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## **Surgical management of left displaced abomasum in dairy cattle**

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### **Clinical scenario**

Upon diagnosing a left displaced abomasum in an otherwise healthy 4<sup>th</sup> lactation Holstein cow on a 150-cow dairy client's farm, you must make a decision regarding treatment options. Your practice routinely performs both right-sided omentopexy and laparoscopy-guided abomasopexy, and your client wants to know which technique is likely to produce the most rapid clinical recovery.

### **The question**

In [dairy cattle with a left displaced abomasum] does surgical treatment by [laparoscopy-guided abomasopexy compared with right-sided omentopexy] show [improved speed of clinical recovery]?

### **Search parameters**

(cow OR cattle OR bovi\*) AND left AND (displaced OR abomas\*) AND (laparo\* OR right\$flank) AND omentopexy

### **Databases searched**

- Medline: All years - 2015 Week 31, using Ovid SP interface
- CAB Abstracts: 1973 - 2015 Week 31, using Ovid SP interface

Limits: English language only

### **Search results**

CAB Abstracts via Ovid SP: 17 papers found, 13 considered irrelevant because they did not answer the question

Medline via Web of Science: 7 papers found, all duplicates of those in CAB Abstracts

Total number of papers used: 4

### **Search last performed**

August 13th 2015

### **SUMMARY OF EVIDENCE**

**Paper 1:** Peritoneal inflammatory response to surgical correction of left displaced abomasum using different techniques (Wittek and others, 2012)

**Patient group:** Lactating dairy cows with diagnosed left displaced abomasum, n=45

**Study type:** Non-blinded, non-randomised controlled trial

**Outcomes:** Rumen contraction rate, blood and peritoneal fluid biochemistry and haematology for three days post-surgery were measured.

**Key results:** The rumen contraction rate increased significantly faster in the laparoscopy-guided abomasopexy group compared with the right or left flank omasopexy groups ( $p < 0.05$ ). Creatine kinase activity increased significantly in the right and left flank omasopexy groups compared with the laparoscopy-guided abomasopexy group ( $p < 0.05$ ). No significant differences were found between groups in the number and differentiation of leukocytes in peritoneal fluid.

**Study weaknesses:** No power calculation was reported, and the sample size was small ( $n = 45$ ). The study was not blinded due to the nature of post-operative wounds. Animals were hospitalised and intravenous fluids were administered for 24 hours post-surgery, which does not reflect standard protocols used in the United Kingdom.

WITTEK, T., FÜRLI, M. & GROSCHE, A. (2012) Peritoneal inflammatory response to surgical correction of left displaced abomasum using different techniques. *Veterinary Record* **171**, 594-599

**Paper 2:** Effect of surgical correction of left displaced abomasum by means of omentopexy via right flank laparotomy or two-step laparoscopy-guided abomasopexy on postoperative abomasal emptying rate in lactating dairy cows (Wittek and others, 2009)

**Patient group:** Lactating dairy cows with diagnosed left displaced abomasum without signs of concurrent disease,  $n = 30$

**Study type:** Non-blinded, randomised controlled trial

**Outcomes:** Rumen contraction rate, abomasal emptying rate following infusion with D-xylose and daily milk yield for three days post-surgery were measured.

**Key results:** The rumen contraction rate was significantly higher for three days post-surgery in cows treated with laparoscopy-guided abomasopexy ( $p < 0.05$ ). The abomasal emptying rate was 192 ( $\pm 51$ ) minutes for laparoscopy-guided abomasopexy, compared with 264 ( $\pm 94$ ) minutes for right-sided omentopexy. This is significantly faster ( $p < 0.05$ ). Daily milk yield in the first three days post-surgery was not significantly different between treatment groups, although an overall postoperative increase in milk yield was identified in cows treated with laparoscopy-guided abomasopexy.

**Study weaknesses:** No power calculation was reported, and the sample size was small ( $n = 30$ ). The study was not blinded due to the nature of the post-operative wounds. Follow-up was limited to three days post-surgery and therefore did not take into account longer-term outcomes such as recurrence. Cows received intravenous saline and glucose solution every 12 hours for 48 hours post-surgery, which does not reflect does not reflect standard protocols used in the United Kingdom.

WITTEK, T., LOCHER, L., ALKAASSEM, A. & CONSTABLE, P. (2009) Effect of surgical correction of left displaced abomasum by means of omentopexy via right flank laparotomy or two-step laparoscopy-guided abomasopexy on postoperative abomasal emptying rate in lactating dairy cows. *Journal of the American Veterinary Medical Association* **234**, 652-657

**Paper 3:** Comparison of 2-step laparoscopy-guided abomasopexy versus omentopexy via right flank laparotomy for the treatment of dairy cows with left displacement of the abomasum in on-farm settings (Roy and others, 2008)

**Patient group:** Lactating dairy cows with diagnosed left displaced abomasum, with or without concurrent disease. All animals were patients of the University of Montreal's Bovine Field Service ( $n = 253$ )

**Study type:** Non-blinded, non-randomised controlled trial

**Outcomes:** Appetite (as % usual daily feed intake), comfort (measured by farmer opinion - comfortable vs. uncomfortable) and milk yield (measured by volume in relation to expected yield as very satisfactory, satisfactory or unsatisfactory) were measured.

**Key results:** There was no significant difference ( $p>0.05$ ) in appetite between groups. There was no significant difference ( $p>0.05$ ) in comfort between groups. There was no significant difference ( $p>0.05$ ) in milk yield between groups.

**Study weaknesses:** Student involvement in some procedures may have affected results due to likely increased surgical time, increased risk of contamination with more than one surgeon, etc. Cows were not randomly allocated to treatment groups, and the study was not blinded. Two measured outcomes (comfort and milk yield) were subjective and subject to bias based on farmer interpretation of 'satisfactory'. There was a significant difference between the treatment groups in the number of cows with acetoaemia on the day of surgery. Effects of acetoaemia on appetite and milk yield are likely to have confounded results. Confidence intervals or standard deviations are not stated, therefore the precision of the true effect is not known.

ROY, J.-P., HARVEY, D., BELANGER, A. & BUCZINSKI, S. (2008) Comparison of 2-step laparoscopy-guided abomasopexy versus omentopexy via right flank laparotomy for the treatment of dairy cows with left displacement of the abomasum in on-farm settings. *Journal of the American Veterinary Medical Association* **232**, 1700-1706

**Paper 4:** Comparison of laparoscopic-guided abomasopexy versus omentopexy via right flank laparotomy for the treatment of left abomasal displacement in dairy cows (Seeger and others, 2006)

**Patient group:** Lactating dairy cows with diagnosed left displaced abomasum and without concurrent disease,  $n=120$

**Study type:** Non-blinded, randomised controlled trial

**Outcomes:** Success of repositioning and fixation; incidence of complications including relapses; daily energy intake (MJ NEL/day); daily milk yield (litres/day); acetoaemia (ketone bodies in urine measured semi-quantitatively with test strip 0-3)

**Key results:** Success rate and complication rate did not differ significantly ( $p>0.05$ ). Daily energy intake increased significantly more ( $p<0.001$ ) for laparoscopy-guided abomasopexy group. Daily milk yield also increased significantly more in the laparoscopy-guided abomasopexy group over the five days post-surgery ( $p=0.003$ ). Urine ketone body concentration did not differ significantly between treatment groups ( $p>0.05$ ).

**Study weaknesses:** No mention of blinding to outcome measurements. Study states low-risk of complications as a benefit of laparoscopy-guided abomasopexy, but the results do not support this. Cows only measured for five days post-surgery, which does not account for long-term outcomes. The surgeries were performed in a hospital setting, which does not reflect the location of most surgical procedures in the United Kingdom.

SEEGER, T., KÜMPER, H., FAILING, K. & DOLL, K. (2006) Comparison of laparoscopic-guided abomasopexy versus omentopexy via right flank laparotomy for the treatment of left abomasal displacement in dairy cows. *American Journal of Veterinary Research* **67**, 472-478

**Comments**

The papers reviewed agree that both techniques are clinically viable options in treating left displaced abomasum. The evidence provided by the Roy and others study is least robust because, despite having the largest sample size, the outcomes measured were subjective, and few attempts to reduce bias are stated. The Seeger and others study provides the strongest evidence to answer this question, due to the larger sample size, quantitative outcome measures and longer-term measurement.

It is prudent to consider a range of factors when choosing a treatment, such as cost, surgeon experience, surgery time and the magnitude and likelihood of post-operative complications if they arise. Laparoscopic techniques have success rates slightly lower than, but approaching that of right-sided omentopexy. However, when considering immediate clinical recovery (gastrointestinal function, milk yield recovery, appetite, inflammatory markers, etc.), laparoscopic abomasopexy is superior to right flank omentopexy.

### **Bottom line**

**Treatment of cows with a left displaced abomasum via a laparoscopy-guided abomasopexy produces a faster clinical recovery than via a right-sided omentopexy.**

### **Acknowledgments**

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