



**Cornell University**  
Cornell Center for Animal Resources and Education

**CARE207.01 Preparation and Care of Fistulated Bovine**

The intent of this procedure is to describe procedures to be followed when placing ruminal cannulas and caring for fistulated bovine. This procedure is intended for use by investigators and their staff who have received approval to place ruminal cannulas in research animals. This procedure is approved by the Cornell Institutional Animal Care and Use Committee (IACUC) and the Cornell Center for Animal Resources and Education (CARE). Any exemption must be approved by the IACUC prior to its application.

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**1. Introduction**

This SOP describes the materials and procedures that are used for the preparation and long term care of fistulated bovine. Fistulated bovine are used for research, education, and extension.

**2. Materials**

- Gloves and designated protective clothing.
- Scalpel.
- Rat-tooth forceps.
- Atraumatic tissue forceps.
- Suture needles.
- Chromic gut, size #1 (or other suitable stay suture material).
- Non-absorbable suture, size #2.
- Rumen cannula.
- Hot water bath.
- Animal clippers.
- Antibiotic (e.g. Naxel).
- Analgesia (e.g. Banamine).
- Antiseptic soap or iodine and water.
- 70% ethanol solution.
- 2% Lidocaine.

### 3. Procedures

#### A. Pre-Operative Care

- i) Fast animal for 18 hours prior to surgery.
- ii) Provide ad libitum access to water prior to surgery.
- iii) Administer antibiotic (e.g., Naxcel at 1 mg/kg IM) 24 hours prior to surgery.
- iv) Place cannula in hot water bath for softening and lubrication 1–2 hours prior to insertion.
- v) Administer sedative (e.g., Xylazine at 0.02-0.03 mg/kg IV) prior to surgery if the cow shows signs of nervousness or discomfort.
- vi) Administer analgesia (e.g., Banamine at 2 mg/kg IV) prior to surgery.
- vii) Gently restrain animal in squeeze chute. Perform surgery with the animal standing if possible.
- viii) Identify area where fistula will be located in the dorsal half of the left paralumbar fossa, approximately 4–5 inches ventral to the transverse processes, and centered between the 13th rib and the tuber coxae.
- ix) Shave surgical area and remove hair.
- x) Wash area with antiseptic soap or iodine and water. Scrub area starting at the incision site and work in a spiral motion progressively towards the margins of the shaved area. Repeat this process with a new iodine scrub.
- xi) Remove scrub solution by applying or spraying 70% ethanol solution.
- xii) Administer 100–150 mL of 2% Lidocaine (could be mixed 1:1 with 0.5% Bupivacaine HCl) subcutaneously in a paravertebral or an inverted L pattern.

#### B. Surgical Procedure

- i) Use aseptic technique:
  - (1) Wash hands
  - (2) Wear sterile gloves and designated protective clothing
  - (3) Do not touch non-sterile surfaces or objects
- ii) Confirm that the level of anesthesia is adequate.
- iii) Use sterile scalpel to make either a 6-inch linear incision (for a 4-inch internal-diameter cannula) or a circular incision through the skin that is 0.5 inch smaller in diameter than the inside diameter of the cannula. Incision should start 4 inches ventral to the transverse processes.
- iv) Use primarily blunt dissection technique to penetrate internal abdominal muscle layers.
- v) Grasp peritoneum with rat-tooth forceps, tent and incise.
- vi) Apply atraumatic tissue forceps to the rumen wall.
- vii) Exteriorize rumen and secure to the dermis in 4–5 points with stay sutures (e.g., size #1 chromic gut), taking special care not to penetrate the lumen of the rumen.
- viii) Incise the exposed rumen and suture to skin with size #2 non-absorbable suture.
- ix) Remove 4–5 stay sutures.
- x) Remove cannula from water bath and insert through the fistula.

- xi) Move animal to recovery pen.
- xii) Document details of procedure in animal's medical records.

### C. Post-Operative Care

- i) Separate the animal from the group and maintain under close observation for several hours after surgery.
- ii) Allow access to some hay to stimulate rumen function.
- iii) Monitor for infection and clean surgical site and outer rim of the cannula daily for 7 days with antiseptic solution.
- iv) Administer antibiotic (e.g., Naxcel at 1 mg/kg IM) once a day for 7 days after surgery.
- v) Administer analgesia (e.g., Banamine at 1 mg/kg IV 1–2 times a day) for 2 days after surgery.
- vi) Monitor feed intake and body temperature at least once a day for 1 week.
- vii) Remove cannula 10 to 14 days after surgery, eliminate any necrotic tissue around the surgery site, and remove sutures. Replace cannula.
- viii) Document post-operative activities in animal's medical records.

### D. Long-Term Care

- i) Observe presence and fitting of cannula daily. If a cannula accidentally comes out, reinsert immediately to reduce the risk of dehydration. If excessive leakage were to occur, clean with warm water, a mild detergent, and a soft scrub brush.
- ii) Examine cannula and fistula at least monthly; more often examination is required when the animal is actively used or during fly season. This examination should include an assessment of the integrity of the cannula and of the health of the surrounding skin.
- iii) Remove cannula at least once a year. Take this opportunity to visually examine the internal surface of the rumen. Rinse cannula and scrub clean in warm water before reinsertion; if a detergent were used to clean the cannula, make sure that it is completely rinsed off before cannula is reinserted. Replace cannula if it has lost its flexibility or it is cracked. Document this activity in the animal's record.

## 4. Safety-NA

## 5. Contingencies

Spare cannulas and cannula plugs should be available at all times, in the event that a plug is lost or the cannula/plug is found to be cracked or hardened.

## 6. References

- A. Fubini, S.L. and Ducharme, N.G., Eds. (2004): Farm Animal Surgery. Philadelphia, Pennsylvania: WB Saunders.
- B. Laflin, S.L., Gnad, D.P., Walz, P.H. (2004): Rumen Cannulation and Utilization of a Donor Animal. The Bovine Practitioner 38 (1) 54-58.

C. Guidelines for Long-Term Care and Maintenance of Animals with Permanent Rumen Fistulas at the Pennsylvania State University, <http://www.research.psu.edu/orp/areas/animals/policies/guide12.asp> (Revised 10/11/04).

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