

# Approach to right-sided pings in the dairy cow

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## Abstract

The diagnosis and approach to the right-sided abomasal displacement in the bovine can be frustrating for any dairy practitioner. Right-sided abdominal pings are varied and often troublesome to diagnose, but a systemic workup can assist the practitioner in successful identification and resolution of these cases. This article is a review of types of right-side abomasal displacements in the dairy cow, typical presenting signs, and approaches to correct diagnosis and positive outcomes.

**Key words:** right abomasal displacement, RDA, AV, right-side ping

## Résumé

Le diagnostic et l'approche du déplacement abomasal à droite chez le bovin peuvent être frustrants pour tout praticien laitier. Les paires abdominales à droite sont variées et souvent difficiles à diagnostiquer, mais un examen systématique peut aider le praticien à identifier et à résoudre ces cas avec succès. Le présent article est un examen des types de déplacements abomasaux du côté droit chez la vache laitière, des signes typiques de présentation et des approches pour corriger le diagnostic et les résultats positifs.

## Introduction

While a left displaced abomasum (LDA) is usually a relatively simple diagnosis, right-sided gastrointestinal abnormalities of the bovine can be difficult to accurately determine. Several different structures can be displaced on the right side of the cow resulting in a variety of “pings” (high pitched sound on simultaneous auscultation and percussion of the abdomen) in a variety of locations. This can be particularly troublesome for the recent graduate who has the disadvantage of a smaller caseload experience to sort out right-sided displacements and make a correct pre-surgical diagnosis.

Abdominal structures that can result in an audible “ping” include the following: right displaced abomasum (RDA), abomasal volvulus (AV), cecal dilatation and rotation, gas in the ascending colon, gas in the rectum, spiral colon gas, duodenal gas, and more rarely pneumoperitoneum and gas in the uterus.

Eighty percent of abomasal displacements are seen within 1 month of parturition. Left displaced abomasum is more common than RDA generally 1 RDA to every 30

LDA.<sup>3</sup> Cases of AV are more common than RDA, with 1 AV to every 10 LDA.<sup>1,3</sup> A further report from a veterinary teaching hospital reported cases of AV to LDA had a ratio of 1 to 7.4.<sup>4</sup> Three different manifestations of AV exist: AV (60% of cases), omasal-abomasal volvulus (40% of cases), and reticulo-omasal-abomasal volvulus (rare).<sup>3</sup>

An understanding of the evolution of the right-side abomasal displacement can be helpful in making an accurate diagnosis. A RDA is best described as counter-clockwise rotation of the abomasum when viewed from behind the cow, and is therefore the mirror image of an LDA.<sup>4</sup> In AV, the abomasum (after an initial 180° counterclockwise rotation as viewed from the rear) and its supporting structures rotate in a counterclockwise direction (as viewed from above the cow) around an axis through the center of the lesser omentum, causing the cranial duodenum to become trapped by the distended abomasal body.<sup>5</sup> Knowing this anatomy and the surrounding structures can help differentiate at least the type of right-side abomasal disorder.

The ping associated with RDA is commonly located in the area between the 10<sup>th</sup> and 13<sup>th</sup> ribs on the right side of the abdomen.<sup>2</sup> The location and integrity of the ping from an RDA can be the same as a common LDA on the opposite side of the cow. These pings are difficult to distinguish from the ping of functional ileus, which underlies ribs 12 or 13 and can extend as far forward as the 10<sup>th</sup> rib.<sup>2</sup> Cecal dilatation and rotation also result in a right-side ping, but the ping is usually located more caudally, well into the paralumbar fossa.<sup>2</sup> Pings resulting from spiral or descending colon gas tend to extend caudal to the ribs and, much like the ping of ileus, are variable in pitch, frequency, and persistence. A consistent ping in the cranial paralumbar fossa extending under the 12<sup>th</sup> and 13<sup>th</sup> ribs that also maintains a fluid “splashing” sound on ballottement of the middle third of the right lateral abdomen with simultaneous auscultation over the ping “area” (succussion). This suggests a fluid-filled viscus which is consistent with both RDA and AV.<sup>4</sup> This is often referred to by the author as the abomasal “tinkle test”.

Typically the ping from an AV is larger than that of an RDA and extends more cranial (cranial to the 10<sup>th</sup> rib). In many cases the AV ping can outline with a diameter of greater than 30cm and extend as far forward as the 7<sup>th</sup> or 8<sup>th</sup> rib space. Abdominal ballottement (succussion) also yields a consistent splashing sound in AV.

Furthermore, rectal palpation can be helpful to diagnose the presence of an AV. In the early stages of AV, the partially distended abomasum may be palpable with the tips of the fingers in the right lower quadrant of the abdomen. It may not be palpable in large cows. In the advanced stage,

the distended tense viscus is usually palpable in the right abdomen anywhere from the upper to the lower quadrant.<sup>4</sup> A RDA is virtually never palpable per rectum; however, rectal palpation can be helpful in differentiating an RDA from cecal dilatation or rotation.<sup>2</sup>

Ultrasound can be a useful tool in confirming the diagnosis of LDA, RDA or AV.<sup>2</sup> In some cases of AV, the liver is displaced medially and this change may be detectable by ultrasound.

Additional physical exam findings can help differentiate the right-side displacements. As with LDA, the typical history of the right side abomasal displacement includes anorexia, decreased milk production, and decreased rumination. In AV, the anorexia is complete, milk production is more markedly reduced and the clinical deterioration is rapid.<sup>2</sup> Furthermore, cows experiencing AV have tachycardia. This tachycardia can increase with the chronicity and severity of the AV as high as 120 beats per minute. The cow with an AV is more depressed, and signs of weakness, toxemia, and dehydration develop as the disease progresses and the animal may become recumbent within 49 to 72 hours after developing volvulus.<sup>2</sup> Recent parturition, partial anorexia, and decreased milk production suggest displacement. Blood chemistry analysis on cows with abomasal displacements include metabolic alkalosis with hypochloremia and hypokalemia. In cattle with AV, blood l-lactate concentrations increase.<sup>2</sup>

With AV, the omasum is displaced medially and can be involved in the volvulus (omasal-abomasal volvulus). The blood supply to the abomasum and proximal duodenum is compromised, eventually resulting in ischemic necrosis of the abomasum.<sup>2</sup> For these reasons, the right-side abomasal displacement is considered an emergency condition.<sup>1</sup> This is, in part, due to the difficulty of on-farm personnel in differentiating between RDA and AV. This can be frustrating for the bovine practitioner who finds themselves responding in emergency fashion to a cow that either does not have an AV or may not even have a displacement at all.

Patience during the examination, consistency of the ping over several minutes of evaluation, presence or lack of the tinkling/splashing sound on succussion, and clinician experience are all important in making the proper diagnosis of the right-side ping. Despite a thorough physical exam, rectal palpation, possible ultrasound, and serum chemistry analysis, the final diagnosis is sometimes made during exploratory laparotomy. A good abdominal exploratory is simply an extension of the physical exam and can be a common necessity in dealing with right side pings in the cow. More often than not an inconsistent, small or transient ping or “pong” (lower pitched sound) indicates no abomasal displacement is present and may resolve with medical therapy. Care should be taken to not overlook the AV patient, and when in doubt, an exploratory should be attempted.

Several pre-surgical prognostic indicators should be considered in cases of AV. Heart rates over 80 bpm to 100 bpm are considered poor candidates for survival.<sup>3,4</sup> Blood

l-lactate concentrations  $\leq 2$  mmol/L indicate a positive outcome with surgical correction, whereas cattle with blood l-lactate concentrations  $\geq 6$  mmol/L carry a high probability of a negative outcome.<sup>2</sup> Additionally, the level of dehydration, duration of the condition, and serum ALP activity are important indicators.<sup>3</sup> Cows with AV present for greater than 24 hours generally have lower survival rates than those diagnosed earlier. The abomasum in AV can fill with a large quantity of choline-rich fluid (over 40 liters). This not only contributes to the hypochloremia, but more chronic cases of AV become so fluid filled that surgical reduction can be especially challenging.

Surgical correction is typically accomplished by right flank laparotomy. However, a right paramedian approach can be used for the recumbent cow. Omentopexy, pyloropexy or a combination thereof can be used for fixation similar to LDA surgeries once reduction is successful. In most cases of AV, evacuation of the intraluminal gas viscous is necessary to complete reduction. This may also help reduce postoperative abomasal hypomotility. Care should be taken on approach to any right-side abomasal displacement, especially AV, as the distended abomasum can extend underneath the incision area in the paralumbar fossa. This could result in inadvertent laceration on approach.

The secrets to improving survival rate of a cow experiencing AV are: 1) early diagnosis; 2) surgical technique; 3) perioperative intravenous fluids; and 4) antibiotics to prevent peritonitis.<sup>3</sup> If hypomotility is present, erythromycin at 4.5 mg/lb (10 mg/kg) BW can be used to increase emptying rates and increase milk production postoperatively.<sup>2</sup> IV or oral calcium supplementation after surgery can help resolve abomasal motility problems. Hypokalemia and hypochloremia are common and can be corrected with 120 grams of KCL twice a day for 2 days.<sup>3</sup> In the simple RDA, fluid and electrolyte abnormalities can correct spontaneously with access to water and salt. Oral drench of water with electrolytes (60 grams sodium chloride and 30 grams potassium chloride) via stomach tube is helpful in cases of longer duration.<sup>2</sup>

Prognosis for LDA and RDA is good – typically 95%. Survival after correction of AV is variable. Published data indicates survival rates of 35 to 80% with an average of 70%.<sup>1,2</sup> Cows with high heart rates, severe dehydration, vascular compromise to the abomasal tissue, and involvement of omasum have decreased survival rates.

## Conclusion

The right-side abdominal ping in the bovine can be difficult to accurately diagnose. This is particularly true for on-farm personnel and veterinarians with less experience. A thorough physical exam utilizing patience while performing percussion, succussion, rectal palpation, possible ultrasound, and potential blood chemistry can help guide the practitioner to a the correct diagnosis and successful case outcome. In some cases, an exploratory laparotomy is necessary for ac-

curate diagnosis.

Right-side abomasal displacements should be treated as emergency conditions given that AV is more likely than simple RDA. Cows experiencing AV should have corrective surgery and concurrent post-operative supportive care within 24 hours of onset. Early diagnosis, supportive IV or oral fluids with electrolytes, and perioperative antibiotics are keys to more successful outcomes.

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