

Splenectomy in cattle via transthoracic approach

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SUMMARY

Sixty-eight cattle under general anesthesia were splenectomized. The transthoracic approach was used to provide better access to the spleen and to facilitate ligation of the major splenic vessels. The procedure was easier and less time-consuming, compared with other surgical approaches, and is considered to be less stressful to the animals. Postoperative recovery was complete in 67 of 68 cattle. After surgery, 1 animal developed respiratory tract disease that was thought to have been unrelated to the surgery.

In cattle, splenectomy is usually done for the purpose of preparing animals for research studies involving hemoparasitic diseases, such as anaplasmosis and piroplasmosis. Occasionally, other clinical indications are encountered, such as traumatic injury to the spleen or adhesion of the spleen to other organs, such as the abomasum.

Several methods and surgical approaches have been described.^{1,2} The transthoracic approach offers the advantage of good surgical exposure, allowing the surgery to be performed quickly and safely, with little stress to the animal. Use of general anesthesia with positive-pressure ventilation is necessary for this approach.

Materials and Methods

Cattle—Sixty eight healthy, mixed-breed cattle, weighing between 200 and 500 kg were included in the study, which encompassed an approximate 4-year period beginning in January 1985. Each animal was given a complete physical examination, after which PCV and plasma protein determinations were done to ensure suitability of the animal for general anesthesia and surgery. In all instances, feed and water were withheld for 24 to 48 hours prior to surgery to facilitate anesthesia and surgical manipulation.

Anatomic features of the spleen of cattle—In cattle, the spleen is shaped like an elongated oval and is flat and of uniform width. It is found attached to the left dorsocranial surface of the rumen. Most of its visceral surface is firmly attached to the rumen without interposition of peritoneum. Its parietal surface lies against the diaphragm, to which a small dorsal area is attached; thus, the spleen is firmly fixed in position. It extends from the dorsal end

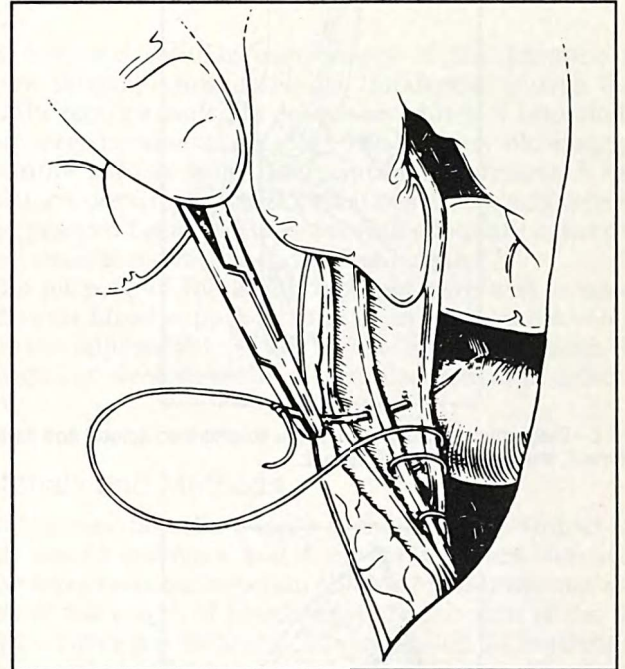


Figure 1—Suture of the cranial edge of the incision in the diaphragm to the cranial edge of the parietal pleura and periosteum.

of the last 2 ribs to the costochondral junction of the seventh and eighth ribs. The hilus of the spleen containing the splenic artery and vein is located on the visceral surface close to the dorsal end of the cranial border.³

Surgical procedure—General anesthesia was induced by IV administration of a combination of 5% glyceryl guaicolate and 0.2% thiamylal sodium given to effect. The animal was positioned in right lateral recumbency. After intubation by use of a cuffed endotracheal tube, anesthesia was maintained with fluothane.

The operative site was prepared for surgery, and a longitudinal incision was made over the center of the eleventh rib. The incision extended from the center of the axial muscles dorsally to the costochondral junction ventrally. Skin, fascia, muscles, and periosteum were incised. Care was taken to stay in the midline of the rib.

The periosteum was elevated and stripped free from the rib. Obstetrical wire was used to cut the rib as far dorsally as possible. The rib then was removed by manually breaking the costochondral junction. The periosteum from the medial side of the rib and parietal pleura was incised, and the thoracic cavity was entered. The diaphragm was incised, exposing the spleen. The cranial edge of the incision in the diaphragm was sutured or clamped to the cranial edge of the parietal pleura and periosteum (Fig

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Figure 2—Diagrammatic illustration of the exteriorized spleen and its firm attachment, the gastrosplenic ligament.



Figure 3—Diagrammatic illustration of the method for clamping and ligating the splenic vessels.

1). This step served to seal off the cranial portion of the thoracic cavity.

The ventral tip of the spleen was exteriorized through the incision, exposing the gastrosplenic ligament, which

firmly attaches the visceral surface of the spleen to the rumen (Fig 2). A second firmer attachment is the phrenicosplenic ligament extending from the parietal surface of the spleen to the diaphragm. Use of rib retractors aided in exposing the spleen. Once scissors were used to start the dissection, blunt dissection was used to manually break the attachments that cover approximately half the visceral surface of the spleen.

The hilus of the spleen was located, and the splenic artery and vein were isolated by use of manual dissection. The vessels were clamped, ligated with No. 3 gut (Fig 3), then cut, allowing the spleen to be removed.

Closure was accomplished by suturing the cranial and caudal edges of the medial part of the periosteum and the diaphragm in a single layer. Care was taken to reestablish negative pressure within the thorax. Caution was exercised in suturing the caudal edge of the periosteum so as not to perforate the intercostal vessels.

Results

Using the transthoracic approach, splenectomy was successfully accomplished in 68 cattle. This approach was used to provide better access to the spleen, particularly, the splenic artery and vein, which must be ligated to prevent excess blood loss. General anesthesia with positive-pressure ventilation was necessary.

Each surgical procedure required approximately 1 hour for a team of 2 surgeons and 1 anesthetist, with some supplemental assistance in handling the cattle. Stress to the cattle was considered to be minimal. Postoperative recovery was uncomplicated in 67 cattle; 1 animal developed respiratory tract infection during the postsurgical period.

Discussion

In cattle, the transthoracic approach to splenectomy offers the surgeon ready access to the spleen and enables easy ligation of the major splenic vessels in secure fashion.

This approach requires a somewhat larger surgical team because general anesthesia with positive-pressure ventilation is necessary. Technically, it is possible to enter the thorax of the cattle without supportive ventilation, but it causes 1 lung to partially collapse. Although not immediately fatal, this complication causes greater stress to the animal and a longer recovery period.

Other approaches to splenectomy in cattle have been described, including left flank, left paracostal, and ventral midline sites, but none of these offers the ready access to the spleen and its major vessels that is provided by the transthoracic approach. Postoperative losses are usually greater, most commonly from failure to secure adequate ligation of the splenic vessels.

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