

# Technical Notes

## Surgical establishment of esophageal fistulae in suckling calves

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### Abstract

Esophageal fistulae were established in five 34-day-old suckling calves by a modified surgical procedure used previously for sheep and goats. After skin incision, the esophagus was exposed by separating the brachiocephalicus and sternocephalicus muscles. A cannula was inserted into the esophagus after a longitudinal incision was made into the lumen of the esophagus. Sutures were not used in the esophagus. The calves recovered quickly with moderate post-operative swelling. We concluded that the surgical procedure was satisfactory and that diets were collected readily and without fistulae shrinkage.

**Key Words:** beef cattle, pasture, rangeland, cattle diets

Esophageally fistulated animals have been utilized extensively to obtain a sample of the grazing ruminant's diet (Lesperance et al. 1974, Cohen 1979, Samuel and Howard 1982, Hart et al. 1983). Several authors have described surgical techniques for establishing esophageal fistulae in mature ruminants (Van Dyne and Torell 1964, Bishop and Forseth 1970, Little and Tokken 1970, Pfister et al. 1990). Only limited information concerning diets of suckling calves has been published (Horn et al. 1979, Peischel 1980, Ansotegui 1986) and procedures for establishing esophageal fistulae in the suckling calf have not been published. Our objective was to test the suitability of a simplified method for establishing esophageal fistulae in sheep and goats (Pfister et al. 1990) for young suckling calves.

### Materials and Methods

Esophageal-fistulae were established in 5 suckling beef calves (average age = 34 days; average body weight = 65 kg) with modification of the procedure described by Pfister et al. (1990) for sheep and goats. Calves were separated from their dam 12 hours before surgery. Each calf was given a .1 ml intramuscular injection of xylazine (Rompun<sup>1</sup>). The calf was placed in right lateral recumbency on a surgical table and hair was closely clipped with a number 40 clipper from the left lateral neck region caudal to the jaw to the cranial shoulder region and from the top of the neck to just across the midline ventrally. The surgical area was scrubbed with soap and with betadine surgical scrub<sup>2</sup>; then the surgical area was rinsed with a 70% alcohol solution. The surgical site (the junction between the brachiocephalicus and sternocephalicus muscles and 30 to 40 mm posterior to the midpoint between the jaw and shoulder) was anesthetized using 20 ml of a 2.5% (volume  $\times$  volume) procaine solution. The local anesthetic was injected sub-

cutaneously and into underlying muscles dorsal and cranial to the incision site in an inverted L shape. A 9.5 mm diameter tygon tubing was passed down the esophagus to the point of just caudal to the proposed incision site. A 60 mm longitudinal skin incision was made overlying the brachiocephalicus and sternocephalicus muscles. The brachiocephalicus and sternocephalicus muscles were separated by blunt dissection, and the aid of the intraluminally placed tygon tubing, the esophagus was located and exposed. A 60 mm longitudinal incision was made into the lumen of the esophagus. The incised edges of the mucous membrane of the esophagus were grasped with Allis forceps to avoid slippage of the mucous membrane away from the incision site. The tygon tube was then removed. A convex 89 mm  $\times$  25.4 mm polyethylene coated aluminum cannula<sup>3</sup> with a 65-mm threaded shank measuring 6.35 mm in diameter was inserted into the lumen of the esophagus. A stopper or plug was fabricated by gluing the small end of a #7 rubber stopper to the large end of a #6 stopper. The 2 stoppers were wrapped with black electricians tape and a 6.45 mm hole was bored through the center of the 2 stoppers. Dimensions of the stopper were 38.1 mm and 25.4 mm diameter for the large and small ends respectively and 50.8 mm in length. The shank was put through the stopper and was secured with a wing nut. The esophagus was not sutured. In 3 of the 5 calves, a single suture through the skin was required cranial or caudal in the skin incision to insure a tight fit around the stopper. The incision site was then lavaged with 20 ml of penicillin and dihydrostreptomycin (combiotic<sup>4</sup>) and an intramuscular dose of 10 ml of combiotic was administered.

The procedure required about 20 minutes and calves were able to stand and walk immediately after surgery. The surgical site was observed daily for any signs of infection and skin sutures were removed 12 to 14 days after surgery. Each calf was given 10 ml of combiotic daily for 5 days after surgery. The cannula was first removed and rotated about 4 weeks after surgery. The fistula was fully healed and there was no sign of soreness resulting from the cannula.

A vinyl bag with a 178 mm  $\times$  152 mm mesh bottom with sides and ends measuring 229 mm and 130 mm high, respectively was constructed for collection of esophageal extrusa. The bag was attached with neck and girth straps as described by Kartchner and Adams (1983).

Esophageal extrusa was collected on 15 June (average calf age = 115 days), 26 July, 20 September, and 29 November from the 5 suckling calves on rangeland. Cows with the suckling calves were penned with water but not given access to feed at 1600 h the day before collections were made and collections were made the following morning at 0700 h. The collection periods lasted from 20 to 30 minutes.

### Results and Discussion

The surgical technique for the suckling calves was found to be effective with only moderate post-operative swelling. The milk diets consumed by the calves were ideal for recovery. Post-

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<sup>1</sup>Haver-Vayvet Div. Miles Laboratories, Inc., Shawnee, Kansas 66201.

<sup>2</sup>Schering Corporation, Animal Health Division, Kenilworth, New Jersey 07033.

<sup>3</sup>Cannula manufactured by Precision Machine, 2933 North 36th Street, Lincoln, Nebraska 68504.

<sup>4</sup>Pfizer Inc., New York, New York 10017.

operative difficulties were not observed for suckling, blockage of the esophagus, or milk leakage from the fistula.

Diets could have been collected earlier than 115 days of age; but a severe drought slowed forage growth and collections were delayed. The procedure of penning the cows and calves overnight was particularly effective, as all animals began grazing immediately when turned out for collection. This was a concern because the cows were not accustomed to being handled. No problems with fistulae shrinkage or in replacing esophageal cannulae after a 30-minute collection period were encountered.

We concluded that this esophageal surgical technique was satisfactory for use in suckling calves. The calves required minimal post-operative care and forage collection was done easily without esophageal fistulae shrinkage.

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