RUMENOTOMY AND RUMENOSTOMY: INDICATIONS AND OUTCOMES
Andrew Niehaus, DVM, MS, DACVS
The Ohio State University, Columbus, OH

Key Points
- Rumen surgery in cattle can be indicated in cases of traumatic reticuloperitonitis, severe bloat, or grain overload.
- If properly performed, surgery on the bovine rumen is a safe procedure and associated with minimal complications.

The rumen in the adult comprises approximately 80% of the abdominal cavity with a capacity around 80 L (roughly 16% of body weight). Some sources report capacities varying from 102-148 liters for mature cattle. It lies primarily on the left side of the abdomen and its length extends from the 7th or 8th rib to the pelvis. The rumen is typically described as a “fermentation vat,” where microbes convert complex carbohydrates into useful products.

Indications
The apposition of the rumen against left body wall makes it an easy portal though which to access proximal GI structures including the reticulum, the reticulo-omasal orifice, and the rumen itself. Indications for surgery on the rumen include traumatic reticuloperitonitis (hardware disease), ruminal and reticular foreign bodies, frothy bloat, vagal indigestion, grain overload, toxin ingestion, chronic reoccurring bloat, and creation of a permanent rumen fistula making surgery on the rumen a common surgical procedure in cattle. Exploratory rumenotomy can be performed to retrieve ingested foreign bodies. Using the rumen as access, the reticulum can be explored and foreign bodies penetrating the wall of the reticulum causing traumatic reticuloperitonitis can be removed. Perireticular abscesses that develop secondary to penetrating reticular foreign bodies can be surgically drained into the reticulum via a rumenotomy. Other indications for performing a rumenotomy include removal of rumen contents in cases of acute toxin ingestion, grain overload, or frothy bloat. A rumenostomy can be a therapeutic option for an animal with chronic bloat, used to provide enteric nutrition, or used to place a rumen canula.

According to a medical record query on cows undergoing rumen surgery at The Ohio State University Veterinary Medical Center from 1999-2011, rumenotomy (RT) was performed in 27 cases, and rumenostomies (RS) were performed 33 cases. For purposes of this discussion, a RT was defined as a surgery where the rumen was opened and closed during the same surgical procedure. A RS was defined as a procedure where the rumen was opened, and a stoma between the rumen and the skin was present at the conclusion of the surgical procedure. No inferences are made on how long the stoma between the skin and rumen was allowed to remain in place. RT was performed in 20 cases diagnosed with traumatic reticuloperitonitis, 4 cases of foreign body ingestion (without traumatic reticuloperitonitis), and 3 cases of bloat (free gas or frothy). RS was performed in 12 cases diagnosed with bloat (free gas or frothy), 1 case of choke, 1 case of omasal impaction, 1 case of rumen acidosis due to grain overload, 1 case to provide enteric nutrition, and 17 elective rumen canula placements.

Techniques
Multiple techniques have been described for performing laprorumenotomy in cattle. All techniques involve making an approach in the left paralumbar fossa to gain access to the rumen,
exteriorization of the rumen, securing the rumen, and limiting contamination. Different devices and techniques have been developed or employed to expedite the procedure or help to limit abdominal contamination.

At best, rumen surgery is considered a clean contaminated surgery since a hollow viscus is penetrated. Antibiotics are recommended in any surgery that is considered less than clean. Haven et al. showed that prophylactic use of penicillin significantly decreased the incidence of abscess formation following rumenotomy. He also demonstrated that an initial antibiotic dose at the time of surgery was all that was necessary, and continuing the therapy for several post operative days had no significant decrease on the incidence of abscess and infection rate.

**Outcomes**

Despite the frequency with which rumen surgery is performed, few studies have been published that report long term (> 1 year follow-up) information on how these animals perform following rumen surgery. The medical records at The Ohio State Veterinary Medical Center between 1999 and 2005 were analyzed to determine how these cattle functioned and produced following surgery, to determine if there were any preoperative factors (clinical signs, radiographic findings, laboratory values, etc.) that were correlated with outcome, and to determine if there were variances in operative techniques (including surgical technique, and medical therapy) that were correlated with outcome.

Rumenotomy (RT) was performed on 66% (19/29) of the animals studied. The remaining 34% (10/29) underwent rumenostomy (RS) four of which had a rumen canula placed (RSC). One cow underwent RT surgery first and is included with the RT group but later had a RS performed due to reoccurring bloat. Sixteen Holsteins were studied (14 RT and 2 RS). Twenty-two dairy cows (17 RT and 5 RS) and seven beef cows (2 RT and 5 RS) were included in the study. Twenty-four different herds were represented in the study, one herd had three animals represented (all RT) and three other herds had two animals each represented in the study. The age at the time of surgery varied from a minimum of 6 hours to 9.58 years with a mean of 4.2 ± 2.0 years for the RT animals. The age at the time of surgery for the RS animals varied from a minimum of 15 days to a maximum of 4.3 years with a mean of 1.8 ± 1.5 years. The overall mean age at surgery was 3.4 ± 2.2 years.

Surgical infection was noted in 3 cases following surgery prior to discharge. These were the only immediate post operative surgical complication noted in the medical record. Two of these cases experienced dehiscence of the surgical wound and potential abdominal contamination.

Five animals (1 RT and 4 RS) died before release or re-presented to the OSU-VTH shortly (<60 days) following the surgical procedure and died. Post mortem examinations were performed on all five animals.

Long term follow-up (>60 days) information was obtained on 25/29 (86%) of the animals. Follow-up information was not obtainable on four animals. Time to follow-up varied from 4 months to 6 years after surgery. Nine animals (5 RT and 4 RS) were still present and productive in the same herd as they were when they originally underwent rumen surgery. Eight animals (7 RT and 1 RS) had been culled from the original herd by the time of follow-up. Eight animals (3 RT and 5 RS) were dead. However, only one of them died from complications related to the surgery itself. This animal had an elective rumen canula placed and developed an abscess at the surgery site within 1 week following. The surgical attachment of the rumen to the body wall eventually dehisced and allowed for abdominal contamination resulting in peritonitis and
death. There was no indication that a technique error or variance in technique contributed to this dehiscence. However, four (50%) died from the original cause for which the surgery was performed (hardware disease and rumen acidosis). Although serious fatal complications can occur, the current disease condition that preceded surgery had a greater influence in causing death than did the rumen surgery itself.

There was only 1 animal that was not placed on systemic antibiotics. This cow was one of three that developed an infection at the surgical site within a week after performing surgery. This is consistent with the previous study which showed that cattle not receiving prophylactic antibiotics had an increased incidence of abscesses at the canula site than those receiving antibiotics. The abscess in this cow resolved by abscess drainage followed by topical lavage, and the cow has had no further problems related to the cannulation.

The surgical procedure appeared to be successful in terms of appetite, maintenance of body condition, and returned to breeding. The clients were questioned wether the animals had a normal appetite following return home. Sixteen clients responded to the question, and thirteen (81%) reported that their animal had a normal appetite following return home. Fourteen clients commented on the maintenance of body condition following return home. Eleven (79%) indicated that the animals maintained normal body condition following return home. Eight of twelve responses (67%) indicated that the animals returned to breeding and bred back in a timely fashion.

Clients were overall pleased with the handling and the outcome of the cases. Clients were asked to rank their satisfaction on a scale of 1 to 5, where 5 indicated complete satisfaction and 1 indicated complete dissatisfaction. Five RT clients responded with a 5, and two clients responded with a 4. Five RS clients responded with a 5 and one RS client ranked their satisfaction with a 2.