

# Field rumen fistula surgery (indications and procedure)

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## Abstract

Rumen fistulation (bloat surgery) is a valuable procedure to manage chronic bloat in cattle. Case selection and proper pre-operative assessment is imperative as this procedure should be reserved for animals that have chronic recurring free gas bloat and will remain in the production phase for a sufficient period to warrant the invasiveness of the procedure. Not all animals with chronic bloat are ideal candidates for a rumen fistula; however, in those that are, the procedure is relatively simple and quick to perform. Postoperative care includes analgesia and broad-spectrum antimicrobials, and if the animal does not succumb to the underlying condition that may be contributing to chronic bloat, the prognosis for these animals is generally good.

**Key words:** feedlot, rumen fistula, bloat surgery

## Introduction

Ruminal tympany, commonly referred to as bloat, is a common occurrence in feedlot cattle or cattle grazing easily fermentable forages. There are two general types of bloat – frothy and free gas. Free gas bloat can occur secondary to other abnormalities that reduce or inhibit the ability for the animal to eructate. The primary goal of treatment is to allow the gas to be expelled from the rumen either by simply passing a stomach tube to relieve free gas bloat or including administration of an antifoaming product in the case of frothy bloat. In the majority of cases, conservative medical management once, or over the span of a couple days, is sufficient to relieve the bloat and prevent asphyxiation and death of the animal until the condition resolves. However, in cases of recurrent free gas bloat, or following an emergency trocarization, a rumen fistula may be warranted. The purpose of rumen fistulation is to release gas without the need for eructation to allow the animal to recover from the underlying cause of recurrent bloat. Eventually the fistula will close, after a period of weeks to months depending on the original size of the fistula, and the animal can finish the rest of the production phase with minimal follow-up required.

## Indications, case selection and management

Proper case selection is important to ensure that rumen fistulation is the appropriate course of action for each specific case. One must consider the history of the animal, the current condition of the animal, any known or suspected comorbidities, and the end goal for the animal to determine how to manage each case.

When considering the animal's history, which can often be done over the phone or with remote access to individual animal records, there are many factors to weigh. First is the length and regularity of recurrent bloat. An animal that has been bloated and required passage of a stomach tube to relieve the gas every day for over a week would be a candidate for a rumen fistula. Other good candidates for a rumen fistula would be an animal

that has had to have emergency trocarization as a lifesaving procedure. In these cases, the animal may not have had a history of bloat, but performing a rumen fistulation will allow the practitioner to clean up the wound and make a proper connection between the rumen wall and skin to reduce the risk of secondary complications. Rumen fistulation would not be the first option for an animal during its first occurrence of bloat as most of these animals will recover after less invasive management. Other factors to consider would be previous treatment history for other diseases. For example, a common history might be an animal that was treated for respiratory disease a couple weeks after arrival into a feedlot and then a short period of time later started to experience recurrent bloat. This might be evidence that there is potential vagal nerve damage that is leading to vagal indigestion and recurrent bloat. In these cases, it will take the animal time to recover from respiratory disease and a rumen fistula may provide temporary relief during this period. Ultimately, rumen fistulation should be reserved for when all other options have been exhausted and the animal continues to experience episodes of free gas bloat.

In conjunction with assessing the history, one must also consider the type of bloat and condition of the animal. In general, frothy bloats are not good candidates for a rumen fistula. These are better managed by administering an antifoaming product and if possible, removing the animal from the forage or ration that likely contributed to the development of frothy bloat. However, in some instances, such as after an emergency trocarization, it may be warranted to perform a rumen fistulation on a frothy bloat.

For animals with recurrent free gas bloat, a rumen fistula may still not be the best option. Primarily if the animal is fat and nearing slaughter weight, in which case shipping the animal to slaughter may be a better option. Performing a rumen fistulation does not come without consequences. Observationally, there is an initial drop in performance following the procedure. In addition, it takes time for the surgery site to heal before the animal can be slaughtered. Therefore, the value of any additional gain that may be achieved for animals already near slaughter weight may not outweigh the costs, especially in times when cost of gain is high relative to cattle prices (i.e. tight feeding margin).

In addition to the local block administered prior to performing the procedure (detailed in next section), providing analgesia is warranted for bloat surgery cases. In Canada there are many options available for analgesia in the bovine. These include various NSAID formulations of ketoprofen, flunixin meglumine and meloxicam. Oral formulations of meloxicam are generally preferred as they are relatively inexpensive, easy to administer, and provide approximately 24 hours of analgesia. In the U.S., there are less options labeled for the bovine; however, oral administration of meloxicam tablets is an option. In addition to analgesia, prophylactic broad-spectrum antibiotics are generally warranted as there is no way to keep the surgery site sterile once the rumen is opened. There is some debate about the need for antibiotics; however, this author argues that the benefit

outweighs any concerns about imprudent use of antimicrobials as there is a justifiable reason and use in a single case represents a miniscule contribution to overall antimicrobial use. Finally, as is the case for all use of any pharmaceuticals in food-producing animals, withdrawal must be considered; however, the time for the rumen fistula to close is generally longer than the withdrawal period of any of the products commonly used.

## Procedure

With respect to the procedure, there are multiple approaches, tricks and techniques that are appropriate. The general principle is to anchor the rumen to the body wall and create good apposition between the incised rumen and skin edge. The following is a description of the procedure this author uses, and others may choose to do specific aspects of the procedure differently based on personal preference.

Prior to arriving on site, it is important to have all equipment organized, in good working order, and ready to go. Communication with the crew is important so that you understand the case and the prospect for performing a rumen fistulation. Ideally, the crew would also tube the animal to let most of the gas off so that the animal is not in distress, and also to allow normal rumen motility to resume prior to your arrival. There is a fine line between having enough gas that the skin and body wall are taut and easy to incise, and too much gas. If the animal is significantly bloated when performing the surgery, once the rumen is punctured and the gas is released, there is usually a period when the rumen becomes hyper-motile making suturing the rumen to the body wall more challenging.

Upon arrival, it is generally most efficient to set everything up (table, clippers, surgical prep supplies, surgery supplies, gloves, etc.) prior to loading the animal in the chute. Once the animal is loaded in the chute, the first step is to make sure the animal is not bloated to the point of distress, in which case tubing may be warranted. The left paralumbar fossa is then clipped in an approximately 10 x 10-inch square with the ideal location for the fistula centered within the clipped area. Depending on the size of the animal, the placement of the fistula should be 2 to 4 inches caudal to the last rib and 2 to 4 inches ventral to the transverse processes. During periods of extremely cold weather (approximately < -25° C, -13° F) it may be warranted to wait until the weather warms prior to doing the surgery if possible since animals will lose heat through the fistula. If performing a bloat surgery is necessary during extreme cold weather, consider making the clipped area as small as possible to reduce additional heat loss.

With respect to surgical site preparation, the most important component is contact time, and this can be used as an advantage to stage the preparation in a manner that is most efficient. This author prefers to do a good rough scrub with iodine to remove all organic matter and clean the site followed by a second scrub. Then, a lidocaine with 2% epinephrine block is applied in an inverse L pattern cranially and dorsally to the surgical site (note: a paravertebral block can also be used based on individual preference). Next, a third scrub is performed but the suds are not rinsed away. During this time the surgery pack can be opened, suture prepared to remove from the cassette, scalpel blade opened and dropped into the open surgery pack, and sterile gloves opened. Preparing these items at this time ensures they remain sterile as long as possible within the barn environment, and also allows good contact time for the iodine and the time for the local block to take effect. Finally, the iodine can be rinsed with isopropyl alcohol, hands dried, and sterile gloves donned.

At the desired surgery site, a circular hole is cut through the skin approximately 1.5 to 2 inches in diameter. Next, the external and internal abdominal obliques, and transversus abdominis are separated along the muscle plains at the center of the skin incision using blunt dissection. This method is preferred over cutting a hole through the muscles as there will be less bleeding and furthermore, leaving the muscles mostly intact will serve as a quasi-sphincter to reduce rumen content seepage when the animal is not bloated. Finally, the peritoneum is incised, taking care not to puncture the rumen, and the abdomen is entered.

Upon entering the abdomen, the rumen can be grasped using a Backhaus towel clamp to facilitate manipulation. This author prefers to use 2 towel clamps placed over top of each other in transecting planes (creating an X) so that if one pulls out and tears the rumen wall, the tear does not interfere with the tissue grasped by the other. Using the towel clamps as a handle, the rumen wall can now be pulled through the hole in the body wall to facilitate placement of stay sutures. When placing the stay sutures, ensure that enough rumen will remain to attach to the skin incision after cutting a 1-inch hole in the rumen where the towel clamps are attached, but not too much that there will be extra folds of rumen tissue blocking the hole. There are various theories and techniques for placing the stay sutures to attach the rumen wall to the body wall. This author prefers to use 4 horizontal mattress sutures placed ½-inch back from the skin edge at 12, 3, 6 and 9 o'clock. A note on suture selection, this is up to individual preference, but should consist of something that is strong and non-absorbable. For the 12 o'clock position, the suture is placed by going through skin, abdominal muscles and rumen. For the remaining sutures, the decision to go through the abdominal muscles or simply skin-to-rumen is based on the thickness of the body wall. There is some debate as to whether the abdominal muscles should be included in the stay sutures, and ultimately it is up to individual choice and does not seem to make a great deal of difference.

Once the stay sutures are placed, the rumen can be incised in a circular pattern approximately 1-inch in diameter removing the tissue damaged by the towel clamps. The cut edge of the rumen wall is then attached to the cut edge of skin using a simple continuous or simple interrupted pattern based on individual choice. After the procedure is complete, it is prudent to clean the surgery site for cosmetic reasons, but also to reduce attraction of flies and to inspect for any deficiencies in the rumen to skin apposition. When releasing the animal from the chute, some animals may become frightened by the noise, and steam if it's cold out, released from its fistula, and act erratically so take caution to not release the animal in a manner that it can injure itself, yourself, or other people in the area.

Finally, no follow up is generally needed and the animal can be kept in a hospital pen for a period of time before returning to its home pen. The suture does not require removal and sometimes the surgery site may look quite "bad" for a period of time due to rumen content spillage. Generally, after a period of 30 to 60 days, depending on the size of the hole created, the fistula will begin to close, and the animal will be left with a small stellate scar in the skin and adhesion between the rumen and body wall. Most will finish the feeding period and be sent to slaughter with no additional concerns.

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## Conclusion

In summary, most animals that suffer from bloat are best managed medically, or in those cases in which the bloat is chronically occurring and the animal is at or near slaughter weight, sent to slaughter. However, in animals that are suffering from chronic bloat and expected to remain in the production phase for a long period of time, a rumen fistula can be created to alleviate the need for constant treatment and reduce the risk the animal will succumb to bloat while recovering from potential comorbidities. The procedure is easy to complete and will take less than 30 minutes for a skilled practitioner. Ultimately, case selection is the primary determinant of outcome as complications from surgery are generally minimal and most negative outcomes are related to other underlying conditions that pre-existed and contributed to the persistent bloat. Animal welfare is of utmost priority, and it is up to the discretion of the individual practitioner to select the appropriate treatment and management plan for individual cases of bloat.

