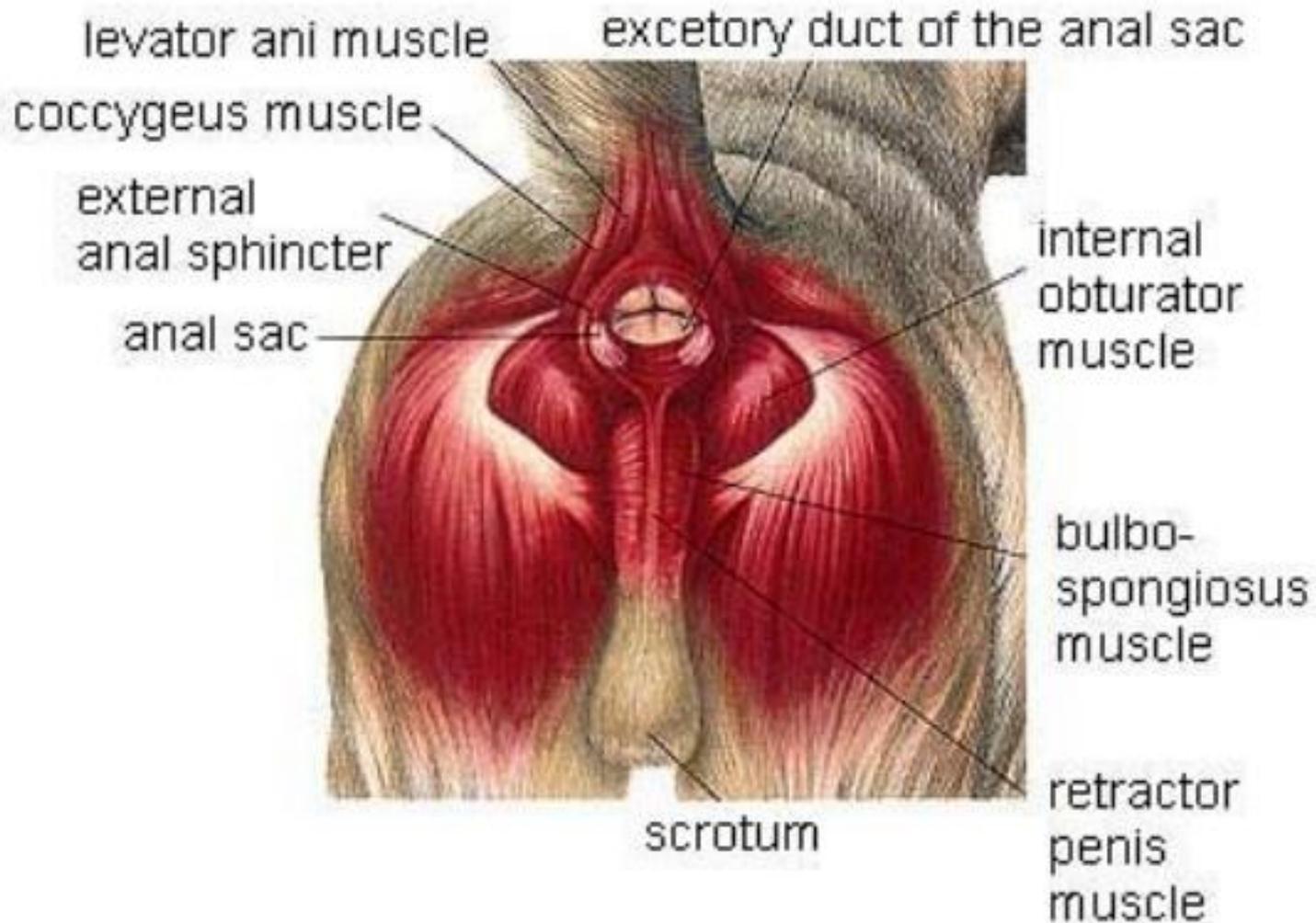
- **Treatment:**

- In congenital hernia, daily manual reduction of the hernia may lead to recovery by time.
- Surgical treatment including reduction of the hernia contents, castration and closure of the inguinal ring.

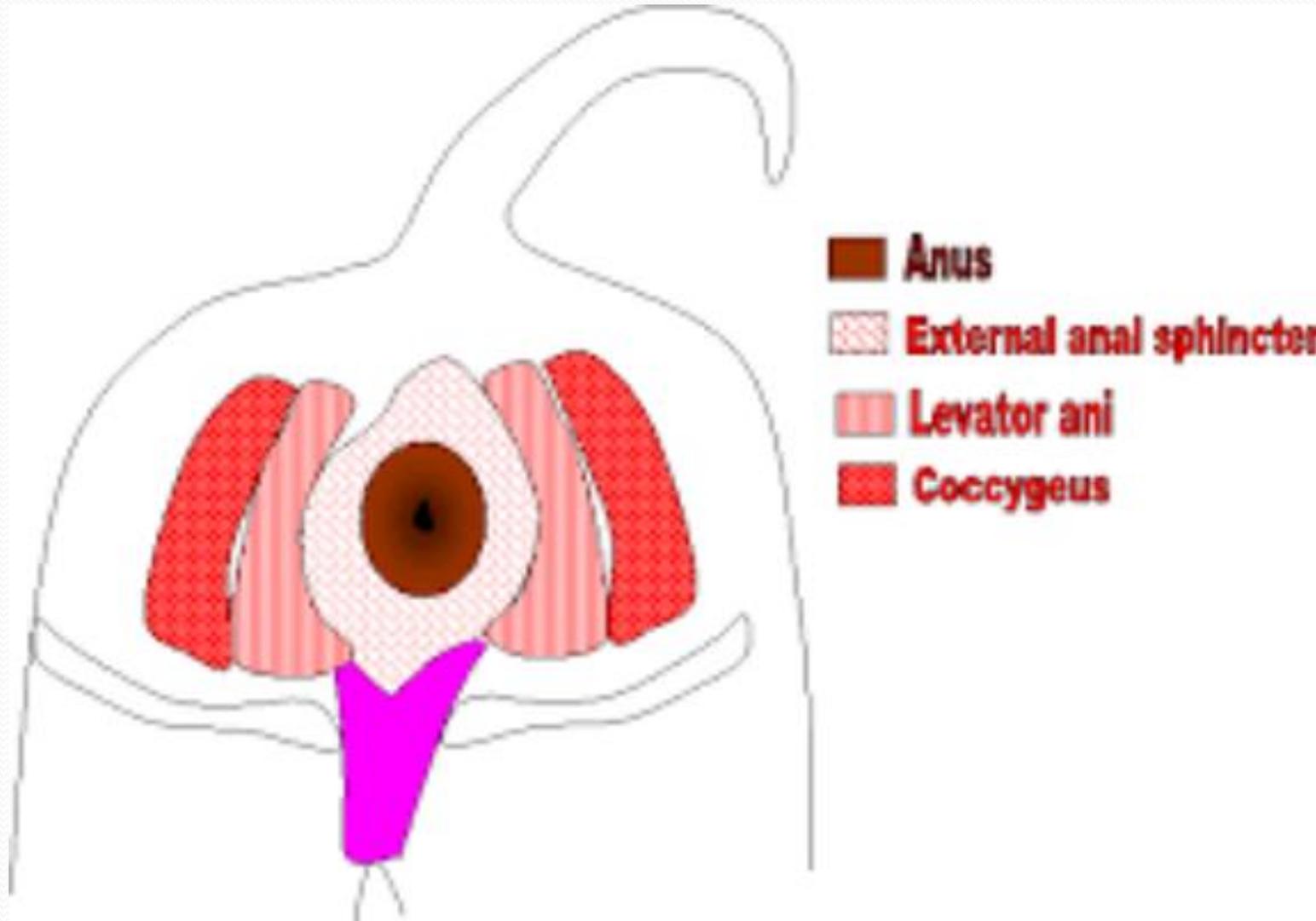
# Perineal Hernia

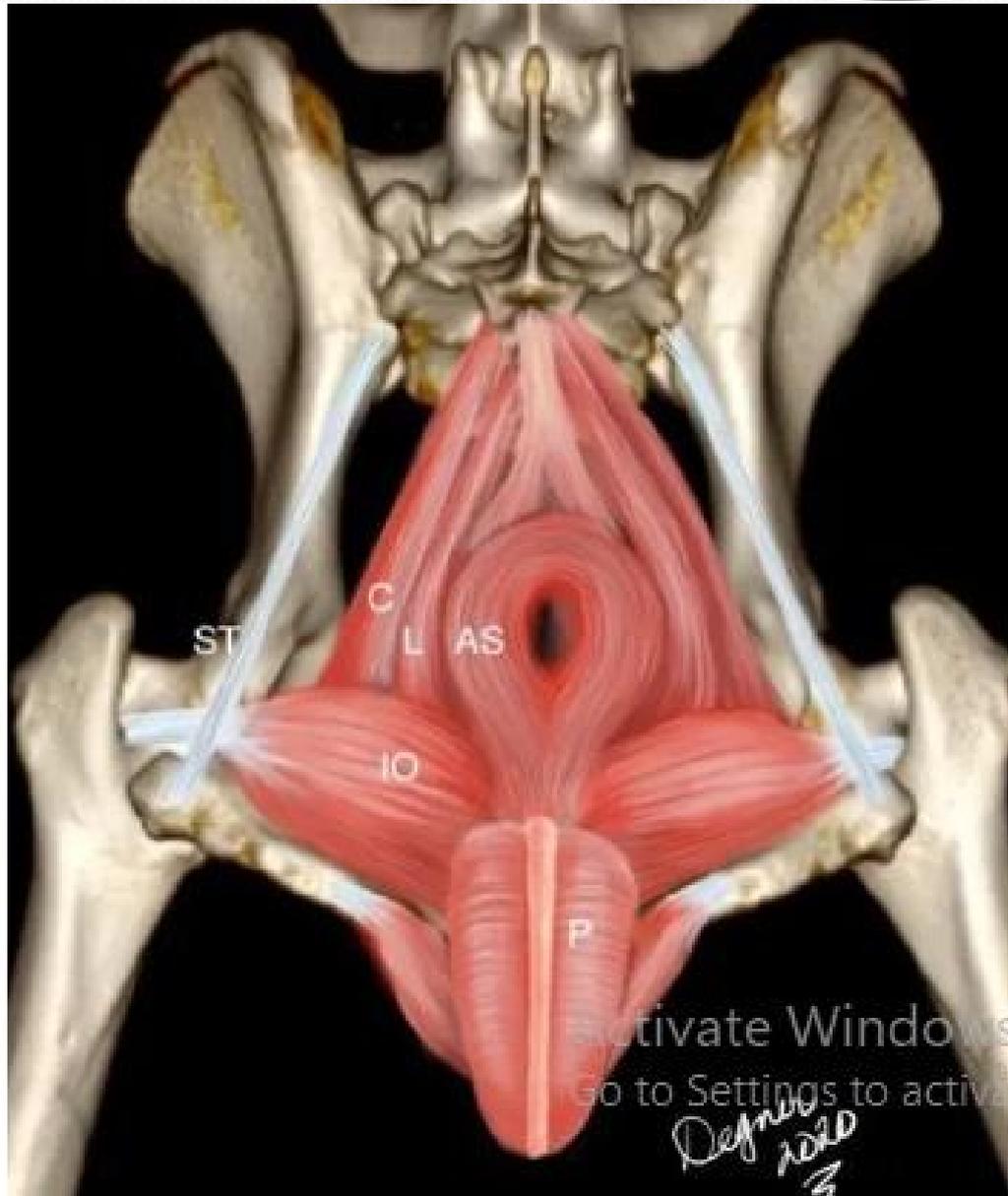
- It is a protrusion of retroperitoneal fat, abdominal and/or pelvic viscera (UB, prostate and/or intestines) through the pelvic diaphragm into the ischio-rectal fossa.
- Pelvic diaphragm is composed of the levator ani and coccyggeus muscles medially, the sacrotuberous ligament laterally and the internal obturator and external anal sphincter muscles caudomedially...

# Perineal Hernia



# Perineal Hernia





# Perineal Hernia

- **Incidence:**

- It is common in old dogs (6-14 years)
- It is common in sexually intact dogs (97% of the cases).
- It is not common in females due to strong levator ani muscle and good adhesion to the rectal wall over a long distance
- It may be unilateral (2/3 of the cases) or bilateral (1/3 of the cases)

# Perineal Hernia

- **Causes:**

- Congenital weakness of pelvic diaphragm in some breeds as Boxer and Pekingese
- Testosterone imbalance
- Prostatic enlargement
- Chronic constipation
- Muscle atrophy especially levator ani muscle
- Concurrent rectal diseases as rectal deviation and dilatation.

# Perineal Hernia

- **Symptoms:**

- Ventro-lateral, to the anus, painless swelling between the levator ani muscle and external anal sphincter.
- May be reducible or irreducible
- May be unilateral or bilateral.
- Change in tail carriage.

# Perineal Hernia

- In chronic cases, overlying skin necrosis may be seen.
- Frequent straining to defecate with little or no feces.
- Dysuria or anuria if the urinary bladder is herniated
- Abdominal pain
- Lethargy and depression

# Unilateral Perineal Hernia in a dog



# Perineal Hernia

- **Diagnosis:**

- Case history
- Clinical signs
- Physical examination
- Rectal examination >>> To detect the impacted rectum & to assess the hernia ring.
- Ultrasonography >>> To image the hernia contents

# Perineal Hernia

- Radiographic examination:
- Plain Radiography >>> To detect the rectal dilatation and hernia contents
- Contrast Radiography of either rectum >>> to discover rectal deviation or rectal diverticulum OR urinary bladder (Cystography) >>> to discover the herniated UB.

# Perineal Hernia



Plain radiography of bilateral perineal hernia in a dog

# Perineal Hernia

**Contrast radiography of perineal hernia in dogs**



**Herniated rectum in a perineal hernia in a dog**

**Herniated UB in a perineal hernia in a dog**



# Perineal Hernia

- **Treatment**
- ***Conservative treatment:***
  - Using laxatives.
  - Periodic rectal enemas
  - Fibers rich diets.
  - Urinary catheterization to decompress the urinary bladder.
  - Digital removal of the impacted feces.

# Perineal Hernia

- ***Surgical treatment:***

- Castration >>> decrease testosterone >>> decrease the size of prostates
- Suture herniorrhaphy (in small herina ring)
- OR
- Prosthetic herniorrhaphy (in large hernia ring or very weak muscles)
- OR
- Muscle transposition perineal hernioplasty (in severe or bilateral hernias and to avoid recurrence)

# Perineal Hernia

- *Conventional or suture herniorrhaphy:*
  - Fasting of the animal for 24 hours
  - Rectal enema
  - Purse string suture around the anus or inserting a piece of gauze inside the anus to avoid defecation during surgery.
  - Sternal recumbency with tying the tail over the back
  - Elevation of the hind quarter

# Perineal Hernia

- Aseptic preparation of the perineum.
- General anesthesia + Epidural analgesia
- Opening the hernia swelling
- Exposure of the hernia contents
- Reduction of the hernia contents intra-abdominally.
- Colopexy may be done to fix the colon and rectum to the left abdominal wall

# Perineal Hernia

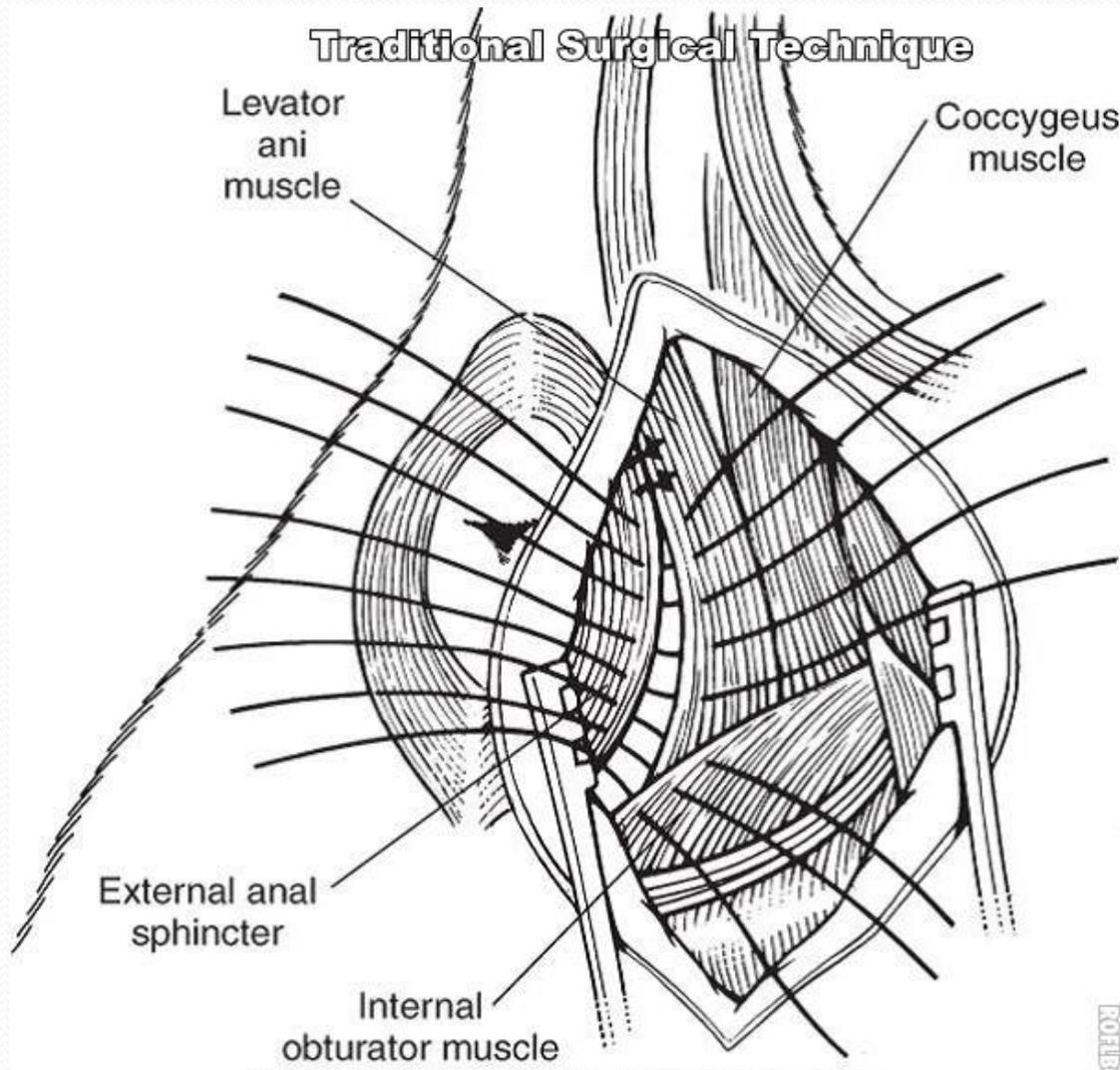
- Cystopexy may be done to fix the urinary bladder to the right abdominal wall
- Ductus deferensopexy can be done to fix the prostates to the abdominal wall.

Closure of the herina ring with 4 layers of horizontal mattress or simple interrupted sutures using synthetic absorbable suture material as follows:

# Perineal Hernia

- 1- First layer sutures the coccygeus muscle and external anal sphincter muscle.
- 2-Second layer sutures the levator ani muscle and external anal sphincter muscle.
- 3-Third layer sutures the internal obturator muscle to the external anal sphincter and to the levator ani and coccygeus muscles to finish closing the hernia defect
- 4- Fourth layer sutures the subcutaneous tissue and external anal sphincter muscle.

# Perineal Hernia



# Perineal Hernia

- Suturing S/C tissue with synthetic suture material and simple continuous pattern
- Suturing of the skin with non absorbable suture material and simple interrupted pattern.
- Removal of purse string suture or gauze from the anus.

# Perineal Hernia

- **Post operative care:**
  - Reduce diet for 3 days post operative
  - Soft easily digested food for 7 days post operative.
  - Daily dressing of the wound with antiseptic solution
  - Systemic antibiotics
  - Removal of the stitches after 7-10 days

