

# Reticulo, Omasal, Abomasal Volvulus in Dairy Cows

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## Introduction

Displacement of the bovine abomasum is a clinical entity which has long been recognized, described, and treated.<sup>4,5</sup> While left displacement of the abomasum (LDA) is more commonly diagnosed, right displacement of the abomasum (RDA) is usually accompanied by a degree of volvulus and is therefore a more serious problem.<sup>7,8</sup>

There have been many papers describing the diagnosis and treatment of RDA as well as the theory of causation, pathophysiology, and prognosis.<sup>1-5,7-11</sup> However, these papers usually do not discuss the problem based upon the degree of volvulus as determined by direct examination of the pathologic anatomy.

This paper will describe the pathologic anatomy, clinical and clinicopathologic data, treatment, and outcome of five cases of RDA with omasal and reticular involvement seen by the author in his practice over a twelve year period.

## Materials and Methods

From July 1975 to June 1987 the author examined and treated 171 cases of abomasal displacements while working in a university referral practice. Based upon an anatomical diagnosis these cases were divided into four groups (Table 1): Group I—left abomasal displacement (LDA), Group II—right displacement of abomasum usually with a degree of volvulus (RDA), Group III—right displacement of abomasum with omasal involvement (RDAO), and Group IV—right displacement of abomasum with omasal and reticular involvement (RDAOR).

These percentages roughly reflect the incidence as seen by the author in a previous position at another university but may not necessarily reflect the true incidence in practice since all cases were referred. The five cases of RDAOR are listed in Table 2. All were Holstein dairy cows.

Although laboratory tests were not performed in all cows prior to surgery, we have some data available in Table 3.

Surgery was performed on all cows through a right flank laparotomy incision with the cow in a standing position, if possible. This is the author's preference because of minimizing the stress on the patient as well as allowing the

more thorough examination of the abdominal viscera.

The abomasum was usually found directly beneath the incision greatly distended with fluid and gas; therefore care was taken in making the incision to avoid entering the abomasum. By visual inspection the liver was usually seen displaced medially to the distended abomasum. Decompression of gas and/or fluid was accomplished either passively (with a needle and tubing) or actively (with a suction apparatus). By palpation one could determine the location and degree of rotation of the volvulus. In the case of omasal and abomasal involvement, the omasum was found resting on the abdominal floor caudal to the liver. In the case of reticular involvement the reticulum was rotated cranially and dorsally so that the honeycombs could be palpated up off of the ventral abdomen. A tight area of volvulus could be palpated between the rumen and reticulum.

TABLE 1. Number and percentage of cases of abomasal displacements 1975–1987.

Type	Number	Percentage
LDA	122	71
RDA	36	21
RDAO	8	5
RDAOR	5	3
Total	171	100

The surgical derotation of the organs was accomplished in two stages. Usually, the abomasum was replaced by using downward pressure of the left forearm of the surgeon on the distended organ. An attempt was made to push the organ ventrally and to the left. The abomasum would usually untwist. The next step was to reach downward along the ventral floor of the abdomen and slide the palm of the left hand underneath the distended omasum. The omasum was then pulled caudally in an attempt to rotate it in a clockwise manner. When the omasum untwisted, the reticulum followed. We then checked all

TABLE 2. Cases of right displacement of abomasum with omasal and reticular involvement (RDAOR).

Case	Cow#	Age	Duration	Outcome
510-996 T 102.3°; P 76; R 92;	553	4y	2 days - 2 weeks	lived 18 days; died; venous thrombosis
512-059 T 103.0° ; P 110; R 64;	122	2y	4 days necrosis	died day after surgery; ischemic
515-281 T 99.0°; P 120; R 12 (cold);	—	3y		unknown presented down died day after surgery; thrombosis
518-241 T 105.6°; P 80; R 68 (hot);	234	3y	2-3 days	aborted postoperatively; lived a few months; died
526-685 T 103.1°; P 80; R 108 (hot);	67	4y	1 day	returned to milking herd

TABLE 3. Laboratory findings in cows with RDAOR.

Case	Blood pH	HCO <sub>3</sub> <sup>-</sup>	Base excess	Chloride	Glucose
510-996	7.398	22.0	----	93	253
512-059	----	---	----	---	---
515-281	7.368	29.2	+ 5.9	---	---
518-241	7.363	24.2	+ 0.9	---	---
526-685	7.439	32.0	+ 9.6	91	---

the forestomachs to ensure that they were in their correct anatomic positions. They usually palpated abnormally because of distention. The gastric vessels were checked for presence or absence of viable pulse, a prognostic indicator. These were located on the medial aspect of the omasum and abomasum.

Post-operative therapy was aimed at restoring normal acid-base balance and hydration as well as encouraging restoration of normal microflora and appetite of the animal.

### Results and Discussion

Abomasal volvulus is usually considered a problem requiring emergency treatment.<sup>1,4,5,6,11</sup> A decision must be reached quickly regarding surgery based upon the value of the animal and other economic considerations. Some authors have attempted to forecast a prognosis for abo-

masal displacement or volvulus based upon clinical parameters such as serum chloride level,<sup>4,5</sup> blood gas analysis<sup>3,5,9</sup> or anion gap.<sup>1</sup> These estimations require the collection and analysis of blood prior to surgery. However, in many instances facilities may not be available for rapid determination of these parameters.

In any case, the degree of volvulus cannot be determined accurately before surgical laparotomy. In the five cases described in this paper the most severe degree of volvulus was encountered. Three animals died shortly after surgical correction, one aborted a fetus and lived for a few months with vague indigestion, and the other cow recovered and returned to the dairy. This is a success rate of only 20%. In cases of RDAO the success rate is much greater and in cases of RDA still greater. With LDA the success rate is approximately 90–95%. In the three cows which died, the onset of illness was prolonged and their condition at surgery was poor. The survivors were cows in

which the problem was detected relatively early and surgical intervention was prompt.

The findings above generally agree with those of others who have found gastric thrombosis and a rather high incidence of vagus indigestion syndrome in cattle postoperatively when abomasal volvulus existed.<sup>2,6,7</sup> Our findings also confirm previous descriptions of abnormal anatomy (2).

### Summary

During a 12 year period the author examined and treated 171 cases of abomasal displacements in a university referral practice. Forty-nine (29%) of the cases involved right displacement of the abomasum with or without omasal and reticular involvement. Five (3%) of

the cases were volvulus of the abomasum, omasum, and reticulum together. These 5 were all dairy cows but only 1 returned to the milking herd.

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## Increased Severity of Calf Pneumonia Associated with the Appearance of *Mycoplasma bovis* in a Rearing Herd

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An increase in deaths in calves from respiratory disease from an average of 9-7 per year to 36-5 per year corresponded with the isolation of *Mycoplasma bovis* from the lungs. It is suggested that this mycoplasma enhanced

the severity of the disease which was normally present on the farm. The characteristic microscopic lesion and demonstration of *M. bovis* by immunoperoxidase labelling could be useful aids to diagnosis.

## A Three-year Study of *Salmonella dublin* Infection in a Closed Dairy Herd

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Over a period of three years, *Salmonella dublin* was isolated occasionally from the faeces of nine adult cattle in a closed dairy herd. The organism was also isolated from 12 of the samples collected after parturition; isolations were made from newborn calves on 11 occasions, from a vaginal swab once and from a milk sample once. Nine of the isolations from the calves were made from swabs obtained within 24 hours of birth. Throughout the investigation isolations were made from heifers, steers and older calves, and 11 infected animals were detected.

*S. dublin* was widespread in the farm environment and it was concluded that environmental contamination was an important source of infection for animals of all ages, some of which may have become latent carriers. The family history of one cow, seven of whose offspring were infected with *S. dublin*, suggested the possibility of vertical transmission. Without reliable tests to detect latent carriers, it is suggested that control of this infection must be based on improved hygiene and the use of vaccination to improve the immunity of the herd.