

Clinical tips: Calf hernia repair

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Abstract

This lecture will cover clinical tips for improving hernia surgery success in calves, from diagnosis to surgery. Proper surgical technique, including anesthesia, suture pattern, and suture material selection will be covered. The goal is for the clinician to be able to perform these surgeries with maximum success and minimal difficulty.

Key words: bovine, calf, hernia, surgery, calf

Key Clinical Diagnostic Points

A complete clinical picture including history and physical exam can help the clinician determine if the calf is a good candidate for surgery. History helps to determine cause of the hernia, as umbilical hernias are generally either congenital or secondary to umbilical infection. The physical examination is extremely important, as it is used to determine if the swelling is a hernia, the size of the hernia, and if the hernia is reducible. Some hernias, such as Richter's hernias, may not be reducible. In young calves, deep palpation may allow the clinician to determine involvement of other umbilical structures. Ultrasound is useful as an ancillary diagnostic tool, allowing the clinician to determine the contents of the hernia, as well as to assess the abdomen for additional pathology, such as infected umbilical structures.

Ultrasound

Ultrasound allows evaluation of the contents of the hernia sac. These may include abdominal fluid, parts of the omentum (epiplocele), parts of the abomasum (abomasocele), loops of small intestine (enterocele), or various combinations of the aforementioned items. Peritoneal fluid is completely anechoic, while the abomasum is characterized by floating hyperechogenic folds that protrude into its lumen, which is filled with mixed-echogenicity contents that may swirl. Loops of small intestine can be identified by visualizing their peristalsis, and omentum appears ultrasonographically as bright white fatty tissue.⁵

To assess the rest of the abdomen for abnormalities of the umbilical structures, the scan starts at the navel and goes cranially toward the liver (right paracostal region) to evaluate the umbilical vein. Following evaluation of the umbilical vein, move back to the umbilicus and follow the urachus and umbilical arteries caudally to the bladder. It may be difficult to visualize these structures as they leave the umbilicus. It

is important to visualize the bladder, as umbilical remnants may increase in size near the cranial pole of the bladder. A 3.5 MHz curvilinear probe is recommended, however a rectal probe may be appropriate in small calves.⁵

Mean diameter (mm) of umbilical structures in clinically normal calves over time from birth

Location	24 hours	1 wk	2 wk	3 wk
Umbilical stalk	24.67 ± 3.57	20.22 ± 3.99	16.78 ± 3.83	14.44 ± 3.78
Vein within stalk	9.61 ± 4.41	2.61 ± 1.78	1.0 ± 1.52	n/a
Vein near stalk	17.67 ± 6.04	10.33 ± 5.05	7.89 ± 4.70	5.33 ± 4.56
Vein at midpoint	11.22 ± 3.60	7.56 ± 2.24	4.44 ± 3.40	1.22 ± 2.44
Vein near liver	10.44 ± 4.50	6.11 ± 3.86	2.78 ± 4.24	1.33 ± 2.83
Arteries	10.33 ± 1.80	8.94 ± 2.11	8.39 ± 1.92	6.82 ± 1.03

from Watson, et al⁶

Initial Treatment

Medical management may be attempted in small hernias (0.8 to 2 inches; 2 to 5cm) prior to surgical fixation. This requires placement of an abdominal support bandage that should be checked at minimum every 2 weeks. These generally heal by 3 months if this method is successful.³ Prior to surgery, feed should be withheld from calves on feed/forage for 24 hours.

Surgical Technique

Anesthesia

For field procedures, sedation with a high-volume caudal epidural or local infiltration of lidocaine is recommended. Nasotracheal intubation is possible in these cases to provide protection for the airway. The author's preference is sedation +/- high-volume caudal epidural.

The author's preferred sedative combinations are xylazine/butorphanol/ketamine given intramuscular at 0.02-0.09mg/lb (0.05-0.2mg/kg) xylazine, 0.01-0.02mg/lb (0.025-0.05mg/kg) butorphanol, 0.09-0.9mg/lb (0.2-2mg/kg) ketamine.

A high-volume caudal epidural can be easily performed using 2% lidocaine at 0.07 to 0.18 mL/lb (0.15 to 0.4 mL/kg) administered as caudal epidural (cattle < 660 lb; (300 kg).⁴

Adding xylazine at 0.02 mg/lb (0.05 mg/kg) will extend the duration of the epidural. If this is done, intramuscular doses of xylazine must be reduced accordingly. Alternatively, a lumbosacral epidural may be performed, using 1 mL lidocaine/4.5 lb (10 kg) body weight.

Surgical Approach

The general surgical approach is the same for hernias and umbilical remnants. The author always performs open herniorrhaphy. Any wounds should be sutured closed prior to incision and final surgical preparation. In bulls or steers, the prepuce should also be sutured closed with a purse string that will be removed at the end of surgery. In heifers, an elliptical incision is made around the umbilical mass, taking care to leave enough skin for closure with as little tension as possible. The subcutaneous tissue is dissected around the umbilical mass, taking care not to penetrate the hernia sac. The white external sheath of the rectus abdominis muscle will be exposed. A small body wall incision (large enough for 1 finger to be inserted in to the abdomen) is made just lateral to the mass, on the left side. This allows the surgeon to palpate for umbilical remnants and release any fibrinous adhesions that may be present. This body wall incision is then continued as an elliptical incision around the hernia ring. The rectus sheath is closed with polyglactin 910 (Vicryl) or polydioxanone (PDS) in size #0-2 depending on the size of the animal.¹ If there is tension preventing easy closure, 1 to 3 near-far-far-near tension sutures are placed at equal distances along the body wall incision. The remainder of the incision is closed using a cruciate or simple continuous pattern. The subcutaneous tissue is closed in a simple continuous pattern using absorbable, monofilament suture such as poliglecaprone 25 (Monocryl), taking care to eliminate dead space to prevent seroma formation. The skin is closed using 0.4-0.6 mm polymerized caprolactam (Vetafil) in a Ford interlocking pattern.¹ Sutures can be removed 10 to 14 days post-operatively. An alternative closure is the modified subcuticular pattern utilizing 2-0 or 0 PDS on a cutting needle. This closes the subcutaneous layer and dermis as one, and eliminates the need for suture removal.²

Bull and steer calves present a logistical challenge due to the presence of the preputial orifice. Elliptical skin incisions can be used only in masses less than 1.2 inches (3 cm) in diameter. The elliptical skin incision is only useful when the umbilical mass is less than 1.2 inches (3 cm) in diameter. In the majority of cases, the incision will need to be extended

caudally, lateral to the prepuce. This allows the prepuce to be reflected to 1 side to avoid inadvertent penetration. This approach allows access to the caudal abdomen, including the bladder. Closure is performed as in the female, however there may be more dead space due to reflection of the prepuce.¹

Post-Operative Care

Antimicrobial therapy should be based on initial diagnosis combined with surgical findings. For simple hernia repairs, a single dose of perioperative antimicrobials is appropriate. The author routinely gives a dose of flunixin meglumine as well at 1 mg/lb (2.2 mg/kg) IV.

An abdominal support bandage or stent bandage is recommended to reduce incisional contamination in the immediate post-op period. Additionally, animals on forage should be gradually re-introduced over 3 to 5 days or longer, to prevent excessive rumen fill and pressure on the incision.

Complications

Common complications include swelling, seroma/hematoma, incisional abscess, and re-herniation. Although many calves will experience minor complications such as swelling of the incision site, rate of re-herniation is low.⁷ In these animals, referral or culling is recommended.

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