



Bloat in Small Ruminants

Lea M. Brewer
Research Assistant
University of Arkansas
at Pine Bluff

David Fernandez, PhD
Extension Livestock
Specialist

Heidi Ward, DVM, PhD
Assistant Professor
and Extension Veterinarian

Bloat is a life-threatening condition, and time is critical if the animal is to be saved. Bloat, also known as tympany, is a buildup of gas in the rumen that cannot be released.

Gas is naturally produced during the breakdown of feedstuffs in the rumen and is typically released through belching (eructation). When belching cannot occur, bloat happens.

Three types of bloat can occur in small ruminants: frothy bloat (primary ruminal tympany), free-gas bloat (secondary ruminal tympany) and abomasal bloat (abdominal tympany). Both frothy and free-gas bloat can occur in any animal with a mature rumen, but abomasal bloat is usually only seen in bottle-fed young.

Frothy Bloat (Primary Ruminal Tympany)

Frothy bloat, also called pasture bloat, is primarily seen in the spring and fall due to animals overeating lush, legume-dominant pastures in the vegetative and early bud stages. High protein legumes, such as alfalfa, ladino and red and white clovers, provide readily available nutrients that are rapidly broken down once ingested, leading to swift production of gas in the rumen. This gas production produces thick foam and causes a quick change in the pH, increasing the viscosity (stickiness) of the rumen fluid. The small bubbles in the foam cannot merge due to this increased viscosity. This prevents larger bubbles from forming and breaking off from the foam to be released through belching. As the amount of gas trapped in foam increases, the rumen will

expand, primarily on the left side. As the rumen expands, it displaces internal organs, restricts blood flow and interferes with the animal's ability to breathe. If there is no intervention, the animal will die from respiratory or circulatory failure.

Free-Gas Bloat (Secondary Ruminal Tympany)

Free-gas bloat, also called grain bloat, occurs when the animal cannot belch, whether it is because of an obstruction, posture or functional problems. Obstructions from foreign bodies, abscesses or tumors can prevent belching, allowing a buildup of gas in the rumen. Posture-induced bloat happens because ruminants absolutely cannot belch while on their backs. Therefore, bloat will occur rapidly if an animal falls into a position where it cannot right itself.



Bloated goat.

Functional problems from grain overload, internal damage or certain diseases can also prevent animals from belching. Grain overload, or grain bloat, occurs when animals suddenly eat large amounts of grain, like corn, before the rumen has had a chance to adapt to the high digestibility.

As the grain is broken down, it ferments as usual, but because the rumen is not adapted to the high digestibility, the pH drops, resulting in reduced ruminal contractions. Without the contractions of the rumen, gas cannot be expelled and accumulates, distending the rumen.

Signs

The clinical signs of both frothy bloat and free-gas bloat are the same. Often the first sign is sudden death unless animals are under close surveillance. Common symptoms of bloat can include:

- Distended left abdomen; sounds like a drum if thumped
- Quit eating
- Pain
- Discomfort
- Reluctance to move
- Bellowing
- Kicking at abdomen
- Respiratory distress
- Death

Usually, free-gas bloat is only seen in one or two animals, while frothy bloat can affect a number of animals in a flock or herd.

Prevention

Proper pasture and grazing management can decrease the risk of, and possibly prevent, frothy bloat.

Pasture Management

1. Develop pastures with non-bloating legumes, e.g., Sainfoin, crown vetch, milk vetch, fenugreek, lespedeza and birdsfoot trefoil.
2. Develop mixed pastures of legumes and grasses with legumes making up no more than 50 percent of available forage.

Grazing Management

1. Keep fiber intake up if animals are on pastures with bloat potential.
 - Feed grass hay first thing in the morning so animals are mostly full before going out to pasture.
 - Hay should equal one-third of diet to reduce bloat.
2. Limit access to legume-dominant pastures during vegetative and early bud stages.
 - Only leave animals on pasture for a couple of hours in the afternoon.
 - Do not turn livestock onto pasture moist with dew, rain or irrigation water. The moisture can increase the chances of bloat.
3. Observe livestock closely the first several days they are on pastures with bloat potential and remove any animals showing signs of bloat.

4. Administration of an antifoaming agent during risk period.
 - Oral products are available for goats and sheep.
 - Approximately \$6/dose
 - Can also be used as a treatment
 - Examples: Duravet Bloat Treatment, Vetone Bloat Treatment and Bloat Release by AgriLabs. Rumen-Eze is available for sheep; use for goats is considered off-label or extra-label use requiring a veterinarian's prescription.
 - Surfactant/surface tension-reducing spraying agents available for pasture.
 - Examples: Bloat Pasture Spray by Vicchem and Bloat Master by Multicrop. Both are only labeled for cattle, making use for sheep/goat pastures extra-label.

Treatment

If bloat does occur, the issue must be addressed immediately before the animal suffocates and dies. The use of a stomach tube is the most effective treatment for free-gas bloat. This technique will also distinguish between free-gas and frothy bloat. Once you place the tube, the gas in the rumen will escape and relieve the pressure. Often the tube may need to be repositioned repeatedly to release all the gas. After the tube has been placed and the gas released, then the cause for obstruction should be identified. If no gas escapes and a foamy substance trickles out of the tube, then the animal has frothy bloat.

For frothy bloat, the stomach tube should remain in place and antifoaming agents administered. Follow dosing directions for your chosen antifoaming agent. If relief does not occur almost immediately, then the animal should be closely monitored for at least the next hour to determine if treatment was successful.



Tubing a goat.

In extreme cases of bloat, the last resort is to use a trocar and cannula to relieve rumen gas. Due to the possibility of severe complications, we recommend that you contact your veterinarian for proper trocar and cannula placement.

Abomasal Bloat (Abomasal Tympany)

Abomasal bloat, sometimes called abomasitis, is a disorder seen in lambs and kids that are generally under three weeks of age. Several factors, including

bacterial infection of the abomasal wall, compromised immunity from inadequate colostrum intake, ingestion of foreign bodies (hair or coarse plants) and vitamin/mineral deficiencies have been linked to the onset of this disease. Poor hygiene and intermittent feeding of large volumes of milk are also potential causes.

When young ruminants are not fed at regular intervals throughout the day but fed a larger than recommended milk meal two to three times a day, the emptying of the stomach (abomasum) can slow. This delayed emptying of the stomach allows more time for the sugars in milk to ferment, causing an overabundance of gas to be produced more rapidly than it can be released. When this happens, the abomasum bloats, often resulting in a quick, unpleasant death.

Signs

Kids/lambs with abomasal bloat will:

- Have swollen bellies that make a tinkling/splashing sound if picked up and shaken
- Be dull
- Be lethargic
- Have abdominal pain (colic)
- Grind teeth
- Die

Prevention

If young are left with their mothers, you need to confirm adequate intake of colostrum. To help ensure the kid/lamb gets enough colostrum, separate it and its mother from the herd or flock for the first couple of days after birth. You will need to observe the kid/lamb frequently to ensure it is nursing and the mother is producing enough milk. Management practices that can cause prolonged interruption of nursing should be limited. This will limit engorgement of the udder and keep young from eating a larger than usual milk meal.

Changes in weather can cause mothers and their young to seek shelter or remain lying down for long periods. In such cases, when the mother stands, the udder is engorged, and the hungry kid/lamb will eat more than normal. This can be discouraged by providing multiple shelters or by providing hay (weather permitting) to encourage mothers to remain standing to eat, allowing more frequent, lower-volume nursing.

When using milk replacers, follow the manufacturer's mixing and feeding instructions. Feeding a diluted replacer mixture can lead to gorging as young try to compensate for lack of nutrients, especially in free-feeding systems. Make sure the milk replacer is mixed thoroughly so there are no clumps. Clumps of replacer can be a contributing factor to abomasal bloat due to the time it takes to break them down. Using poor quality milk replacers can also influence the occurrence of abomasal bloat. Make sure the milk replacer relies on milk proteins, like casein, and not plant-based proteins that ferment more quickly.

Milk replacer can be fed at body temperature or cold (40°F) but must be mixed at the manufacturer's recommended temperature. Since abomasal bloat is associated with bacterial populations, feeding cold milk will decrease chances of occurrence. For ease, you should prepare the replacer one feeding in advance so the replacer has time to cool before feeding.

There are different types of feeding systems available, depending on the number of young you are feeding and what works best for you. Often the most practical option for a small number of young is feeding a set amount of milk replacer several times a day (based on manufacturer label) with either bottles fitted with nipples or nipple pails. Importantly, with this form of feeding, make sure there is one nipple for each kid/lamb. For larger numbers of kids/lambs, there are self-fed systems based on free-choice feeding: young have access to milk at all times. This form of feeding lowers the risk of abomasal bloat as young can ingest smaller amounts of milk at more frequent intervals. The different self-fed systems include nipple pails, teat bars and commercial units. The milk in nipple pails and teat bars can be kept cold by placing a plastic bottle with frozen water into the container with the milk. A heat lamp can be used during winter months to keep milk from freezing. Commercial or automatic feeding units measure and mix the milk replacer with water and deliver the milk to the pens where the young are located.

Proper sanitation is a must. Bottles and nipples must be sanitized after each use. If feeding systems like buckets and nipple bars are used, they should be taken apart, cleaned and disinfected on a regular basis. Worn out parts, like nipples, should be replaced as needed. Refrigerate leftover milk in a clean container and never keep it past the manufacturer's recommendation. If milk replacer is left mixed in improper conditions or mixed past the manufacturer's recommendation, it can sour. Soured milk from improper handling is not to be confused with fermented milk which helps prevent abomasal bloat.

Fermented milk is milk replacer mixed with plain yogurt with live cultures. The yogurt contains both probiotics and prebiotics which promote a healthier gut. For optimal results, you should feed fermented milk cold. Young can start fermented milk at five days old. This fermented milk will keep in the refrigerator for up to seven days if using sterile containers.

A veterinarian-tested Norwegian fermented milk recipe is:

- 4 quarts of warm water to 3 pounds of milk replacer to 1 cup of yogurt.
- Mix well. Cover with a lid.
- Keep mixture warm and let ferment for 8 to 12 hours. Mixture may have a soft crust on top with some liquid at the bottom, or it may resemble thick commercial yogurt when it is ready.
- Remove 1 cup of the liquid yogurt as the starter for the next batch.

- If feeding a small number (one or two), add 1 teaspoon of yogurt with live yogurt cultures per 17 ounces of milk replacer right before feeding, and mix well.

Clostridial bacteria have been connected to abomasal bloat; therefore, it is imperative to vaccinate young for *Clostridium perfringens* Types C and D. Follow your veterinarian's recommendation or the manufacturer's label for administration dose and age.

The incidence of abomasal bloat can increase if young are fed milk replacer for too long. The ideal age for weaning bottle-fed young is 30 days. Usually, there is no benefit to waiting later. Introducing kid or lamb starter rations with a legume-base hay early will promote rumen function and decrease the risk of abomasal bloat.

Treatment

Treatment of abomasal bloat is often futile as an estimated 75 percent to 100 percent of cases die. *Early intervention is the key to saving bloated kids/lambs.*

References

- Bowen, Richard. Ruminal Tympany. In: VIVO Hypertexts for Biomedical Sciences Pathophysiology. <http://www.vivo.colostate.edu/hbooks/pathphys/digestion/herbivores/tympany.html>, accessed Nov. 10, 2018.
- Costello, Rob. 2012. Bloat in Young Calves and Other Pre-ruminant Livestock. Merrick's. http://www.merrick.com/uploads/Bloat_in_young_calves-2012.pdf, accessed Jan. 8, 2019.
- Laven, Richard. 2004. Bloat. National Animal Disease Information Service. <http://www.nadis.org.uk/disease-a-z/cattle/bloat/>, accessed Nov. 12, 2018.
- Martin, S. John, Anita O'Brien and Christoph Wand. 2010. Artificial Rearing of Lambs. ISSN 1198-712X Queens Printing for Ontario. <http://www.omafra.gov.on.ca/english/livestock/sheep/facts/99-019.htm>, accessed Dec. 5, 2018.
- Merck Veterinary Manual. Bloat in Ruminants. <http://www.merckvetmanual.com>, accessed Nov. 12, 2018.
- Tagesu, A. 2018. Study on the Prevalence of Bovine Frothy Bloat in and Around Kebele Lencha, Tokke Kutaye District, Oromia Region. *Appro Poult Dairy and Vet Sci.* 2(3). APDV.000537. DOI: 10.31031/APDV.2018.02.000537.
- Van Metre, Dave. Abomasal Bloat and Abomasitis in Calves. College of Veterinary Medicine and Biomedical Sciences, Colorado State University. <http://veterinaryextension.colostate.edu/menu2/Cattle/Abomasitis.pdf>, accessed Dec. 5, 2018.

Several treatments are available.

1. Stomach tube – can be passed to release gas.
2. Oral penicillin – may aid in counteracting the bacteria. Will need a veterinary prescription.
3. Sodium bicarbonate (baking soda) – can be mixed in water and given to help neutralize the acidity in the abomasum, or administration of other antacids may help neutralize the acidity. This acidity occurs when the sugars in milk rapidly ferment.
4. Severe circumstances – a needle can be inserted into the abomasum to relieve the gas. Only a licensed veterinarian or other trained personnel should perform this procedure.

Gas may be a natural product from the breakdown of feedstuffs, but an overabundance can be a serious problem. No matter which form of bloat occurs, time is always critical in saving the animal's life. As with any disease, prevention is the best approach.

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LEA M. BREWER is a research assistant in the Agriculture Department at University of Arkansas at Pine Bluff. **DR. DAVID FERNANDEZ** is an extension livestock specialist with the 1890 Cooperative Extension Program and is located at the University of Arkansas at Pine Bluff. **DR. HEIDI WARD** is an assistant professor and veterinarian in the Department of Animal Sciences with the University of Arkansas System Division of Agriculture and is located in Little Rock.

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