Surgical affection of compound stomach

The stomach of ruminants has four compartments: the rumen, reticulum, omasum and abomasum, as shown in the following diagram.

Collectively, these organs occupy almost 3/4ths of the abdominal cavity, filling virtually all of the left side and extending significantly into the right. The reticulum lies against the diaphragm and is joined to the rumen by a fold of tissue. The rumen, far and away the largest of the forestomaches, is itself sacculated by muscular pillars into what are called the dorsal, ventral, caudodorsal and caudoventral sacs. In many respects, the reticulum can be considered a "cranioventral sac" of the rumen; for example, ingesta flows freely between these two organs. The reticulum is connected to the spherical omasum by a short tunnel. The abomasum is the ruminant's true or glandular stomach. Histologically, it is very similar to the stomach of monogastrics. The interior of the rumen, reticulum and omasum is covered exclusively with stratified squamous epithelium similar to what is observed in the esophagus. Each of these organs has a very distinctive mucosa structure, although within each organ, some regional variation in morphology is observed.

The rumen

The rumen (on the left side of the animal) is the largest stomach compartment and consists of several sacs. It can hold 25 gallons or more of material depending on the size of the cow. Because of its size, the rumen acts as storage or holding vat for feed. Aside from storage, the rumen is also a fermentation vat. The rumen’s environment favors the growth of microbes. These microbes digest or ferment feed within the rumen and make volatile fatty acids (VFAs). The rumen absorbs most of

the VFAs from fermentation. A good blood supply to the rumen walls improves absorption of VFAs and other digestion products. Tiny projections (papillae) line the rumen, which increases the rumen's surface area and the amount it can absorb

Rumen Physiology and Rumination

The rumen is a fermentation vat par excellance, providing an anaerobic environment, constant temperature and pH, and good mixing. Well-masticated substrates are delivered through the esophagus on a regular schedule, and fermentation products are either absorbed in the rumen itself or flow out for further digestion and absorption downstream.

Ruminants evolved to consume and subsist on roughage - grasses and shrubs built predominantly of cellulose. Despite the fact that some ruminants, feedlot steers for example, are feed large quantities of grain, this section will focus on a ruminant's "natural diet".

The reticulum

The reticulum is a pouch-like structure in the forward area of the body, close to the heart. The tissues in the reticulum form a network similar to a honeycomb. A small tissue fold lies between the reticulum

and rumen, but the two aren't separate compartments. Together they're called the rumino-reticulum.

The omasum

The omasum is a globe-shaped structure containing leaves of tissue (like pages in a book). It absorbs water and other substances from digestive contents. Feed material (ingesta) between the leaves will be drier than ingesta found in the other compartments.

The abomasum

The abomasum is the only compartment lined with glands. These glands release hydrochloric acid and digestive enzymes, needed to breakdown feeds. The abomasum is similar to a nonruminant stomach.

Affection of Compound Stomach:

Rumen surgery:

Rumen fistulation (Rumenostomy) : that mean abnormal opening between inside the rumen toward the out. The fistula may be enquired or induced, Chronic recurrent ruminal tympany usually occurs in calves of three to nine months. Condition causes unthriftiness resulting from reduced feed intake. Fistula affords symptomatic relief and is rapidly produced.

Etiology of recurrent tympany

Often caused by inadequate fibre intake and poor rumen development. Occasionally there is obstruction of thoracic esophagus and/or cardia by external pressure by mediastinal lymphadenopathy, which may be sequel to chronic pneumonic pathology. Stomach tube can often be passed without any difficulty, so excluding possibility of mechanical stricture or stenosis.

Signs

Slight but progressive loss of condition associated with more or less permanent overdistension of rumen. Many such calves eventually recover spontaneously. Rumination is usually unaffected.

Treatment

Technique

• paravertebral analgesia (T13, L1, or localinfiltration analgesia. Site is upper left paralumbar fossa, one third of distance from last rib to external angle of ilium

• clip skin over site 10 × 7 cm and disinfect

• pass stomach tube to relieve any tympany

• remove oval section of skin 4 × 2 cm, and split muscularis by blunt dissection (scissors)

• pick up peritoneum with Allis forceps, incise, and grasp

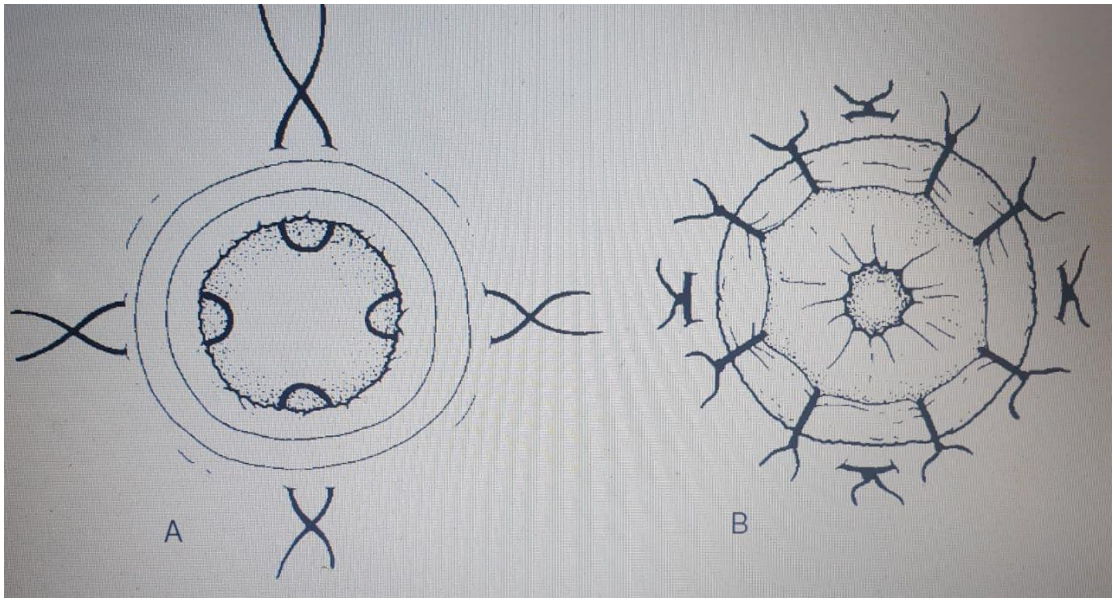
• exteriorise underlying ruminal wall with second Allis forceps

• place sutures (polyamide) between skin and rumen using interrupted horizontal mattress pattern or simple continuous stuture for initial fixation (see Figure A)

Alternatively, a screw trocar (Buff model) may be inserted through flank for several weeks as needed. Problems can occur: lumen blockage, displacement out of rumen, peritonitis

• incise rumen (3 cm) and place four or eight simple sutures to overlap rumen and skin margin (see Figure below)

• if thought necessary, convert slit into oval by removing portion of wall slightly smaller than the previously resected skin

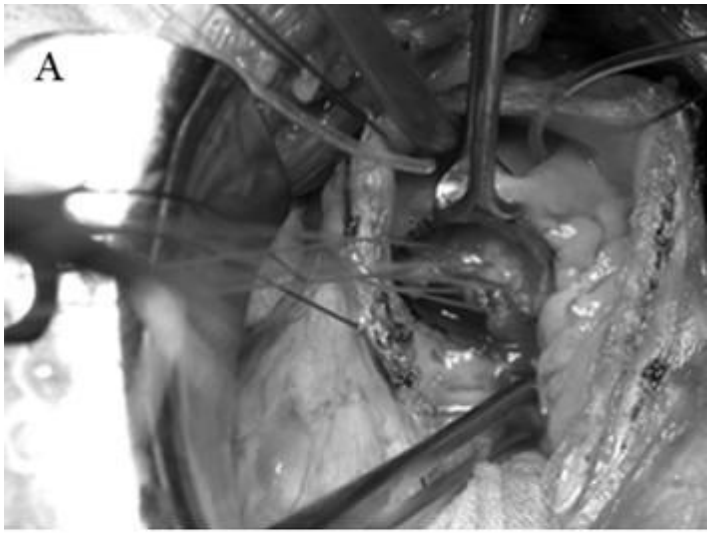


This ruminal incision usually heals in three to five weeks following fibrous tissue proliferation and stricture. A permanent fistula requires a ruminal incision at least 6 cm long.

Rumenotomy

Indications

Rumenotomy is indicated for vagal indigestion, hardware disease, rumen acidosis and some forms of choke. Rumenotomy allows exploration of the rumen, reticulum and parts of the omasum.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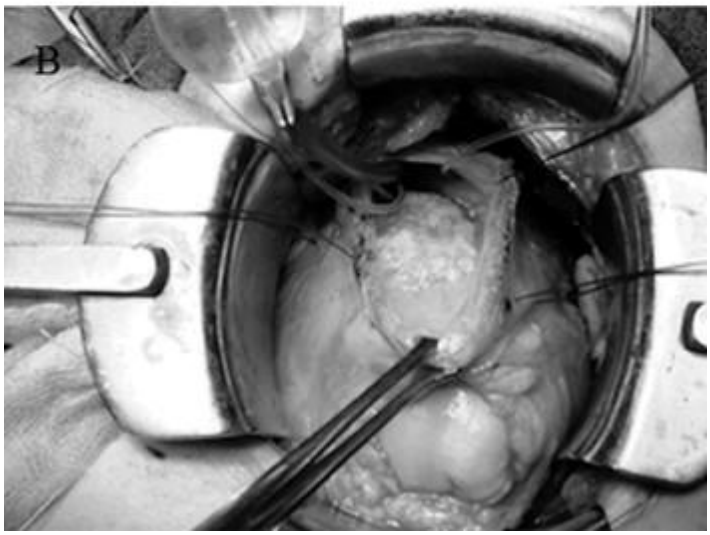
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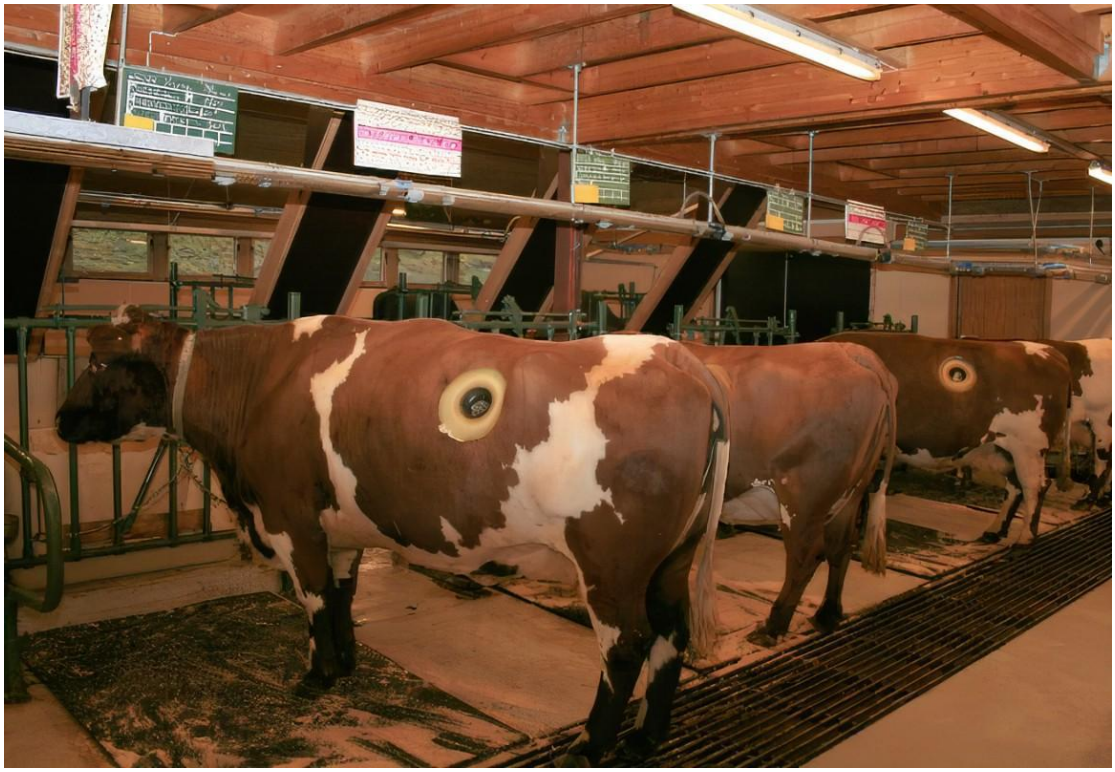

Postoperative care

1. NSAIDs are continued for 2-3 days, antibiotics for 5 days
2. The flank is coated with vaseline and cleaned as needed to minimize scalding from the rumen juices.
3. Nonabsorbable sutures are removed at 10-14 days
4. Without a cannula, the rumenostomy site will gradually shrink and eventually close in most situations. If sized appropriately, the bloat should be resolved by the time it closes.

Complications

1. Peritonitis- animals may have a fever and be off feed. Some cattle can wall off the infection.
2. Incisional infection- part of the suture line may need to be opened to allow drainage.
3. Skin scald – can be treated with cleaning, zinc oxide and vaseline

4. Lack of closure – with constant manipulation from cleaning or continued cannulation, the site will stay open. It can be closed if needed. Closure involves resecting the fistula and should be done by an experienced surgeon.

Diseases need Rumenotomy

Surgical opening of the rumen by making the incision on the wall of rumen is known as rumenotomy. Rumenotomy is a routine procedure for treating many diseases in ruminants.

Indications

1. Exploratory surgery, e.g. in chronic intermittent rumen tympany Persistant ruminal impaction.
2. Frothy Bloat.
3. Foreign bodies lodged in distal esophagus, rumen, and reticulum.
4. Traumatic reticulitis.
5. Atony of omasum and abomasum.
6. Exploratory rumenotomy for diagnosis of intraruminal diseases. other than foreign bodies.
7. Ingestion of toxic plants.