

# Acute Abdomen

Subjects: Veterinary Sciences

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Acute abdomen (AA) is the term used to define a pathological condition that affects the abdominal cavity and frequently manifests itself with acute clinical symptoms capable of compromising a cow's life. Therefore, it should be considered as an emergency that should be evaluated as quickly as possible to adopt the appropriate therapeutic measure (medical or surgical).

Keywords: acute abdomen ; emergency ; dairy cows

## 1. Introduction

Cow's milk has been an important part in the food culture for more than 2000 years. When human beings learned to domesticate cattle to take advantage of the multiple properties of their milk, it became an economic source for many people, converting it into an industrial sector.

Therefore, regardless of the development of biotechnology in this field, cow lactation continues to be a vital physiological period in the maintenance and prosperity of a farm. However, the cow must be controlled from a medical and nutritional point of view, so that it can produce high-quality milk while keeping its health and well-being.

Nevertheless, this does not prevent the lactating cow from suffering alterations on some occasions. One of them is known as an acute abdominal disorder. In dairy cattle, the highest emphasis has been placed on studies related to mastitis and diseases of the reproductive tract and hooves. However, information on abdominal diseases is scarce in the veterinary literature <sup>[1]</sup>.

Acute abdomen (AA) is the term used to define a pathological condition that affects the abdominal cavity and frequently manifests itself with acute clinical symptoms capable of compromising a cow's life. Therefore, it should be considered as an emergency that should be evaluated as quickly as possible to adopt the appropriate therapeutic measure (medical or surgical) <sup>[2][3][4]</sup>.

This condition includes a large number of different disorders that cause abdominal pain and distension, creating discomfort for the cow. These clinical signs, however, can be caused by digestive, renal, or reproductive structures (**Table 1**).

**Table 1.** Causes of acute abdomen and common physical examination findings <sup>[5]</sup>.

Gastrointestinal Visceras Disease	Common Clinical Signs
Abomasal volvulus	dehydration, tachycardia, tachypnea, bruxism, skin is cool, rarely colic, pulse is weak and thready, faeces are absent or watery but scant, abdominal distension, greater on the right side, large area of tympanic resonance on the right extending from the eighth rib to the middle of the paralumbar fossa.
Abomasal displacement	reduced appetite and milk production, ketosis, faeces are often normal to softer than normal but reduced in volume, ruminal contractions decreased to absent, the last one or two ribs on the left are sprung but the abdomen is sunken in the paralumbar fossa, large area of tympanic resonance (ping) in left cranial abdomen.
Hemorrhagic jejunitis	variable dehydration, tachycardia, tachypnea, cool extremities, ± fever and hypothermia in advanced cases, early-stage colic, auscultation of fluids sounds on right, hemorrhagic diarrhoea.
Intussusception	dehydration, tachycardia, tachypnea, ±pale mucous membranes cool extremities, ±severe colic, right sided ventral abdominal distension and generalized in advanced cases, auscultation of multiple areas of tympanic resonance over right abdomen, bloody and scanty faeces on rectal examination.

<b>Gastrointestinal Visceras Disease</b>	<b>Common Clinical Signs</b>
<b>Mesenteric torsion</b>	colic severe, tachycardia, tachypnea, rapid debilitation and progression to moribund state, inability to stand up, examination rectal: multiple loops of distended small and large intestine, no faeces.
<b>Paralytic ileus</b>	tachycardia, tachypnea, variable hydration status, variable colic: may be severe, moderate abdominal distension in lower right abdomen, small areas of tympanic resonance, auscultation reveal fluids sounds in right sided abdominal.
<b>Non Gastrointestinal Visceras Disease</b>	<b>Common Clinical Signs</b>
<b>Uroliths</b>	lethargy, reduced appetite or anorexia, straining to urine, mild colic, hematuria, and it can evolution to ruptures urethra or bladder.
<b>Pyelonephritis</b>	anorexia, fever, dehydration, colic, frequent urination, straining to defecate, dysuria, hematuria, ±stranguria, exudate adherent to vulvar hairs, rectal palpation: enlarged left kidney.
<b>Uterine torsion</b>	tachycardia, tachypnea, signs of impeding parturition without progress, mild colic, vaginal examination: circumferential constiction of vaginal wall, rectal examination: torsion of the uterine ligament is palpated.
<b>Cholestasis</b>	weight loss, anorexia, diarrhoea, ascites, icterus, pain over liver elicited with pressure.

The sensation of pain from the parietal peritoneum travels through the peripheral spinal nerves and is usually localized over the affected area. This pain is exacerbated by pressure on the area, so the cow is reluctant to move and has a reflex tonic contraction of the abdominal muscles. In the case of visceral pain, some nerve endings are located in the submucosa and muscle layers of hollow viscera, such as the intestine or bladder, and in the capsule of solid organs (kidney, liver). They transmit the painful sensation through the sensory pathways of the autonomic nerves, generating a diffuse pain that is difficult to localize. The clinical manifestations, in this case, are very intense: the animal kicks its abdomen, steps on its hind legs lie down, or stands up and stretches.

Many of the reports available in the literature refer to diagnostic and complementary methods (such as laparotomy) carried out in specialized facilities that are often far from livestock farms. It is also important to take into account that the farmer cannot always assume the cost of transport and hospitalization of the animal. Therefore, the resolution of the problem in situ is of vital importance.

To establish an accurate diagnosis, we should do an exhaustive clinical history together with a detailed clinical examination **Table 1**, choosing proper ancillary tests. In the case of acute pain, the diagnosis should be made urgently, selecting the least invasive technique possible that would offer the best results, according to the cost-benefit ratio, being sometimes necessary, as a last resort, to do a laparotomy. Nevertheless, we have avoided unnecessary complementary tests that would increase the cost and delay the resolution of the case, worsening the critical condition of the animal.

## 2. Predisposing Factors to the Development of Acute Abdominal Syndrome

Age, breed, nutrition, and lactation stage are relevant parameters to take into consideration when evaluating a cow with AA. Thus, the type of aptitude of the cow is important: dairy cows, strictly speaking, are more predisposed to suffer from displacement or abomasal volvulus than lactating cows destined for meat production <sup>[6]</sup>. In relation to physiological stage, uterine torsions are normally observed at the time of parturition or during the dry period <sup>[7]</sup>. In addition, recent estrus could be associated with hypocalcemia, which results in paralytic ileus <sup>[8]</sup>.

Nutritional management also predisposes to AA signs. For example, if a dairy cow is fed with highly non fermented energy-rich carbohydrates after the early lactation stage, a subacute ruminal acidosis with signs of abdominal pain can be developed <sup>[9]</sup>.

It is during the periparturient period, particularly during the first two months of calving, that cows have been reported to be most vulnerable to the development of caecal dilatation. This is due to the fact that high milk yield demands the consumption of more concentrates, which leads to an increased production of volatile fatty acids (VFA's) <sup>[10]</sup>. The high level of VFAs produces the accumulation of gases. This, in turn, produces atony which leads to cecal dilatation and subsequent dislocation <sup>[10]</sup>. Winter season has been found to be an important predisposing factor the occurrence of caecal dilatation <sup>[11]</sup>.

As regards infections, one of the most problematic ones is jejunal hemorrhage syndrome (JHS) which is an acute, highly fatal enterotoxemic disorder in dairy cattle. Multiple descriptive names have been proposed for this condition, including hemorrhagic bowel syndrome, acute hemorrhagic enteritis of the small intestine, bloody gut, or JHS. The cause is uncertain and the pathogenesis poorly understood. Nevertheless, *Clostridium perfringens* type A has been strongly suggested as a primary etiologic agent <sup>[12]</sup>. Other authors, however, have reported an association between JHS and infection with *Aspergillus fumigatus* <sup>[12]</sup>. This infection has been frequently reported during the last few decades in all regions in the United States and some European countries <sup>[13]</sup>, especially in the autumn and winter months <sup>[14]</sup>. In addition, approximately 60% of the cases occur within the first 100 days of lactation and another 20% of the cases occur during midlactation. More than 90% of reported cases occur during the second lactation and in older cows <sup>[13]</sup>. The high incidence take place early during lactation, when a cow's milk production and feed intake are both relatively high. Therefore, it could be associated with nutritional factors. In fact, feeding a high-energy diet has been found to increase the risk of developing JHS <sup>[12]</sup>.

### **3. Conclusions**

From our clinical point of view, when facing an acute abdomen, the following premises should be taken into account:

The most important point is to remain calm, despite being faced with a clinical or surgical emergency, with limited technical means and personnel.

The clinical history and a complete physical examination are the first steps to be taken in order to reach a diagnosis.

It is necessary to have several ancillary tests in situ, considering the emergency of the patient and the need to intervene as soon as possible: sometimes, the urgency is such that it is necessary to intervene before stabilizing the patient. Ultrasound, abdominal fluid analysis, and biochemical tests, in this order of importance, can help us to confirm the diagnosis, localize it, and assess the extent of AA.

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