

Surgical Correction of Left Displaced Abomasum

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Introduction

Displacement of the abomasum (DA) has developed over the past years into one of the most important metabolic and organic internal disorders in cattle. The disease is most frequent in high performing milk breeds (Sali *et al*, 1987; Karatzias, 1992; Lotthammer, 1992). The number of patients with DA in this clinic lie between 20 to 25%. Possible treatment of animals with a left displacement of the abomasum (LDA) include conservative methods, *e.g.*, hay diet, spasmolytic agents, analgesics, parasympathomimetic agents, puncture of the abomasum, or rolling and surgical intervention. It must be realized that conservative methods harbor the risk of a renewed displacement and the possibility of future recurrence.

Methods of Operation

Throughout the literature several different methods of surgical correction and prevention of LDA have been proposed for quite some time (Hansen *et al*, 1957; Jennings, 1957; Rosenberger and Dirksen, 1957; Wood, 1957; Steere and Nealy, 1958; Straiton and McIntee, 1959; Numans, 1961; Dirksen, 1961 and 1967; Lagerweij and Numans, 1962 and 1968). The most accepted methods with recurrence prevention (Klee and Kehler, 1991) at the time are:

1. Right side laparotomy with concurrent caudo-ventral omentopexia (Dirksen, 1961 and 1967) - the so called Hannover Method-
2. Left side laparotomy with concurrent ventral omentopexia (Lagerweij and Numans, 1962 and 1968) - the so called Utrecht Method-
3. Ventral laparotomy with abomasopexia (Straiton and McIntee, 1959)
4. "Blind Stitch": Fixation of the abomasum to the ventral abdominal wall without laparotomy (Hull, 1972)
5. "Toggle suture": Fixation of the abomasum to the

ventral abdominal wall without laparotomy (Grymer and Sterner, 1982)

This clinic prefers the use of the method by Dirksen (1961 and 1967): Laparotomy is performed in the right flank with the incision directed from caudo-dorsal to cranio-ventral. The surgeon inserts his left hand and reaches behind the bowels over the rumen to the displaced abomasum. The abomasum is then punctured at its most elevated point with a needle attached to a hose leading the accumulated gas out through the incision. The needle and hose are removed after deflation of the abomasum.

Following this, the hand is inserted cranio-ventrally along the ventral abdominal wall pushing and elevating the bowels to the right of the rumen into a right dorsal position. In doing so the abomasum, which is attached to the bowels via the great and lesser omentum, slides back into its normal position. The pylorus is then located as a firm palpable structure within the soft bowel masses. The caudo-ventral portion of the great omentum is then pulled as far as possible into the incision. It may be held here with the use of a rumen holding forceps. The great omentum is then attached to the abdominal wall by means of a button. The button is attached approximately one hand's width away from the pylorus with a sturdy synthetic suture. A second incision is then made just above the subiliac region. The loose ends of the button suture are then pushed through the abdominal wall into the skin incision with a strong needle. A second button is then tightly fastened with the ends of the suture pulling the inside button in place. The second button is attached subcutaneously to the outside of the abdominal wall. The inside button attached to the great omentum should now be in tight contact with the abdominal wall. The mesenteria should be slightly tense.

For beginners and inexperienced surgeons, this method often leads to problems:

1. Complete deflation of the abomasum. While deflating the abomasum by reaching it from above the rumen, it is often difficult to follow the receding organ as it moves cranio-ventrally. The remaining gas can complicate the repositioning or

make it partially impossible.

2. Reposition of the abomasum by elevating the bowel to the right of the rumen, into a right dorsal position. These problems are possibly due to the increase of body-frame size of dairy cows (Holstein-Friesian and Red Holstein crossbreeds) in the past few years. With the increase in body size, there is also an increase in bowel volume which in return leads to difficulties applying this method when the abomasum is strongly filled. Further complications develop in pregnant animals.
3. Finding the pylorus and/or the great omentum and completing the reposition by pulling the great omentum. Extreme difficulties in performing these tasks are due to remaining gas in an incompletely deflated abomasum or a strongly filled organ. Well fed animals often have a very fragile omentum which can lead to tears while pulling.
4. Determining the position for fixation of the great omentum a hand's width away from the pylorus.

In order to simplify this method by Dirksen, the operation on 200 adult cows, within two years, was performed in the following way:

1. Laparotomy in the right flank. The incision should begin approximately 8 to 10 centimeters below the lumbar spine and run vertically in an appropriate length (20 to 25 cm) (Fig. 1). In dealing with deep chested cows, it is advisable to lengthen the incision ventrally. This allows the surgeon to possibly reach the abomasum by going underneath the rumen or even in front of it. A further advantage is that the great omentum and the pylorus can thus be brought under sight control.



Figure 1. Incision line for right sided laparotomy.

2. Deflation of the abomasum as previously described.
3. Following deflation the flat hand is moved in a cranio-ventro-medial direction towards the front of the rumen alongside the abdominal wall. As soon as the middle of the abdomen is surpassed, one must push the dorsal and ventral cranial sacks of the rumen in a caudo-dorsal direction, while continuing to reach towards the abomasum located on the left side of the rumen. In doing so the surgeon inevitably reaches the displaced abomasum located between the rumen and the left abdominal wall. The abomasum is firmly grasped on its most elevated point with a flat hand and spread fingers and pulled in a ventro-cranio-medial direction. The abomasum is edged around the rumen by moving it partially below and partially in front of the rumen into a right sided position. It is then further pulled in a caudal direction as far into the incision as possible. The pylorus is thus moved into a position near or in the orifice of the incision. If the abomasum cannot be reached the first time, then the surgeon must continue to try and push the rumen in a caudo-dorsal direction. In a continuous effort it becomes easier to move the rumen, and the top of the abomasum can be reached. Should the abomasum still not budge, then it could well be possible that the abomasum has adhered to the rumen or even to the left abdominal wall. It is then essential to try and cautiously pry the abomasum from its adherence by hand. Further complications in repositioning the abomasum can be due to an obstruction by the ligamentum teres which runs from the liver to the navel. By puncturing this ligament at its base at the navel using a finger, it is then possible to carefully "tear" the created strands.

Having completed this part of the repositioning, the experienced surgeon is now able to palpate the pylorus in the great omentum as a structure approximately the size and texture of a hard boiled egg. After having located the pylorus, the repositioning continues by further pulling the omentum or the pylorus itself in a caudo-dorsal direction. Thus the pylorus is revealed and may be recognized by its typical shape and colour (Fig. 2). Should the surgeon not be able to find the pylorus by means of palpation, it is advisable to pull the portion of the omentum in the cranio-ventral part of the incision to a more elevated position. It is necessary that the most lateral and cranio-ventral portion of the omentum is the portion pulled on. In order to differentiate the

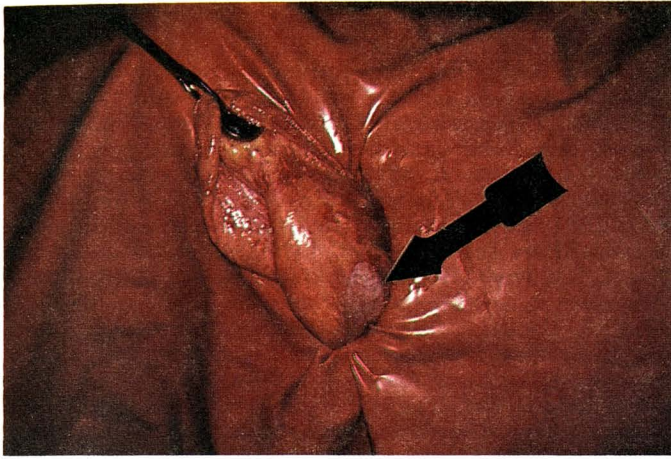


Figure 2. The greater omentum with the pylorus (arrow) as seen in the incision site.

great omentum from the lesser, it is suitable to observe the thickness, consistency and colour of the structure in hand. Depending on the amount of fatty tissue present, the great omentum is usually light yellow in colour with a fleshy and fatty consistency and much thicker than the lesser omentum. The finding of a typical, flabby, bulgy lobe-like structure (Fig. 3), referred to as the "pig's ear" (Trent, 1990), located in the great omentum near the pylorus is a further indication for the correct identification of the great omentum. According to EDVI (1987)

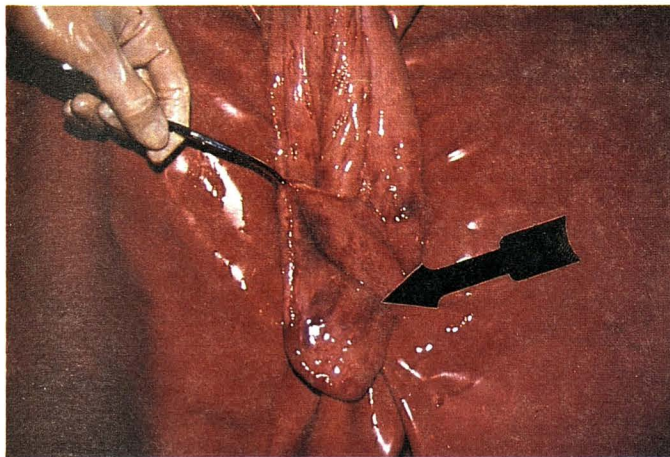


Figure 3. The greater omentum with the so called "pig's ear" (arrow) as seen in the incision site.

70% of these fatty structures are located within 10 to 25 cm from the pylorus. With the identification of the greater omentum, it is then possible to pull it caudo-dorsally into the incision area (as mentioned above). Determining the correct position of the omentopexia, located approximately a hand's width caudo-dorsally of the pylorus, fixation no longer poses a problem (Fig. 4). In fixating the internal button, it is essential that no small intestines are wedged, and that the fixation site is not too close to the pylorus (Figs. 4 and 5).

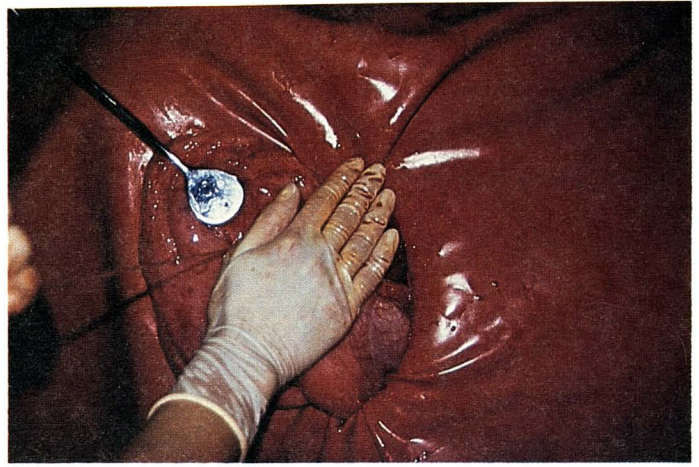


Figure 4. The omentopexia, a hand's width caudo-dorsally to the pylorus.

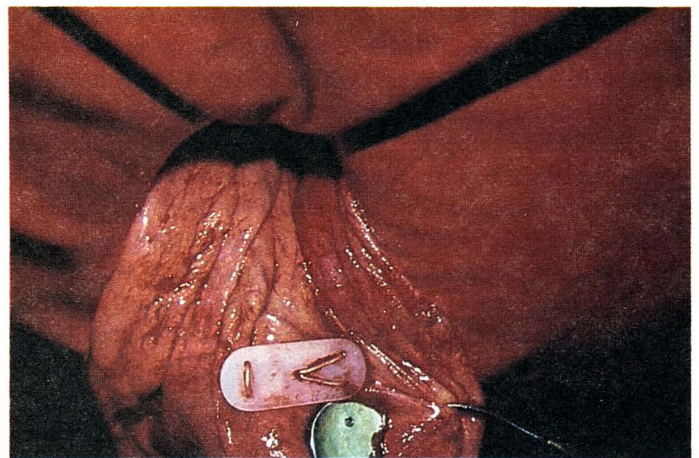


Figure 5. Location of the inside button on the greater omentum.

The fixation of the outer button is dependent on the strain imposed on the greater omentum and the size and volume of the repositioned abomasum. The location is determined by taking the button attached to the omentum and gently pulling it together with the omentum in a caudal direction. As soon as the omentum is slightly tense, the position for the subcutaneous, outer button is reached. An incision of approximately two cm length is made at this position in the skin. The button is attached with a simple suture (Fig. 6). The achieved position of the pylorus by means of this method is slightly further dorsal than its normal position near the ventral end of the 9th and 11th rib. Having progressed in the described way almost the entire abomasum becomes located on the right hand side. The risk of wedging small intestines while fixating in this dorsal position is very small due to the ventral location of the small bowels.

The repositioned abomasum is checked by running the left hand from the tight omentopexia area of the



Figure 6. Fixation site of the outside button.

great omentum over the pylorus on the visceral side of the abomasum in a cranio-ventro-medial direction. The abomasal fundus and the reticulum can be reached by continuing in this direction (this inspection of the repositioned abomasum is also applied in repositioned, right-sided displacements). The right sided position and the higher elevation of the pylorus do not seem to impair the function of the abomasum nor the cow itself in any way. In fact, both seem to contribute to lesser recurrences.

The use of this method in cases with slightly to mildly displaced abomasums does not require a deflation of the abomasum. This decreases the risk of contracting a peritonitis and saves operating time.

Summary

Surgical correction of left displaced abomasum in 200 adult cattle was performed using a modification of the method originally described by Dirksen. Manual reposition of the dislocated organ, localisation of the pylorus and fixation of the omentum majus are described in detail.

Acknowledgement

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References

1. Dirksen, G. (1961): Die Erweiterung, Verlagerung und Drehung des Labmagens beim Rind. *Zbl. Vet.-Med.*, 8, 934-1015.
2. Dirksen, G. (1967): Gegenwärtiger Stand der Diagnostik, Therapie und Prophylaxe der Dislocatio abomasi sinistra des Rindes. *Dtsch. Tierärztl. Wschr.*, 74, 625-633.
3. Edvi, P. (1987): Untersuchungen über die Beziehungen zwischen Lebensalter und Körpergewicht sowie Lage, Form und Größe der pylorusnahen Fettsfalte ("pig's ear") im großen Netz des Rindes. *Dtsch. Tierärztl. Wschr.*, 94, 346-350.
4. Grymer, J. u. K. E. Sterner (1982): Percutaneous fixation of left displaced abomasum, using a bar suture. *J. Am. Vet. Med. Ass.*, 180, 1458-1461.
5. Hansen, A. G., E. R. Elefson, H. E. Warsinske, O. Hjort, u. R. Schoenberg (1957): Displaced abomasum: A relatively common bovine syndrome. *North. Am. Vet.* 38, 129-134.
6. Hull, B. L. (1972): Closed Suturing Technique for Correction of Left Abomasal Displacement. *Iowa State Univ. Veterinarian*, 34, 142-144.
7. Jennings, S. (1957): Method of correcting the displaced bovine abomasum. *Vet. Med.*, 69, 435-436.
8. Karatzias, H. (1992): Untersuchungen über späteren Verbleib von Milchkühen mit operativ behandelte links- bzw. rechtsseitiger Labmagenverlagerung in Griechenland. *Mh. Vet. Med.*, 47, 463-466.
9. Klee, W. u. W. Kehler (1991): Operationsverfahren bei linksseitiger Labmagenverlagerung. *Tierärztl. Praxis*, 19, 466-467.
10. Lagerweij, E. u. S. R. Numans (1962): Die operative behandelingsmethoden van en gedислоceerde lebmaag bij het rund. *Tijdschr. Diergeneesk.*, 87, 328-337.
11. Lagerweij, E. u. S. R. Numans (1968): Die operative behandeling van le lebmaagdislocatie bij het rund volgens de "Utrechts methode". *Tijdschr. Diergeneesk.*, 93, 366-376.
12. Lotthammer, K.-H. (1992): Epidemiologische Untersuchungen über das Vorkommen von Labmagenverlagerungen (dislocatio abomasi) in Milchrinderbeständen. *Tierärztl. Umschau*, 47, 320-328.
13. Numans, S. R. (1961): Erfahrungen mit der operativen Reposition von Lageveränderungen des Labmagens und im Dickdarmkomplex des Rindes. *Dtsch. Tierärztl. Wschr.*, 68, 12-17.
14. Rosenberger, G. u. G. Dirksen (1957): Über die Labmagenverlagerung des Rindes. *Dtsch. Tierärztl. Wschr.*, 64, 2-7.
15. Sali, G., Sali, A. u. M. Sali (1987): Zwanzigjährige Erfahrungen mit Labmagenverlagerungen beim Rind. *Tierärztl. Umschau*, 42, 438-440.
16. Steere, J. H. u. J. Nealy (1958): Correcting the displacement of the bovine abomasum. *Mod. Vet. Pract.*, 39, 45-48.
17. Straiton, E. C. u. D. P. McIntee (1959): Correction of the displaced abomasum. *Vet. Rec.*, 71, 871-874.
18. Trent, A. V. (1990): Omentopexie Technique from Right Paralumbar Fossa. In: BRISTOL D.G. (Hrsg): *The Veterinary Clinics of North America, Food Animal Practice, - Surgery of the Bovine Digestive Tract - Bd. 6*, S. 432-434, W. B. Saunders Company.
19. Wood, C., (1957): Displacement of the bovine abomasum. *Vet. Rec.*, 69, 91-92.