

Abdominal emergencies in cattle: clinical signs, diagnosis and treatment strategies

Author : Sotirios Karvountzis

Categories : [Farm animal](#), [Vets](#)

Date : September 5, 2016

Along with obstetrical emergencies, abdominal alimentary ones are the most commonly occurring in cattle. A selection of them is considered, based on their frequency according to the author's experience. Finally, all suggested actions are on the proviso these are economically viable to treat.

Left displacement of the abomasum

Left displacement of the abomasum (LDA) occurs predominantly in dairy cattle. The exact cause of the condition is complex and the following instigators have been put forward:

- predisposing factors (breed, age, production level, nutrition, metabolism, concurrent disease, environment)
- aetiological factors (feed intake, negative energy balance, calcium)
- triggering factors (abomasal gas production, abomasal hypomotility)

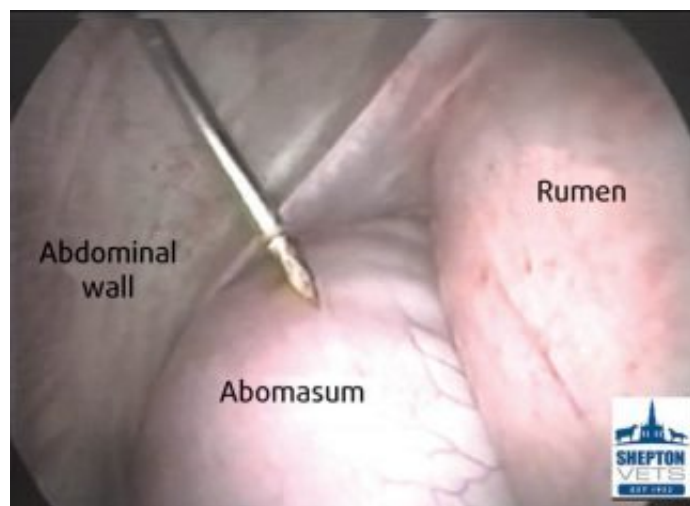


Figure 1. View of abdominal contents through left-flank exploratory endoscopy in a case of left displacement of the abomasum.

It has been agreed between authors the transition period in the cow's productive cycle holds the

key to preventing the condition (van Winden et al, 2003).

Predictor tests are available for the disease, but they are not “cow-side” and are quite expensive. There are, however, two methods:

- the revised quantitative insulin sensitivity check index (RQUICKI), which is possibly the best predictor, incorporates the simultaneous collection and testing for insulin, glucose and non-esterified fatty acids (Kobayashi et al, 2002; Stengärde et al, 2012).
- measurement for insulin-like growth factor 1 (IGF-1). Low concentrations of IGF1 in the peripartum period are an indication of the disease (Lyons et al, 2014).

The non-specific signs of the condition are acetonaemia, loss of milk yield, selective appetite on roughage, depression and loss of bodyweight. The pathognomonic sign is the distinct sound of the left intercostal area, identified by a combination of intercostal percussion and auscultation or left flank ballottement and auscultation (“ping” and “slosh”, respectively). The diagnosis can be complemented by ultrasound and endoscopy (**Figure 1**).

Correction can be carried out conservatively or surgically. An anecdotal high rate of relapse is seen through conservative corrections, which focus on medical management of the condition with or without rolling the cow. Rolling of the patient in the conservative approach has no means of fixing the displaced organ in its original position.

A plethora of established surgical correction methods exist. In these, and not necessarily in the following order, the displaced abomasum is identified, anchoring sutures or toggles inserted and the organ is deflated and repositioned. Depending on where the abomasum is fixed, these methods are classed in the following categories:

- laparotomic right paralumbar fossa omentopexy or abomasopexy (including pyloropexy)
- laparotomic right paramedian abomasopexy
- laparoscopic right paramedian abomasopexy
- paracentesis right paramedian abomasopexy

Techniques such as Hanover (laparotomic right paralumbar fossa omentopexy through right flank), Utrecht (laparotomic right paramedian abomasopexy through left flank), endoscopy (laparoscopic right paramedian abomasopexy through left flank or ventral abdomen), paramedian (laparotomic right paramedian abomasopexy through ventral abdomen) and toggle (paracentesis right paramedian abomasopexy through ventral abdomen) can be used.

Finally, 20L to 40L of postoperative oral rehydration therapy of the patient is paramount and facilitates a speedy recovery.

Right displacement of the abomasum

The cause of right displacement of the abomasum (RDA) is not exactly known, but some articles quote a similar pathogenesis to LDA. Two discrete forms of the disease exist – abomasal dilatation and abomasal torsion. In the former, the organ becomes atonic and dilates, whereas in the latter, which is a progression of dilatation, the organ twists around the vertical axis producing a torsion. Abomasal torsion is a life-threatening condition in which the abomasal contents are completely blocked and this leads to serious toxic side effects.

Dilated cases produce milder signs of milk yield loss, selective appetite, depression and bodyweight loss. The pathognomonic sounds are similar in pitch and diagnostic methods as in LDA, but in this case they are found on the right intercostal area. In cases of torsion, additional severe toxicity symptoms are found, with tachycardia a particularly important prognostic tool. Heart rates below 60bpm indicate mild cases of RDA, whereas higher than 100bpm indicates severe and very often morbid cases.

Conservative treatment has been considered with spasmolytics and oral rehydration therapy, but is accompanied by predominately low cure rates. The most successful approach is laparotomic reduction and deflation of the displaced abomasum, with abomasopexy or omentopexy. Endoscopy can be considered as an alternative surgical technique. In cases of abomasal torsion, two endoscopic applications are required – the first to deflate the displaced abomasum and torsion, whereas the second would carry out the abomasopexy. The two applications take place 12 hours apart and, in the meantime, the patient receives three administrations of 20L to 40L of oral rehydration therapy.

Mesenteric torsion

Mesenteric torsion is a disorder of acute colic in cattle, encompassing a number of conditions such as obstruction, tympany, torsion, prolapse and intussusception of the intestine. Strong peristaltic movements of the gut are the trigger mechanism behind bowel displacement.

Inappetence, reduced milk yield and elevated heart rate are accompanied by signs of colic – the latter manifested by restlessness, kicking at the ventral abdomen and shifting weight between the hindlimbs. Very often rectal examination reveals no contents or just thick mucus. Exploratory laparotomy through the right paralumbar fossa can be used not only as a diagnostic tool, but as a means of cure.

Treatment of the condition can be conservative or surgical. The former includes administration of parenteral spasmolytics, oral purgatives (such as liquid paraffin) and copious amounts of fluids (20L to 40L) by stomach tube. If following administration the patient does not improve, the author resorts to the surgical approach. In the latter, exploration of the abdomen takes place to identify the offending section of the bowel, as well as correct it – if feasible.

Caecal dilatation and displacement

The cause of the dilatation and displacement is similar to that of an LDA, but the differential aetiology that triggers this organ to displace is unknown.

Apart from non-specific symptoms of inappetence, depression and weight loss the pathognomonic sign is identified by using a combination of percussion and auscultation of the right flank and can be backed up by rectal palpation of the displacement area. This distinct sound (“ping” or “slosh”) should be differentiated to a pneumorectum, when air is introduced into the rectum, particularly during its palpation. Diagnosis of the displacement can be aided by the use of ultrasound or endoscopy.

Treatment is almost always surgical where, with exploratory right paralumbar fossa laparotomy, the organ is identified, its content drained and it is very often amputated. The operation is not without risk – particular attention has to be placed on oral rehydration therapy, especially when copious amounts of fluid are removed from the affected organ. Finally, postoperative antibiotics and NSAIDs are an important complement to treatment.

Traumatic reticulitis

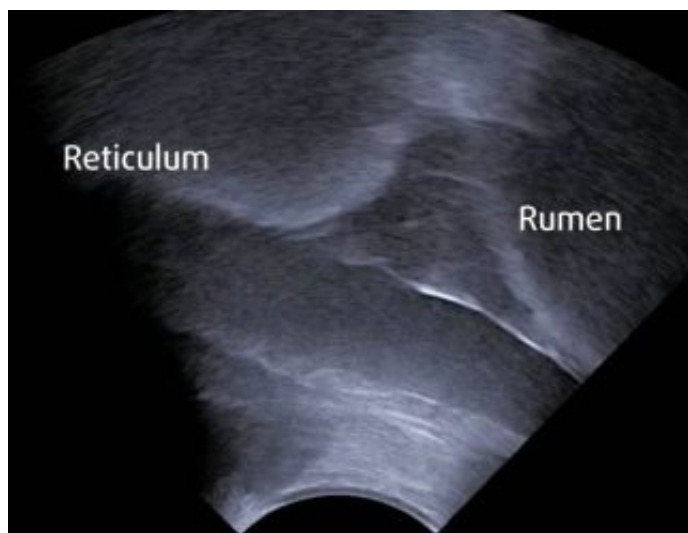


Figure 2. View of the rumen-reticular separation in a normal cow with the aid of a sector scanner.

The causes of traumatic reticulitis are foreign bodies made of ferrous or non-ferrous metal, plastic or wood that the animal ingests accidentally. In the author’s experience, the most common offending article nowadays is tyre metal wiring, which is inadvertently included in the total mix ration wagon. The common characteristic of these bodies is they have to be sharp to penetrate the reticular wall. The penetration is aided by the ruminal or reticular contractions and can lead to complete perforation. Once perforation takes place, abscessation and localised peritonitis will be found on the exit point. As the advance of the foreign body continues, and depending on its routing, secondary pericarditis, pleurisy, hepatitis or splenitis can be found.

Symptoms of the disease range from non-specific to area specific and, finally, pathognomonic. Non-specific ones are inappetence, weight loss, fever, reduced milk yield and those arising from the secondary complicating conditions. Area-specific ones indicate a problem in the posterior thoracic/anterior peritoneal region and these are the arched back and grunting, especially when tested with the withers, fist ballottement or Williams test. Finally, pathognomonic symptoms include reduced frequency and range or reticular contractions as can be seen by a linear or sector ultrasound in the ventral left abdomen, where the organ lies (**Figure 2**). Such diagnosis can also be reached with endoscopy, while the patient is in dorsal recumbency.

The removal of the offending article can be done conservatively or surgically. With the former, two magnets are inserted per os in the rumen, aiming to retract the offending article and reverse the symptoms. The prerequisite of this method is the foreign body has to be ferrous and mobile. When treating conservatively, supportive therapy is paramount and includes oral rehydration therapy, antibiotics and NSAIDs.

Surgical correction includes laparotomic exploration and foreign body removal by hand. The foreign body can also be removed endoscopically, with the aid of ultrasound that would allow the precise location of it. In either technique, the animal lies in dorsal recumbency. Finally, in case of complicating concurrent disease, the treatment plan must also address those too.

Rumen acidosis

Aetiology is excess consumption of carbohydrates, either accidentally or intentionally while granting unlimited access to concentrates with or without compromised access to fibre. Carbohydrates rapidly ferment in the rumen, altering the ruminal flora and fauna, leading into production of lactic acid. This in turn drops the ruminal pH from 6.5 to 7 to 4 to 5.5. Lactic acid also increases the intraruminal osmotic pressure, drawing fluids into the rumen and leading to dehydration and diarrhoea – the latter by increasing the intraluminal contents of the rumen and intestine. Due to altering of the rumen flora and fauna, Gram-negative bacteria dominate, which, when they in turn die, release a large number of endotoxins leading to widespread toxæmia.

Symptoms are primarily generalised with depression, ataxia, dehydration and diarrhoea. The pathognomonic sign is the presence of large amounts of grain in the rumen, identified through oesophageal catheterisation. Also, rumen paracentesis will yield acidic pH of the content. Farm-side tests with quick results are preferable, due to the acute nature of this condition.

Treatment depends on the amount of grain ingested and the level of metabolic acidosis. Removal of the acidic rumen contents, by rumenotomy and transfaunation of contents from dead or living animals with normal rumen contents, should be considered. Rehydration with large volumes of water (up to 60L), containing restorative agents is important. Reversing the acidosis is achieved by using sodium bicarbonate up to 500ml at the rate of 5% in normal saline IV. Ideally, the blood pH should be constantly monitored during this phase of the treatment, aiming to prevent iatrogenic

alkalosis. This is hardly ever done in practice though, due to cost and delays in reported results. Finally, supportive therapy should be carried out, with NSAIDs, broad-spectrum antibiotics, multi-complex vitamins and calcium and magnesium solutions.

Rumen tympany

Commonly known as bloat, rumen tympany accounts for a large proportion of cattle deaths. The inability of the animal to eructate leads to gas build up in the rumen and results in increased intra-abdominal and thoracic pressures. Left unattended this will lead to death from asphyxiation. Two types of bloat exist, depending on whether the failure to eructate is primary or secondary:

- **Frothy (primary).** Increase in ruminal content viscosity will lead to entrapment of the gas that is constantly produced by fermentation. The produced gas cannot coalesce and escape through the oesophagus and, therefore, the rumen will increase in volume. Agents, such as saponins or pectins in clover can increase content viscosity. This is very common in the spring, where cattle are turned out in pastures with young clover that is high in such substances.
- **Gaseous (secondary).** Any mechanism that will lead in failure to eructate through oesophageal obstruction is categorised here. Bulky feeds such as potatoes or afterbirth, abscesses of the oesophagus or the surrounding tissues (bronchial, mediastinal), prolonged lateral or dorsal recumbency and, finally, other concurrent disease (milk fever, hypomagnesaemia, tetanus) are included.

Mild to severe distention of the left paralumbar fossa will be observed in most cases. Depending on severity, accompanying signs of colic can be seen (kicking of ventral abdomen and bellowing). Differentiation between primary and secondary tympany can easily be achieved with oesophageal catheterisation.

Treatment of the condition depends on the root cause of the disease. In cases of primary tympany, various surfactants can be used to reduce the surface tension of the rumen contents and release the trapped gas. Such products can be silicone-based specialised preparations or generic oil-based treatments given by stomach tube or per os. In the latter group, oils such as olive, rape or paraffin can be used at amounts up to 0.5L to 1L.

In cases of secondary bloat, the focus lies initially in reducing rumen volume and then, if possible, in removing the primary cause of the tympany. The rumen volume can be reduced very quickly by oesophageal catheter, or if this is not achievable by ruminal paracentesis by trocar or rumenotomy in more severe cases. The paracentesis or rumenotomy are best placed at the highest point of the extended left paralumbar fossa to allow rapid escape of the gas. Trocar or rumenotomy can also be applied in cases of primary bloat with varying success, depending on the viscosity of the rumen content.

Summary

The number of abdominal emergencies in cattle are well defined and, in most cases, preventable. The vast majority of them are management-related and, provided due care is exercised, their incidence can be very low. Aside from the conventional clinical examination in aiding diagnosis of those emergencies, the use of ultrasound and endoscopy can be invaluable facilities in identifying their aetiology. More importantly, “scanning” and “scoping” can be irreplaceable prognostic tools.

References

- Andrews AH et al (2004), *Bovine Medicine: Diseases and Husbandry of Cattle* (2nd edn), Blackwell Science.
- Blood DC et al (1983). *Veterinary Medicine* (6th edn), Bailliere Tindall, London.
- Christiansen K (2000). Laparoskopisch kontrollierte Operation des nach links verlagerten Labmagens (Janowitz Operation) ohne Ablegen des Patienten, *Für Studium und Praxis* **66**: 118.
- Fubini SL and Ducharme N (2004). *Farm Animal Surgery*, Saunders, St Louis.
- Janowitz H (1998). Laparoskopische Reposition und Fixation des nach links verlagerten Labmagens beim Rind, *Tierärztliche Praxis* **26**(G): 308-313.
- Kobayashi Y, Boyd CK, McCormack BI and Lucy MC (2002). Reduced insulin-like growth factor-I after acute feed restriction in lactating dairy cows is independent of changes in growth hormone receptor 1A mRNA, *Journal of Dairy Science* **85**: 748-754.
- Lyons NA, J. S. Cooke JS, Wilson S, van Winden SC, Gordon PJ and Wathes DC (2014). Relationships between metabolite and IGF1 concentrations with fertility and production outcomes following left abomasal displacement, *Veterinary Record* **174**(26): 657.
- Nickel et al. *Lehrbuch der Anatomie der Haustiere*, Band I, Parey.
- Sterner K and Grymer J (2002). 20 years' experience with the Grymer/Sterner toggle suture technique for LDA repair: improvements in materials and methods, *Proceedings of the XXII World Buiatrics Congress*, Hannover, Germany.
- Stengärde L, Holtenius K, Tråvén M, Hultgren J, Niskanen R and Emanuelson U (2010). Blood profiles in dairy cows with displaced abomasum, *Journal of Dairy Science* **93**(10): 4,691-4,699.
- Turner AS and McIlwraith CW (1989). *Techniques in Large Animal Surgery* (2nd edn), Lea and Febiger, Philadelphia.
- Weaver DA, St Jean G and Steiner A (2005). *Bovine Surgery and Lameness* (2nd edn), Wiley-Blackwell.
- van Winden SC and Kuiper R (2003). Left displacement of the abomasum in dairy cattle: recent developments in epidemiological and etiological aspects, *Veterinary Research* **34**(1): 47-56.