

## ECONOMIC IMPACT OF DISPLACED ABOMASUM ON A DAIRY FARM IN CARAMBEÍ, PARANÁ

### *IMPACTOS ECONÔMICOS DO DESLOCAMENTO DE ABOMASO EM UMA PROPRIEDADE LEITEIRA EM CARAMBEÍ, PARANÁ*

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#### SUMMARY

Abomasum displacement is a multifactorial syndrome that occurs in high performance dairy cattle, especially during the first 6 weeks after delivery. Left abomasal displacement (LAD) is more frequent (85 to 96%). This paper aimed at evaluating the economic impact of abomasum displacement on a high performance dairy farm. During one year, eleven cases of abomasal displacement in female Holstein cows were followed. Of all the cases observed, 63% occurred on the 25th day after delivery. We verified that the comparison of milk production between before and after diagnosis showed a 74.5% decrease, which represents daily losses of R\$ 17.21 (US\$10.12) per sick cow. Each animal with abomasum displacement costed R\$417.00 (US\$248.00). Mean milk production was recovered an average of 14 days after surgery.

**KEY-WORDS:** Abomasum. Cost. Milk.

#### RESUMO

O deslocamento de abomaso é uma síndrome multifatorial que acomete bovinos de alta produção leiteira e pós-parto, neste, 90% dos casos ocorrem em até seis semanas após o parto, sendo que 90% dos casos podem ocorrer até seis semanas após. Dos transtornos dos vólculos abomasais, o deslocamento de abomaso para esquerda representa de 85 a 96% das ocorrências. O trabalho teve como objetivo avaliar os impactos econômicos provocados pelos casos de deslocamento de abomaso em uma propriedade leiteira de alta produção. No período de um ano, foram acompanhados onze casos de deslocamento de abomaso (DA) em fêmeas bovinas da raça Holandês. As ocorrências no 25º dia pós-parto corresponderam a 63% dos casos. Foi possível verificar, quanto à produção de leite antes e após a enfermidade, perda de 75,45%, com prejuízo diário de R\$17,21 ou US\$10.12 por vaca doente. No total, cada animal com DA dispendeu R\$ 417,00 ou US\$ 248.00. O retorno da produção normal de leite após a cirurgia ocorreu em média aos 14 dias.

**PALAVRAS-CHAVE:** Vólculo abomasal. Custo. Leite.

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## INTRODUCTION

Displaced abomasum is a common disease in dairy herds, which fits well into the profile of new diseases of modern cattle raising. This displacement results in economic losses due to treatment costs, decreased milk production, increased involuntary discharges and deaths (FARIA, 2010). In properties where abomasal displacement is often diagnosed, surgical correction is only a palliative measure that is not sufficient to control the disease. Dettleux et al. (1997) observed that from birth up to 60 days after diagnosis, dairy cows with this disorder produced 557 kg less milk than healthy animals, of which 30% of the losses occurred before diagnosis. Geishauser et al. (2000) cited by Van Winden & Kuiper (2002) estimated that the annual loss in North America due to abomasum displacement exceeds 220 million dollars.

Subclinical rumen acidosis, laminitis, hypocalcaemia, mastitis, retained placenta, metritis and ketosis lead to decreased food consumption, causing hypotonia/atonía of the digestive tract. The most important prerequisite for the displacement to occur is the total or partial cessation of the abomasum movement, with subsequent distension by gases (FARIA, 2010).

Cameron et al. (1998) argue that abomasum displacement is due to multifactorial causes, where nutrition and metabolism play a central role. Most abomasal displacement occurs in the first month after birth, or early lactation (85% of cases within the first 21 days). Thus, the preventive measures to be adopted should focus on factors that influence the onset of lactation (FARIA, 2010). During late pregnancy, the increasing grain intake should be avoided in order to prevent ruminal acidosis, and the diet should contain at least 17% crude fiber. Transition diets should be adequate to reduce the chances of indigestion. Retained placenta, metritis, mastitis and hypocalcemia are diseases that occur in the postpartum period, and must be treated immediately (CAMARA, 2010).

According to Bartlett et al. (1995), cited by Van Winden (2002), the economic importance of abomasal displacement depends on the impact and value of affected cows. The costs per patient ranged between US\$200.00 and US\$400.00 in the U.S., and €250.00 to €700.00 in the EU. The expenses depend on the treatment and replacement of animals, lactation performance and slaughtering value if surgical correction is not successful.

Seventy-nine percent of cows with displaced abomasum recover after treatment, 13% are killed and 9% die from complications. The average economic loss (milk/veterinary expenses) for cows that developed displaced abomasum may vary from 305 to 690 dollars per occurrence (ZERKEL & SHARNKS, 2006). These authors showed that 80% of the cows with left abomasal displacement produced from 1100 to 2200 less kilos of milk during lactation while about 10% of cows produced at least 8810 kilos less than expected.

In Brazil, left abomasal displacement (LAD) is frequently noted in dairy cows; however, the

economic losses resulting from the disease are unknown. Therefore, the objective of this study is to evaluate the economic impact of this disease in dairy cows in the region of Carambeí-PR.

## MATERIAL AND METHODS

Eleven cases of LAD that occurred in black spotted Holstein cows, four multiparous and seven primiparous, on a farm in Carambeí-PR, were followed for 12 months to assess the economic impact caused by the disease.

The farm has an area of 1700 hectares (ha), of these, 300 ha are for dairy farming. The property features 919 animals, with 471 lactating cows with an average daily production of 19,000 liters of milk, housed in free-stall system with rubber beds covered with canvas and sawdust. The milk is dried 45 and 60 days before the next delivery in primiparous and pluriparous cows, respectively. The body condition score (BCS) of pre-calving cows is 3.75 average, as indicated by Edmonson et al., 1986.

The feeding supplied to the cows consisted of minerals and additives (Premix<sup>®</sup>), protected fat (Megalac<sup>®</sup>), soybean meal, finely ground corn, citrus pulp, cottonseed *in natura*, pre-dried ryegrass and, soybean and corn silages. The meals were provided twice daily for lot 5 and 3 times a day for the lots 01 to 04, ranked according to the daily milk production. Lots 01 (18 newly calved cows), 02 (172 primiparous cows), 03 (119 high producing cows), 04 (101 average production cows) and 05 (61 late lactation cows) received respectively 44, 51, 59, 53 and 51 kg feed per day.

The milking (automated system with milk production control) was performed three times a day on all lots.

During a period of 12 months, of 425 lactating cows, 11 had LAD (2.58%). All affected animals were submitted to surgical treatment to correct the anomaly.

For analysis of the economic impact of the disease, we calculated the differences between daily milk production of each animal and the production of the day of the abomasal displacement diagnosis; time period (days) to normalize milk production after surgery; period (days post-partum) that the abomasal displacements occurred.

## RESULTS AND DISCUSSION

Of the 11 cows with LAD, seven were primiparous (63%) and four multiparous (37%). Therefore, at this particular farm, the disease was about 1.5 times more frequent in primiparous than in multiparous cows. It is known that the onset of lactation is a high risk period for the development of the abomasal displacements, particularly in heifers, which have low levels of social interaction and nutritional adaptation, considered predisposing factors for the occurrence of the disease (CARDOSO, 2007).

Among displacement, LAD contributes with 85% to 95.8% of cases (SATTLER, 2000).

Of the 11 cows with LAD, five had retained placenta (45.45%) while four of these developed metritis (36.6%); five had mastitis (45.45%) and one had interdigital phlegmon (9.09%) before the occurrence of LAD. It is noteworthy that one animal had two conditions (retained placenta and phlegmon). Nevertheless, subclinical rumen acidosis, laminitis, hypocalcaemia, mastitis, retained placenta, metritis and ketosis are diseases that cause anorexia, resulting in less movement of the digestive tract (CARDOSO, 2004). Massey et al. (1993) reported that hypocalcemic cows at calving (total serum calcium < 7.9 mg/100mL and serum ionized calcium < 4mg/100mL) had a higher risk of displaced abomasum, possibly due to reduced ruminal and abomasal motility. Thus, it appears that the diseases diagnosed postpartum contributed with abomasal atony, organ distension due to gases, important factors that can lead to LAD (FARIA, 2010).

The incidence of rejection or death from post-surgical complications, disease or inability to resume milk production after displaced abomasum was 27%. However, 73% of the animals responded to treatment, with a return to the average milk production around 14 days after surgery. Zerkel & Sharnks (2006) observed that 79% of the cows that developed displaced abomasum recovered after treatment while 12% were slaughtered and 9% died of complications.

The flock was assisted by a consulting veterinarian, through a technical assistance plan. The average cost of surgery was R\$350.00 or US\$205.00 while postoperative average cost was R\$50.00 or US\$29.00. Zerkel & Sharnks (2006) stated that the average economic loss (milk losses/veterinary expenses) for cows that developed displaced abomasum can vary from US\$305.00 to US\$690.00 per event and surgery costs about US\$250.00 per occurrence. Similar values were reported by Bartlett et

al. (1995) who estimated economic losses between US\$250 and US\$450, depending on how LAD was treated.

Table 1 summarizes the postpartum days when LAD occurred and the period necessary to resume milk production after surgical treatment. The average daily milk production before LAD, the amount of milk produced on the day of diagnosis and the calculated economic losses are shown in Table 2.

The average milk yield per cow before LAD was 33 liters of milk/day. On the day the displacement occurred, the measured average was 10.6 liters/cow, or 75.45% loss, with a daily loss of R\$17.21 or US\$10.12 per sick cow. The expenses on each animal with LAD were on average R\$417.00 or US\$248.00, including treatment costs and production losses. With regard to production per lactation, Zerkel & Sharnks (2006) reported that 80% of cows with LAD yielded 1100-2200 less kg of milk during lactation. In Brazil, there is lack of studies evaluating the economic losses caused by LAD, thus preventing a more accurate discussion of the results.

It appears that the cows affected by LAD were able to resume average milk production after 14 days (Table 2). Detilleux et al. (1997) observed that from birth until 60 days after the diagnosis of abomasal displacement, milk cows produced 557 kg less milk than healthy animals, of which 30% of the losses occurred before diagnosis. In most cases (63%), the disease occurred 25 days postpartum (DPP) while in the other cows (37%) up to 70 DPP, an average of 42 DPP. FARIA (2010) reported that most abomasal displacement occurs either during the first month after birth or early lactation (about 85% of cases within the first 21 days). Sexton et al (2007) relate the high incidence of displaced abomasum in the first month of lactation with the high metabolic and feeding stress.

**Table 1** - Number of days postpartum when LAD was diagnosed and the period needed to resume milk production after surgical treatment, Carambeí, PR.

Animal No.	LAD	Recovery of milk production
	Days after delivery	Days after surgery
2087	06	07
2090	11	11
2024	25	11
2048	20	18
2008	76	12
1884	100	20
1861	74	18
1335	05	19
1022	102	Not returned
1749	25	16
1758	20	24
Average	42	14

LAD - left abomasal displacement.

**Table 2** - Economic losses, average milk production before and on the day of diagnosis of LAD in dairy cows, Carambei, PR.

Animal	Average milk production before LAD	Milk production on the day of LAD	Loss of milk production	Economic losses / day	
				R\$	US\$ *
No.	Liters	Liters	%		
2087	15	04	73	8.45	4.97
2090	35	17	51	13.86	8.15
2024	33	13	61	15.40	9.00
2048	40	16	60	18.48	10.86
2008	34	13	62	16.17	9.50
1884	38	09	76	22.33	13.13
1861	25	04	84	16.17	9.50
1335	33	09	73	18.48	10.87
1022	38	10	74	21.56	12.70
1749	30	05	83	19.25	11.32
1758	42	17	60	19.25	11.32
Average	33	10.6	75.45	17.21	10.12

\* Official Rate of the day

The results of this study also corroborate Trent (2004), cited by Camara (2009), who reported that 57% of the cases occur in the first two weeks postpartum, 80% within the first month and 85% to 91% during six weeks postpartum. Although in this study, two animals (1884 and 1022) had the disease for a mean period of lactation. Possibly the concomitant affections (mastitis, metritis and interdigital phlegmon) of cow 1022, diagnosed postpartum, contributed to reduce food intake, thus predisposing the cow to LAD. On the other hand, cow 1884 did not have any concomitant condition; therefore, LAD was not attributed to any known risk factors.

Although several individual factors have been pointed out as predisposing (BARROS FILHO; BORGES, 2007; FUBINI; DIVERS, 2008; DOLL et al., 2009), there are also multifactorial causes that often go unnoticed by owners or handlers and may trigger LAD. The average body condition score of cows was 3.75, a rate considered good for dairy cattle, but some animals had inadequate body condition score at calving, a factor that might have prolonged the period

of negative energy balance, and at the same time, act as a predisposing factor to LAD.

## CONCLUSION

The results showed that the average cost of displaced abomasum was R\$417.00 or US\$248.00 per sick cow, the equivalent of 541 liters of milk, which was calculated using the cost per liter of milk in November 2010 (R\$0.77 and US\$0.45). The abomasal displacement occurred on average 30 days post-calving and milk production resumed on average 14 days after the disease was treated.

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