

Rumenotomy: Why, When and How to Perform Emergency Forestomach Surgery

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Abstract

In large animal veterinary medicine, the indiscriminate ingestive habits of cattle, buffaloes, sheep and goats present a frequent clinical challenge. Free-range grazing, urban scavenging and nutritional or mineral deficiencies often lead livestock to swallow indigestible debris. A rumenotomy is a surgical procedure involving a controlled incision into the rumen. This procedure is a cornerstone of ruminant medicine, serving as both a definitive therapeutic intervention and an invaluable diagnostic window. Veterinarians use it to manage complex gastrointestinal disorders in cattle and small ruminants, from life-threatening toxicities to mechanical obstructions. For veterinary students and producers alike, the goal is clear: timely intervention to resolve distension, remove pathological contents and restore the delicate microbial balance of the forestomachs. Rumenotomy provides an essential life-saving intervention when the ingested foreign bodies cause gastrointestinal obstruction or puncture internal organs

Why Perform a Rumenotomy?

A rumenotomy is indicated across a wide spectrum of acute and chronic forestomach disorders where conservative medical management fails.

- Traumatic reticuloperitonitis (TRP / Hardware Disease): Ingestion of sharp metallic foreign bodies (such as baling wire, nails and needles) leads to perforation of the reticular wall. This causes acute peri-reticular inflammation, local or diffuse peritonitis, adhesions and potentially fatal complications like traumatic pericarditis or vagal indigestion.
- Non-metallic foreign body impaction: Accumulation of indigestible, non-metallic debris primarily plastic shopping bags, synthetic ropes and clothing fragments, may form dense, heavy concretions weighing anywhere from 2.5 kg up to 14 kg. These masses settle in the ventral reticulorumen, causing chronic ruminal distension, atony, muscle fatigue and recurrent bloat.

- Severe ruminal acidosis & grain overload: Sudden ingestion of massive quantities of rapidly fermentable carbohydrates (e.g., overfeeding of rice, grain, rotten apples or food leftovers) causes ruminal pH to plummet below 5.0. This shift destroys ruminal protozoa, promotes toxic lactic acid accumulation and triggers severe chemical rumenitis and systemic dehydration, requiring rapid surgical evacuation and lavage.
- Acute bloat & recurrent tympany: Severe free gas or frothy bloat that cannot be relieved using an orogastric stomach tube or anti-foaming agents poses an immediate threat of asphyxiation due to pressure on the diaphragm.
- Ingested toxins & rumen transfaunation: Rapid removal of toxic plants or spoiled ingesta, as well as providing direct access for enteral nutrition and microflora transfaunation in cases of severe dysbiosis.

When to Perform a Rumenotomy?

Determining the exact timing for surgical

intervention is critical to patient survival:

- Diagnostic Imaging: Survey lateral reticular radiography may confirm radiopaque metallic foreign bodies. B-mode ultrasonography complements radiography by visualizing non-metallic foreign bodies (showing mixed echogenicity and strong distal acoustic shadowing), reticular dysmotility, wall thickening and localized peri-reticular abscesses.
- Severe bloat and acute grain engorgement are classified as high-priority surgical emergencies capable of causing death within 3 to 4 hours due to cardiovascular collapse and respiratory failure.
- When orogastric intubation, fluid therapy or anti-foaming agents (such as liquid paraffin or poloxalene) fail to reduce severe abdominal distension, emergency surgery must be scheduled immediately.

Key Diagnostic Biomarkers include:

1. Serum Lactate: Elevated serum lactate levels (>4.0 mmol/L) serve as a critical early indicator of tissue hypoperfusion, systemic stress and anaerobic cellular metabolism prior to severe electrolyte depletion.
2. Inflammatory leukogram & fibrinogen: Marked neutrophilic leukocytosis, elevated total serum protein and plasma fibrinogen levels exceeding 600 mg/dL indicate active reticular perforation, peritonitis and severe tissue trauma.
3. Rumen fluid analysis: A ruminal fluid pH below 5.0 with complete absence of live protozoal motility under microscopy confirms severe lactic acidosis or dysbiosis requiring surgical evacuation.

Surgical Technique

A standard rumenotomy is a clean contaminated procedure performed on the standing animal

1. Anaesthesia and site preparation- Local analgesia of the left paralumbar fossa is achieved via a proximal or distal paravertebral nerve block (targeting T13, L1 and L2 with 2% lignocaine

hydrochloride) or an inverted 'L' or inverted 'T' field block. The left flank is clipped and scrubbed antiseptically.

2. Incision and rumen fixation- A vertical skin incision (15 to 40 cm long) is made centrally in the left paralumbar fossa below the lumbar transverse processes. The abdominal oblique muscles (External oblique abdominis followed by internal oblique abdominis), transverse abdominis muscle and peritoneum are incised. To prevent ruminal fluid spillage into the peritoneal cavity, the rumen wall is exteriorised and tightly anchored to the skin using stay sutures or a weingarth ring.
3. Exploration & Evacuation- The rumen is incised, allowing manual exploration of the rumen and reticulum. Impacted non-metallic debris, toxic ingesta or metallic foreign bodies are manually extracted or swept out using magnets.
4. Closure- Surgical margins are copiously flushed with sterile isotonic saline. The rumen wall is closed using a double-layer continuous inverting suture pattern (Cushing followed by Lembert suture pattern) with absorbable suture (such as chromic catgut or polyglycolic acid). The abdominal muscles and peritoneum are closed in continuous patterns, followed by skin closure using cross-mattress or ford-interlocking sutures.

Postoperative care & Prognosis

- Patients are maintained on systemic broad-spectrum antibiotics, anti-inflammatory analgesics, fluid therapy and daily wound dressing until full recovery.
- Transferring fresh rumen fluid and fiber cud from a healthy donor animal directly into the forestomach is essential to re-establish normal microbial populations, volatile fatty acid production and ruminal motility.
- Surgical removal of foreign bodies carries an excellent prognosis (77% to 100% complete recovery) when intervention occurs early. Factors like

extensive peri-reticular adhesions, chronic peritonitis, plasma fibrinogen levels >600 mg/dL and a long-term history of feeding finely ground grain diets significantly worsen prognosis.

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