

HERNIA SURGERY



BASICS

OVERVIEW

- A hernia is the protrusion of a portion of an organ or tissue through an abnormal opening. Hernias can be classified according to location, cause, content, and condition of the content.
- Internal hernias involve herniation of an organ or tissue through a rent or natural opening within a body cavity and include omental, mesenteric, diaphragmatic, and pelvic hernias.
- External hernias involve herniation of an organ or tissue through a rent or natural opening in the abdominal wall, forming a hernia ring and sac.
- External hernias can be classified as ventral, umbilical, inguinal, scrotal, or femoral.
- Further characterization is based on classification of the hernial sac contents such as enterocele and whether the contents are reducible, incarcerated (non-reducible), or strangulated (compromised blood supply).
- Finally, hernias can be classified as congenital (present at birth) or acquired (occurring later in life).

SYSTEMS AFFECTED

- Multisystemic

GENETICS

- Umbilical hernias in Holstein-Friesian cattle can be inherited in a dominant or recessive manner.
- Scrotal hernias in rams are likely inherited as a recessive trait.

INCIDENCE AND PREVALENCE

- The prevalence of umbilical hernias in dairy heifers during the first 3 months of life is reported to be around 15%.
- Scrotal, diaphragmatic, and ventral body wall hernias are considered uncommon in ruminant species.

GEOGRAPHIC DISTRIBUTION

Worldwide, depending on species and hernia type.

SIGNALMENT

- Potentially any breed, species, age, or sex of ruminant can develop any of the described hernias. However, umbilical hernias are most commonly reported in dairy calves with heifers being most represented.
- The risk of umbilical hernia in the Holstein breed is reported to be twice that of other breeds. Scrotal hernias, although rare, seem to be most often reported in rams. However, inguinal and scrotal hernias have been reported in steers and bulls.

CAUSES AND RISK FACTORS

Umbilical Hernias

- Umbilical hernias in Holstein-Friesian cattle can be inherited or caused by environmental factors.
- Holstein heifers with umbilical infection are reported as being 5.65 times more likely to develop an umbilical hernia than heifers without umbilical infection.
- Trauma to the umbilicus may also predispose to herniation.

Scrotal Hernias

- Inguinal or scrotal hernias are the result of an abdominal organ passing through the inguinal canal.
- Inguinal or scrotal hernias are reported in bulls, steers, and rams. In bulls, the left inguinal ring seems to be most affected. Inguinal hernias have been reported in heifers.
- In rams, inguinal/scrotal hernias seem to be inherited.
- Heritability in cattle is not described, but should always be taken into consideration before performing corrective surgery on breeding stock.

Body Wall Hernias

- Body wall hernias are usually associated with trauma. However, spontaneous herniation of the body wall is described in late gestation cows.
- Dehiscence of a surgical incision might also cause a body wall hernia.

Diaphragmatic Hernias

- Diaphragmatic hernias can be congenital or secondary to trauma.
- Herniation of the reticulum through the diaphragm is usually associated with traumatic reticuloperitonitis, which causes local weakening of the diaphragm, but congenital defects in the ventral diaphragm may occur.
- Congenital hernias of the dorsal tendinous portion of the diaphragm are reported to occur in all species and may involve multiple abdominal organs, and in some cases defects in the pericardial sac.

CLINICAL SIGNS

- Diagnosis of external hernias is usually based on physical examination.
- Uncomplicated external hernias should be reducible and consist of an external hernial sac and body wall hernial ring.
- Non-reducible hernias (those with incarcerated or strangulated hernial sac contents) may require ancillary diagnostic testing.
- Clinical signs associated with external hernias are usually minimal unless the hernial sac contains incarcerated or strangulated internal organs.
- Symptoms in the latter situation may include evidence of gastrointestinal obstruction, toxemia, sepsis, and colic.
- Clinical signs associated with diaphragmatic hernias include decreased appetite (particularly for grain), decreased milk production (lactating dairy cattle), loss of condition, abdominal distension, chronic bloat, and borborygmi may be heard during thoracic auscultation.



DIAGNOSIS

DIFFERENTIAL DIAGNOSES

- Differential diagnoses for the swelling associated with external hernias include abscess, hematoma, or seroma.
- With a non-complicated hernia, the herniated tissue or organ can usually be pushed back into the abdominal cavity through the hernial ring during physical examination.
- External hernias that are non-reducible may require ultrasonography to differentiate them from an abscess, hematoma, or seroma.
- Differential diagnoses for a diaphragmatic hernia include traumatic reticuloperitonitis, traumatic reticulopericarditis, and vagal indigestion.

CBC/BIOCHEMISTRY/URINALYSIS

- Clinical pathology data is regarded as not very useful in the diagnosis of hernias. However, CBC changes might include an inflammatory leukogram with an elevated fibrinogen if there is a concomitant process involved, such as abscessation, incarceration or strangulation of an organ.
- Serum biochemistry changes might include electrolyte abnormalities and changes in acid/base status if organs are incarcerated or strangulated within the hernial sac.

IMAGING

- Ultrasonography may be useful in differentiating a non-reducible body wall or umbilical hernia from a fluid-filled mass such as a seroma, hematoma, or abscess.
- Contrast radiography has been employed to aid in the diagnosis of diaphragmatic hernias in ruminants.



TREATMENT

TREATMENT

- The majority of hernias require surgical correction, referred to as herniorraphy.
- Surgical technique varies according to the type of hernia being repaired. Surgery can be performed under sedation and regional anesthesia or under general anesthesia. Lumbo-sacral epidural anesthesia can also be used for the repair of umbilical hernias, body wall hernias, and scrotal hernias if the procedure is performed with the animal recumbent.
- Given the known or possible heritability of scrotal and umbilical hernias it is recommended that affected animals not be used for breeding stock.

Umbilical Hernias

- Umbilical hernias are repaired by making an elliptical skin incision at the base of the hernial sac, leaving adequate skin edges to facilitate skin closure. The hernial sac is bluntly dissected away from the peritoneum and removed. The peritoneum is inverted into the abdomen and the abdominal wall (linea) is closed using an interrupted suture pattern such as an inverted cruciate or sliding mattress suture (“vest-over-pants”) pattern.

- Alternatively, the repair can be accomplished using an open technique in which the peritoneum is incised and the hernial ring is debrided to facilitate primary closure of the sides of the incision. The body wall can be closed with either a non-absorbable or absorbable monofilament suture. The subcutis is usually closed with absorbable suture to reduce dead space and the skin is usually closed with an interrupted or continuous suture pattern of a non-absorbable monofilament suture material.
- Primary closure can be augmented by incorporating sterile surgical mesh into the opening, thus enhancing the strength of the closure and decreasing the tension that must be applied across the opening. However, recent evidence suggests that the risk of post-operative complications increases when mesh is used.

Scrotal Hernias

Inguinal or scrotal hernias can be repaired either by laparotomy or externally by incising the skin at the base of the scrotum. Multiple techniques are described elsewhere. In each, correction is accomplished by reducing the hernia (returning the abdominal organ or tissue to the abdominal cavity) and then partially closing the inguinal ring while leaving a sufficient aperture for the spermatic cord to course through.

Body Wall Hernias

- Surgical repair of body wall hernias is similar to the technique described for repair of umbilical hernias.
- Success of the repair will depend on the extent and location of the hernia and the degree of tension that will be placed on the sutures.
- Primary closure can be augmented by incorporating sterile surgical mesh into the opening, thus enhancing the strength of the closure and decreasing the tension that must be applied across the opening. However, post-operative complications may be increased when mesh is used (see above).

Diaphragmatic Hernias

Surgical repair of diaphragmatic hernias is usually not recommended because there often are multiple adhesions present and reports of attempted repairs suggest that most fail.



MEDICATIONS

MEDICATIONS

- There are no specific medical treatments for hernias. However, when umbilical hernias are accompanied by an abscess, antimicrobial therapy is warranted.
- Prophylactic peri-operative antibiotics may also be administered to prevent secondary infections associated with surgery.
- Nonsteroidal anti-inflammatory drugs (NSAIDs) such as flunixin meglumine may also be used to ameliorate post-operative pain.

CONTRAINDICATIONS

- Regulations for extra-label drug use must be followed and appropriate milk and meat withdrawal times must be assigned for all compounds administered to food-producing animals.

- Goats are extremely sensitive to the effects of lidocaine. Care should be taken with the use of this drug to avoid overdosage (dose should not exceed 5mg/kg).



FOLLOW-UP

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- Skin sutures should be removed in 10 to 14 days.
- For animals with ventral abdominal incisions, clean dry bedding will aid in preventing incisional infections and dehiscence.
- Incisions should be monitored for heat, pain, swelling, redness, and drainage.
- Incisional abscesses should be drained and flushed with a dilute antiseptic such as betadine.

PREVENTION

- Avoid sires with a history of umbilical hernias in their progeny.
- Do not use animals with umbilical or inguinal/scrotal hernias as breeding stock because of the possibility that such hernias are heritable.
- Minimize umbilical infection through topical disinfection of the navel and ensuring adequate transfer of maternal immunoglobulins shortly after birth.
- Avoid situations that may lead to blunt trauma of the body wall or inguinal ring.
- Administer a magnet orally to cattle at weaning to decrease the likelihood of traumatic reticuloperitonitis.

POSSIBLE COMPLICATIONS

Complications of surgery may include incisional or body wall dehiscence and recurrence of the hernia.

EXPECTED COURSE AND PROGNOSIS

- Prognosis is good for uncomplicated umbilical hernias.
- If the hernia is associated with an abscess in one or more of the umbilical structures the prognosis is less favorable due to possible peritonitis or incisional infection which predisposes to wound dehiscence. Omphalophlebitis may also course proximally to the liver causing abscessation and a grave prognosis.
- The prognosis for body wall hernias will depend on the extent of the hernia and the surgeon's ability to repair the rent in the body wall.
- Prognosis for cattle with incarcerated or strangulated organs within the hernia is guarded due to adhesion formation and devitalization of the involved internal organ.
- Prognosis is poor for diaphragmatic hernia repair because most attempts in ruminants are reported to have failed.



MISCELLANEOUS

ASSOCIATED CONDITIONS

Incisional or body wall dehiscence and recurrence of the hernia.

AGE-RELATED FACTORS

Umbilical hernias are most commonly reported in dairy calves, with heifers being most represented.

PREGNANCY

Pregnancy may exacerbate hernia symptoms.

PRODUCTION MANAGEMENT

- Do not use animals with umbilical or inguinal/scrotal hernias as breeding stock because of the possibility that such hernias are heritable.
- Administer a magnet orally to cattle at weaning or pre-breeding to decrease the likelihood of traumatic reticuloperitonitis.
- Avoid sires with a history of umbilical hernias in their progeny.
- Minimize umbilical infection through topical disinfection of the navel and ensuring adequate transfer of maternal immunoglobulins shortly after birth.

SEE ALSO

- Anesthesia: Inhalation
- Anesthesia: Injectable
- Anesthesia: Local and Regional
- Traumatic Reticuloperitonitis
- Umbilical Disorders
- Vagal Indigestion

ABBREVIATIONS

- AMDUCA = Animal Medicinal Drug Use Clarification Act
- NSAIDs = nonsteroidal anti-inflammatory drugs

Suggested Reading

Ames, N.K. Noordsy's Food Animal Surgery. 5th ed. Ames: Wiley Blackwell. 2014:83-95.

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