



Hernia

UMBILICAL HERNIA

Umbilical hernia has a reported incidence of 0.5% to 2%, and has even been reported as high as 29.5%, making it the most common type of hernia observed in foals. Anatomically, this type of hernia consists of intact peritoneum covered with fascia and skin, and a defect at the linea alba where an umbilical scar has failed to form. Umbilical hernias are congenital and are often associated with trauma to or pressure on the umbilicus during birth or with umbilical infection. In severe cases of umbilical trauma, evisceration can occur through the umbilicus immediately after parturition (Figure 179-1). This is an immediate surgical emergency necessitating prompt referral and repair; a successful outcome can be expected as long as the intestine and mesentery have not been unduly compromised. Most umbilical hernias less than 2 cm in diameter will resolve spontaneously if they are repeatedly manually reduced. Repair of some smaller hernias, or hernias larger than 4 cm, is performed for cosmetic reasons or to prevent possible incarceration of the intestine. Banding or clamping of smaller hernias is commonly performed.

Clinical signs such as sudden enlargement of the hernia, ventral edema, signs of colic, and inability to easily reduce the hernia all can be indications of a surgical emergency. A large plaque of ventral edema is commonly a sign that omentum has been incarcerated in the hernia. Umbilical hernia may or may not be associated with signs of colic. Evagination of the urinary bladder through an umbilical hernia also has been reported. Parietal or Richter's hernias can also occur, with the antimesenteric surface of the bowel, most commonly the ileum, becoming entrapped in the umbilical hernia. Partial obstruction or complete obstruction, as well as necrosis of the bowel, can occur. Large and small colon can also be involved with parietal hernias. Enterocutaneous fistulas can develop in chronic parietal hernias. Ultrasound examination of the hernia is helpful in determining its contents and viability of incarcerated bowel.

Treatment

Correction of umbilical hernia can be achieved in uncomplicated cases by placement of clamps, elastrator bands, or hernia belts. The clamps or bands are generally placed with the foal in dorsal recumbency and under short-term general anesthesia. Complications of the use of clamps or bands can include colic, abscess formation, dislodging of the bands or clamps, and parietal hernia. A reported complication rate of 19% was reported in one study in which 40 cases were evaluated. An equine hernia belt applied for several weeks can also be used in foals to resolve a small hernia. Hernias less than 6 cm (three or four finger widths) in length in foals younger than 6 months respond best to the latter treatment. A hernia belt is often chosen because the treatment cost may be less than that associated with surgical repair.

Surgical repair of umbilical hernias can be performed by open or closed herniorrhaphy techniques. Surgery is

recommended if the foal is older than 6 months of age, for hernias longer than 6 to 8 cm, or whenever intestine or omentum is incarcerated in the hernia. The foal is anesthetized, and the area around the hernia is surgically clipped and aseptically prepared. An elliptical incision is made in the skin around the hernia sac and is continued down to the level of the hernia sac. The hernia sac can be inverted or removed. Preplacement of interrupted sutures in a tension-relieving pattern, such as vertical mattress, near-far-far-near, or vest-over-pants pattern, with an absorbable suture material is recommended. The subcutaneous tissue and skin are then closed in a routine manner. Perioperative broad-spectrum antimicrobials are recommended. Stall rest for 30 days is recommended to prevent failure of the repair. Colic, edema at the incision site, dehiscence, and pneumonia have all been reported as complications of herniorrhaphy. Complication rates have been reported to be similar to those associated with clamping techniques overall, although the rates are higher for complicated umbilical hernias.

DIAPHRAGMATIC HERNIA

Diaphragmatic hernias in the foal can be congenital or may arise secondary to trauma during parturition. They can also often develop secondary to rib fractures in the foal, especially when fractures involve ribs 3 through 8 at the costochondral junctions. In recent reports involving 31 cases of diaphragmatic hernias, 6 cases were foals younger than 1 year. Colic was the presenting complaint in all cases. Diagnosis is often made on the basis of several imaging modalities, and the smaller the size of the foal, the easier the diagnosis can be made with ultrasound and radiography. Hemothorax, hemoabdomen, or both may be seen in neonates with diaphragmatic hernia. Respiratory distress is another common presenting sign in foals. The small intestine is most frequently herniated through the defect, but the large intestine, stomach, liver, and spleen can also be involved.

Treatment

Surgical repair can be aided by placing the foal in reverse Trendelenburg position to help the viscera fall away from the defect and facilitate repair. Positive-pressure ventilation is necessary during anesthesia. From an abdominal approach, the viscera can be retrieved from the thorax, and the defect can be closed by suturing alone or by both suturing and stapling a mesh over the defect. Hernias involving the ventral portion of the diaphragm are more amenable to repair than hernias involving the dorsal aspect, near the ribs. Thoracoscopic approaches or rib resection techniques have been reported for repairing defects in the dorsal part of the diaphragm.

Evacuation of the air in the pleural cavity is necessary after repair, and an indwelling chest tube may be placed for additional evacuation of pleural cavity air during recovery or after surgery. Rib fractures can be repaired concurrently with



Figure 179-1 Photograph of foal with evisceration of bowel through the umbilicus after foaling. (Photo courtesy D.H. Rodgerson.)

a combination of surgical plate and wire techniques to prevent further trauma to the diaphragm or thoracic cavity contents.

The prognosis for survival is guarded (46% survival rate). Foals can die or undergo euthanasia because of the severity and extent of intestinal compromise. Foals that survive through the surgery may die during recovery.

INGUINAL HERNIA

Inguinal hernias in foals can be classified as indirect or direct. Indirect hernias are the most common type of inguinal hernias in horses, but direct hernias are more common in foals than in adult horses. Direct hernias develop when the intestine is incarcerated through a rent in the peritoneum, when there is rupture of the parietal vaginal tunic, or when there is a tear in the musculature adjacent to the inguinal ring. In all these instances, the intestine is located outside of the vaginal tunic. Inguinal rupture is a term often used to describe a rent in the peritoneum adjacent to the inguinal ring. Indirect hernias occur where intestine, most commonly the ileum and jejunum, passes directly through the inguinal ring and becomes entrapped by the internal or external rings. The intestine is then located within the vaginal tunic, adjacent to the testes. These hernias have been reported to occur most commonly in Standardbred, draft, and warmblood breeds that may have congenitally larger rings. The condition most commonly occurs in the left inguinal ring. Repeated manual reduction may result in correction of the condition. Herniation of the large colon has also been reported, albeit less frequently. Hernias may be a surgical emergency when the foal presents with acute enlargement of the hernia, local edema, or signs of abdominal discomfort, which arise with rupture of the vaginal tunic. When the tunic has ruptured, foals with direct hernias commonly have intestine located subcutaneously in the ventral abdomen or the inguinal or medial thigh areas at evaluation (Figure 179-2). The overlying skin and subcutaneous tissue may be cold to touch, edematous, and even macerated as a consequence of traumatic contact against the inner thigh. Affected intestine can be adherent to the subcutaneous tissue and skin.

Treatment

An open herniorrhaphy by an inguinal approach is the most common method used to reduce the hernia and perform

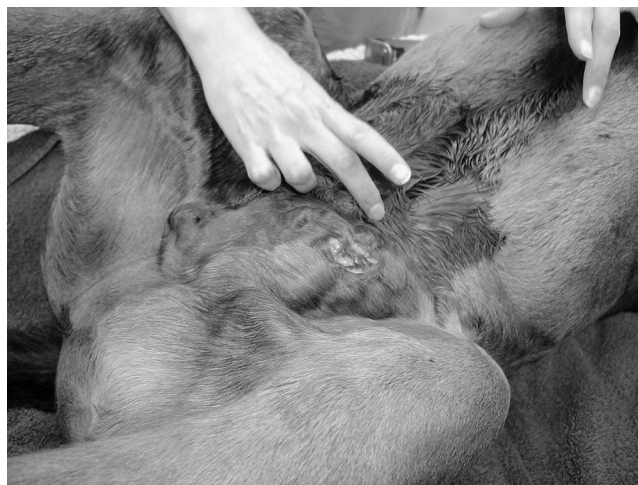


Figure 179-2 Direct hernia in a foal with intestine located subcutaneously. Notice the macerated skin commonly found with this condition. (Photo courtesy D.H. Rodgerson.)

closure of the inguinal ring. Perioperative use of broad-spectrum antimicrobials and flunixin is recommended. Indirect hernias can be reduced by gently maneuvering the intestine through the vaginal ring by means of placing gentle traction and a twisting motion on the testicle. Closed castration of the affected side can then be performed with a ligature of the vaginal tunic and spermatic cord. Testicular atrophy may develop if the testicle is not removed.

Direct hernia repair is performed through a similar inguinal approach. Resection of compromised bowel may be performed through the inguinal approach or may necessitate an approach through a ventral midline incision if a resection or bypass procedure such as a jejunocostomy or jejunoileostomy is required. A combination of external traction and pulsion may be required, especially in foals in which the mesentery is more delicate and less amenable to manipulation. Enlargement of the rent or tear by digital manipulation or incision may be required to facilitate reduction of incarcerated intestine. The testicle on the affected side is usually compromised enough so that unilateral castration is necessary. Ligature of the spermatic cord and the vaginal tunic is performed as proximally as possible, ideally including the defect in the vaginal tunic. The structures are then transected distal to the ligatures. Closure of the external inguinal ring is performed with direct suture apposition in a continuous or interrupted pattern with an absorbable suture. Repair with a polypropylene mesh has been reported in a foal that had a hernia too large to be repaired by apposition with sutures. The more commonly reported complications include failure of repair, recurrence secondary to compromised tissue in the inguinal area, swelling, and drainage. Postoperative ileus, delayed necrosis of affected intestinal segments, and adhesions can also develop in foals with more complicated cases of inguinal hernia. Adhesions can develop at the inguinal ring, and inadvertent suturing of the bowel during repair of the inguinal ring has also been reported. Survival rates have been reported at 50% to 76%.

Testicle-sparing techniques with open or laparoscopic methods have also been described. Manual reduction of the entrapped bowel or reduction of the entrapped intestine with an atraumatic grasping instrument can also be performed. Positioning the foal in Trendelenburg position may facilitate reduction. Laparoscopic repair with stapling techniques, peritoneal flaps, barbed suture, intracorporeal suture

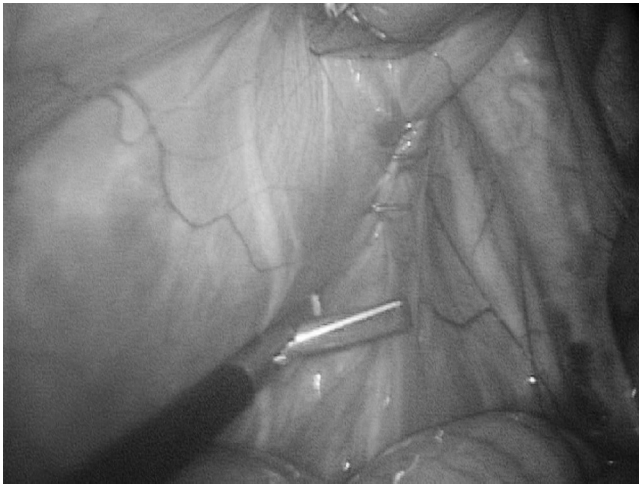


Figure 179-3 Laparoscopic view of stapled closure of inguinal hernia. (Photo courtesy D.H. Rodgerson.)

techniques, or mesh herniorrhaphy can be performed. Although laparoscopic repair is reported to have fewer post-operative complications than conventional techniques, a higher degree of technical skill is required, and surgical times may be long because of the complexity of instrumentation and the repair technique. Survival rates among foals undergoing laparoscopic techniques have been reported as higher than in those that underwent open techniques, although case selection may influence results.

In foals with large inguinal rings, such as those of Standardbred or draft breeds, inguinal ring hernia can be prevented by laparoscopic use of a stapling device¹ to decrease the size of the internal inguinal ring ([Figure 179-3](#)).
