

# Four Methods of Surgical Correction of Abomasal Displacement in the Cow

by  
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The purpose of this paper is to compare and contrast various surgical methods of correction of displaced abomasum in cattle. Points to be considered include: The relative ease of the procedure; the exposure afforded if complications arise; and, of course, the chances of success.

The abomasum normally lies slightly to the right of the midline on the floor of the abdominal cavity extending from the xiphoid to the ninth or tenth rib with the body between the ventral sac of the rumen and the omasum. The superficial part of the greater omentum is attached to the greater curvature of the abomasum and to the transverse duodenum.<sup>10</sup> When the abomasum is displaced to the left it is usually found in or just anterior to the left paralumbar fossa between the rumen and the body wall. In a displacement the greater omentum is stretched ventral to the rumen since it also attaches to the duodenum. The proximal portion of the abomasum near the omaso-abomasal orifice will be stretched and could be torsed.

The object of any surgery to correct a displaced abomasum is to return it to a normal position. It is also important to stabilize it in that position to prevent recurrence of the problem. At the present time there are four methods of correction that are used regularly by veterinarians: left paralumbar abomasopexy, right paralumbar omentopexy, right ventral abomasopexy and closed suture abomasopexy.

To prepare for the right paralumbar omentopexy<sup>3,4,8</sup> the cow is restrained in a head-gate or stocks and given tranquilizers as is seen fit by the surgeon. The

paralumbar fossa is clipped and surgically scrubbed. Either a paralumbar nerve block or inverted "L" block is placed with 2% lidocaine to anesthetize the site of the incision. A 20 cm skin incision is made vertically in the center of the paralumbar fossa. The external and internal oblique muscles are incised as they are encountered as is the transversus abdominis. The peritoneum is carefully incised so as not to cut any underlying structures. At this point the surgeon inserts his arm and passes posterior to the intestinal mass and the rumen to the left abdominal wall where he should be able to palpate the gas-filled abomasum. Then using a large bore needle and rubber tubing the abomasum is deflated to expedite return to the right side. The abomasum is swept ventral to the rumen by the surgeons hand and forearm until it can no longer be detected on the left. At this point the duodenum is located in the superficial layer of the greater omentum. It should be running transversely across the area of the incision. Trace it anteriorly to the pylorus to verify the presence of abomasum on the right side. A fold of this omentum is then attached to the edge of the incision with a staple suture of #3 gut. The omentum is included in the first layer of the standard three layer laparotomy closure thereby establishing an omentopexy to stabilize the abomasum.<sup>3,4</sup>

This operation can be done by one man working alone and can be done in a short period of time. If adhesions are present they must be broken down blindly hoping not to perforate the abomasum. If there is a perforating ulcer or a rent is made in the abomasum a left flank laparotomy is indicated to attain exposure to effect repairs on the abomasum. There is also a chance of peritoneal contamination when the needle

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is removed from the abomasum. Also, a friable abomasum could easily tear in the process of replacement. Gabel at Ohio State University claimed 86% success in 147 cases operated in this manner.<sup>3</sup> This is by far the greatest number operated on in any published study of the right approach. Recurrence was seen in fewer than 3% of the cases and involved an elongation of the omentum attached to the abdominal wall.

Correction of a displaced abomasum via the right ventral abomasopexy<sup>7,8,9,12</sup> requires that the animal be restrained on its back with the fore and hind limbs stretched out. A tranquilizer is usually needed to place the cow in this position. The surgical site is just posterior to, and to the right of the xiphoid, midway between the ventral midline and the milk vein. The area is clipped and scrubbed as is standard for surgery and a line block is placed with 2% lidocaine along the incision line. The incision extends about 20 cm from just posterior to xiphoid. The aponeurosis of the external oblique is encountered and cut as is the rectus abdominis muscle. Then the transversus abdominis and peritoneum are carefully incised. The surgeon can now insert his arm into the abdominal cavity and reaching across the midline can palpate and retrieve the gas-filled abomasum. At this point decompression may rarely be necessary to return the abomasum to a more normal position. Once the abomasum is in place, an abomasopexy is performed by suturing the abomasum to the lateral margin of the incision using simple interrupted or mattress sutures with #3 gut. Then the abomasal musculature is closed in the first layer of the incision with the peritoneum and transversus abdominis. The rectus, abdominal tunic and skin are all closed separately.

This technique will cause two lines of adhesions of the abomasum to the right abdominal wall. We again are faced with the possibility of tearing the abomasal wall through blindly breaking down the adhesions. In such a case the abomasum can be and should be inspected for ulcers that are nearing perforation. This surgery can be done by one man, however, a minimum of three would have to be present to adequately position the animal. With the animal tranquilized and on its back there is

a possibility of regurgitation and aspiration of rumen content. This is a factor that must be considered as a risk when contemplating the surgery.

A publication of this surgery from Cornell University revealed 94% success in 82 cases.<sup>7</sup> A good adhesion would be directly formed between the abomasum and ventral abdominal wall thereby permanently establishing the abomasum in its correct position.

Abomasopexy of the displaced abomasum can also be done from the left side by using a left paralumbar laparotomy.<sup>5,8,11</sup> In preparation for surgery the animal is clipped in the area of the left paralumbar fossa. Another spot is also clipped and prepared for surgery just to the right of the ventral midline and posterior to the xiphoid area. A paralumbar or field block is placed to anesthetize the operative site in the paralumbar fossa. A 20 cm vertical skin incision is made 5-6 cm posterior to the last rib. The external oblique, internal oblique, transversus abdominis and peritoneum are each cut in turn as they are encountered. The abomasum should be readily visible in the incision or just anterior to it. Approximately two meters of heavy Vetafil is double armed with straight cutting needles. The Vetafil is passed through the muscle of the abomasum in a continuous in and out pattern over the greater curvature, being careful to avoid the omental attachments. With the needles held in the surgeons hand in a protective manner the surgeon passes his hand along the abdominal wall ventral to the rumen and across the midline. Here he palpates with his finger until an assistant directs him to the prepared site to the right of the midline. One needle is pushed through the ventral abdominal wall and the second is placed 10-15 cm posterior. Then with hand and forearm the surgeon forces the abomasum ventrally until it is in contact with the body wall while the assistant gently takes up the slack in the ventral suture. The suture is tied on the outside by the assistant when the surgeon has determined there are no structures between the abomasum and the body wall. The gas in the abomasum generally passes off as it is manipulated back into normal position. The laparotomy

incision is closed using a three layer technique.

The best exposure of the abomasum is probably gained using this technique. The abomasum is readily inspected and repaired at the site of incision. The suture should be placed immediately in the abomasum so that through excessive manipulation it does not lose gas and slip away. The ventral suture will cause a relatively firm adhesion between the body wall and the abomasum. Using this technique an 80% or better success rate can be obtained.<sup>1</sup> The surgeon will need an assistant to complete this operation. Although the assistant need not know an excessive amount of surgical technique, he must be able to tie a square knot. If the suture is tied too tight there is a possibility of tearing the abomasum before a firm adhesion could be established.

The closed suture technique<sup>6,13</sup> for abomasopexy is a modification of a non-surgical technique<sup>2</sup> and the most inexpensive of the methods of correction of left displaced abomasum. It calls for the use of two or three assistants since the cow must be rolled about. In preparation the ventral abdomen must be clipped from xiphoid to umbilicus between the midline and milk vein on the right side. The cow is then cast using a reliable rope technique and put on her right side. The fore and hind legs may be tied and the cow rolled on to her back. Then the surgeon using a stethoscope will locate the characteristic abomasal "ping." Then by manipulation and ballottement the abomasum is positioned at the prepared site. Using a 4 or 6 inch curved upholstery needle armed with heavy Vetafil, a suture is placed through the body wall and abomasum. If a "ping" can still be heard a second suture is placed. The cow is allowed to roll onto her left side and rise at will. It is very important to place the suture only when the surgeon can hear the "ping" otherwise one runs a higher risk of puncturing intestine or rumen.

Obviously, this will not work on an abomasum that is adhered to the left body wall and there is risk of puncturing something other than the abomasum. But, if done properly one can expect a high rate of success in the range of 90-95%. Again, as with the left approach the abomasopexy

sutures can be pulled too tight causing a tearing of the abomasum. This is a valid technique that allows an economic break to the owner and a good chance of success.

## SUMMARY

Any of the procedures described in this paper can be done in a short time by a surgeon experienced with the technique. All the procedures offer a high rate of success when done in a competent manner. The surgeon should be well versed in each of the techniques since they all have their indications and contraindications depending on the specific case. They differ in exposure in the event of complications. In the event of a perforation of the abomasal wall be it an ulcer or iatrogenic the rent must be repaired in order to insure success in the surgery. The right flank approach allows little or no exposure of the abomasum. Even when it is returned to the normal position there is very little exposure of the body and fundus. The ventral approach allows the abomasum to be exteriorized to repair any holes. The left flank approach allows the abomasum to be inspected in the displaced position. Therefore, if a rip is present it can be repaired with minimal contamination of the peritoneal cavity. Of course, the closed suture allows no visualization of the abdominal cavity whatsoever.

The success of any operation to correct a displaced abomasum is dependent on the formation of an adhesion to hold the abomasum in position. All but the right flank approach allows for the formation of an adhesion between the abomasum and the body wall by some type of abomasopexy. The closed suture and left approach have a greater possibility of tearing the abomasum than the ventral while forming the adhesion. With the closed suture technique there is a possibility of only getting an omentopexy, which is less desirable than the abomasopexy. The omentopexy established from the right flank approach has a possibility of stretching and allowing the abomasum to move back to the left side, over a long period of time. If the omentopexy is as close as possible to the pylorus it will reduce the chances of recurrence.

In the final analysis all of the techniques are workable and the decision must be made as to which the surgeon feels the most comfortable with. In the event of complications the left or ventral approach would be best. On an animal that is not very valuable the closed suture technique should be tried, for economic reasons. In the event of failure of the closed suture for whatever reason an open approach could be attempted. The right flank approach remains the best for one man working alone.

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