

LAPAROSCOPIC REPOSITION WITH ABOMASOPEXY (JANOWITZ METHOD) FOR TREATMENT OF LEFT DISPLACED ABOMASUM IN DAIRY COWS

EL-GHOUL, W.* and SEEGER, T.**

* Department of Surgery, Anesthesiology and Radiology, Faculty of Veterinary Medicine, Cairo University ,

** Klinik für Wiederkäuer und Schweine (Innere Medizin und Chirurgie), Justus-Liebig-University Giesen, Germany.

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SUMMARY

This article describes a minimal-invasive technique for surgical correction of left displaced abomasum in dairy cows. This laparoscopic technique was first described by Janowitz in 1998 as a two-step-method. During the first part the cow is in standing position. From the left flank the displaced abomasum is visualized with a laparoscope and punctured with a trocar. Under laparoscopic control the abomasum deflates and a special toggle is inserted in the abomasal lumen. For the second part of surgery the cow is placed in dorsal recumbency. The laparoscope and a special forceps are inserted in the abdominal cavity from the ventral abdominal wall. The toggle sutures are visualized, grasped with the forceps and exteriorized. In right lateral recumbency the abomasum is positioned with the toggle sutures and each suture is threaded through a bandage and tight together. The sutures are cut 4 weeks after surgery. Field experiences with this method and two controlled clinical trials show that it is a fast and well

suitable technique for surgical correction of left displaced abomasum. It can be performed regardless of the degree of abomasal displacement and rumen filling. Using the laparoscope a fixation of the pyloric part of the abomasum or other abdominal structures is avoided and the diagnosis of adhesions of the abomasum is possible. Further advantages of this technique are a low incidence of complications and a fast postoperative recovery of the animals.

Keywords: Dairy cows, left displaced abomasum, laparoscopic surgery.

INTRODUCTION

Abomasal displacement is one of the most important disorders in high producing dairy cows. For reposition of left displaced abomasum casting and rolling the cow is successful, but this method has a high risk of recurrence so that a surgical intervention with fixation of the abomasum at its physiological position is the preferred way of treat-

ment (Kümper and Seeger, 2003 and Seeger et al, 2006).

For surgical correction of a left displaced abomasum several methods are described. This includes methods with laparotomy, with transcutaneous fixation and laparoscopic surgery. Methods with laparotomy are the right-flank laparotomy with omentopexy (Hannover method; Dirksen, 1967), the left-flank laparotomy with omentopexy (Utrecht method; Gertsen 1967) and the paramedian laparotomy with abomasopexy (Lowe et al., 1965). Methods with transcutaneous fixation of the abomasum are the "Blind-stitch-technique" (Hull, 1972) and the "Bar-suture-technique" (Grymer and Sterner, 1982).

Minimal-invasive surgery has rapidly changed the performance of practice in a wide range of veterinary surgery in the last years. Instead of open laparotomy, laparoscopy can be used safely and effectively for the diagnosis and treatment of many abdominal disorders (Babkine and Desrochers, 2005; Boure, 2005). But until now in the bovine abdominal surgery only the laparoscopic technique for reposition and fixation of a left displaced abomasum is published. It was first described by Janowitz in 1998 (Janowitz, 1998) as a two-step-method in which the cow is placed in dorsal recumbency during the second step. In 2004 this method was modified by Christiansen (Christiansen, 2004) and by Barisani (Barisani, 2004), so that the complete surgery can be done in standing animal. In 2005 a one-step laparoscopic

abomasopexy with the cow positioned in dorsal recumbency was described (Newman et al., 2005). Field experiences with these methods are good (Janowitz, 1998 and 2001; Leeuwen, 2000 and 2002; Christiansen, 2004; Barisani, 2004). But only the Janowitz method was proved by two prospective controlled clinical trials according to the principles of good clinical practice (Koch 2003; Seeger, 2004a). The aim of this article is the description of this method and a discussion of the published results.

Surgical technique

The Janowitz method (Janowitz, 1998) is a two-step-method used for treatment of a left displaced abomasum in 15 dairy cows presented to the Clinic for Ruminants and Swine, University of Gießen, Germany. During the first part the left flank of the standing cow is needed and for the second part of surgery the cow is placed in dorsal recumbency to fix the abomasum at the ventral abdominal wall. For immobilization and rolling the cow a special operating table¹ is useful (Fig. 1a). Alternatively the cow is sedated with xylazine hydrochloride (0.1 mg/kg i.v.) and placed in dorsal recumbency by casting and rolling. For the Janowitz method a set² with special instruments for minimal-invasive surgery is necessary (Fig. 1b, c and Fig. 2), but for the pneumoperitoneum no medical gas is needed. The used laparoscope is a non-flexible scope with a 0°-optic and 40 cm length (Fig. 2). The toggle for abomasopexy is a special toggle³ with a 5 cm metal bar and 10 cm double suture (Fig. 1d).

¹Cattle operating table; Bartmann Comp., Lübbecke, Germany

²Set for laparoscopic repositioning and fixation of abomasal displacement in cattle (acc. to Dr. Janowitz); Dr. Fritz Endoskope, Tuttlingen, Germany

³Safety-toggle (acc. to Dr. Janowitz); Dr. Fritz Endoskope, Tuttlingen, Germany

During the first part of surgery the two entry points are in the dorsal quarter of the left flank. The cranial point is in the 11th intercostal space and the caudal point is directly behind the last rib (Fig. 3). At both sites the skin is clipped and prepared for aseptic surgery and a local anaesthesia is performed with 20 ml of a 2%-solution of procaine hydrochloride at every site. After a 10 mm strap incision the Verres needle (Fig. 1c) is inserted into the abdomen at the caudal entry point (Fig. 3). Air is insufflated in the abdomen by the help of the insufflation pump at the lightning source (Fig. 1b). If the establishment of pneumoperitoneum (Fig. 3) is finished, the Verres needle is removed from the abdomen and at the same site a magnet ventile trocar is inserted into the abdomen and the laparoscope (Fig. 2) is placed in the abdominal cavity through this trocar. The left abdominal cavity with the rumen, the spleen and the left displaced abomasum are controlled (Fig. 4). If the displaced abomasum cannot be visualized completely, a partly deflation of the abomasum with a gas cannula (Fig. 1c) from the cranial entry point is performed.

The toggle placing trocar (Fig. 2) is inserted at the cranial entry point, first into the abdomen and then into the abomasal lumen, under laparoscopic guidance (Fig. 5). Now the special toggle (Fig. 1d) is inserted into the abomasum by the help of the toggle inserting stylet (Fig. 2). The abomasum deflates through the toggle placing trocar and sinks ventrally (Fig. 6). When the toggle placing trocar is slid out of the deflated abomasum the suture end of the toggle is inserted into the abdominal cavity (Fig. 6). All instruments are removed from the abdomen at the end of the first part of the surgery.

For the second part of surgery the animal is placed in dorsal recumbency and two entry points at the paramedian ventral abdominal wall 10 cm cranial to the umbilicus are clipped and prepared for aseptic surgery. The entry point for the laparoscope is 5 cm left lateral and the entry point for the laparoscopic forceps is 5 cm right lateral to the median line (Fig. 7). A local anesthesia with 10 ml of a 2%-solution of procaine hydrochloride and a small skin incision are performed at both sites. After insertion of the two magnetic ventile trocars the laparoscope is placed in the abdomen and the toggle sutures are visualized. Now the laparoscopic forceps (Fig. 2) is placed in the abdomen. The toggle sutures are grasped with the forceps under laparoscopic control, exteriorized, and clamped (Fig. 7). The insufflated air in the abdominal cavity is brought out through the opened magnetic ventile trocar by manual pressure and all instruments are removed from the abdomen.

Now the animal is placed in right lateral recumbency. The abomasum is positioned at the ventral abdominal wall (Fig. 8) and the both toggle sutures are threaded through a bandage and tied together loosely because of the expected wound swelling at the site of abomasopexy (Fig. 8). Woundspray is placed on the skin incisions and the animal is allowed to stand up.

No routine postoperative antibiotic treatment is necessary. The toggle sutures are cut 4 weeks after surgery, when the adhesions of abomasopexy are strong enough to prevent from a relapse of abomasal displacement.

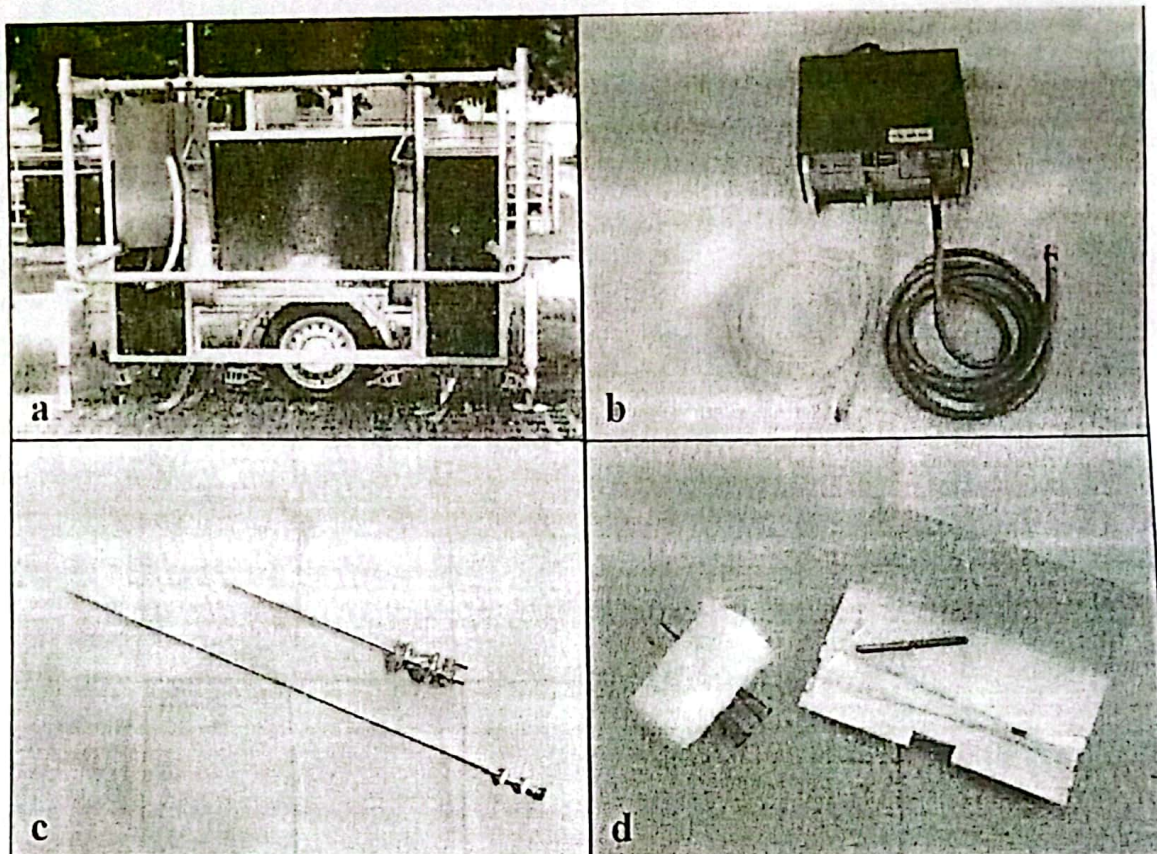


Fig 1: Equipment for the Janowitz method: a: Hydraulic operating table; b: Lighting source with insufflation pump; c: Verres needle and gas cannula; d: Special toggle and bandage

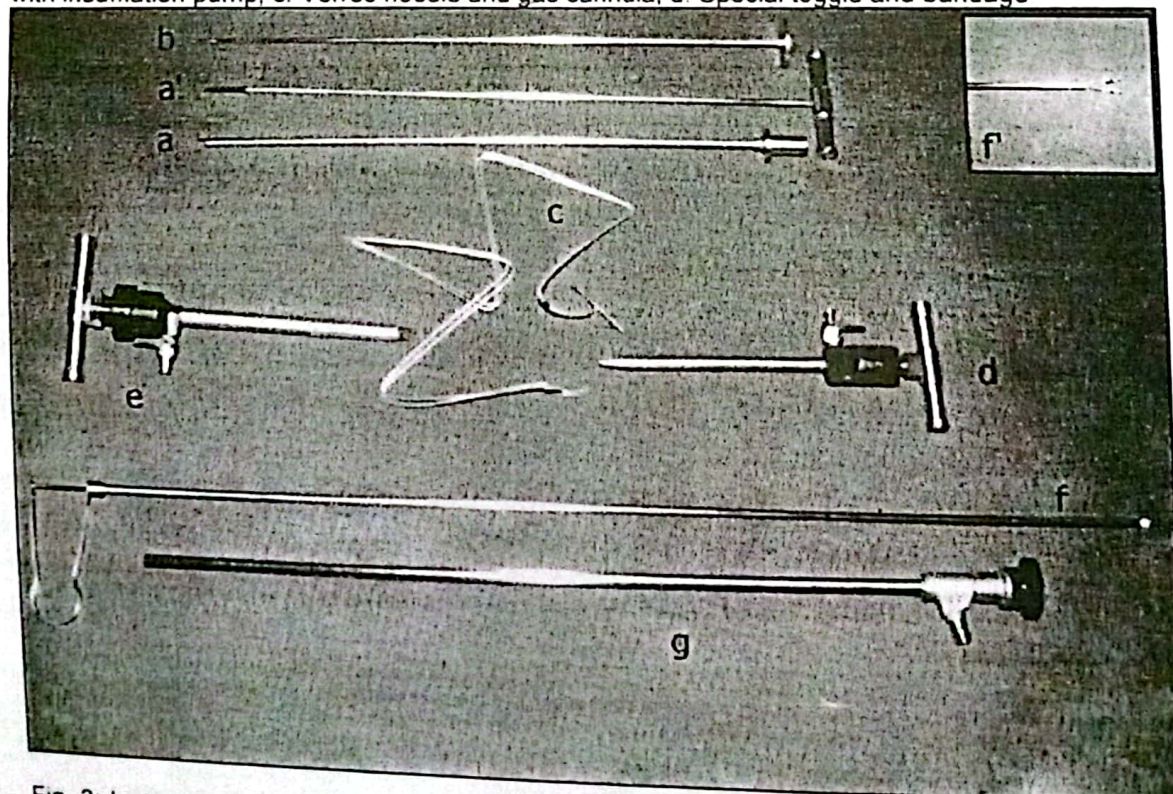


Fig 2: Instruments for the Janowitz method: a: Toggle placing trocar; a': Stylet of the toggle placing trocar; b: Inserting stylet for the special toggle; c: Special toggle; d: Trocar for the toggle placing trocar; e: Trocar for the special toggle; f: Verres needle and gas cannula; g: Long metal rod

laparoscope; e: Trocar for the laparoscopic forceps; f: Laparoscopic forceps; f: Magnification of the laparoscopic forceps tip; g: Laparoscope

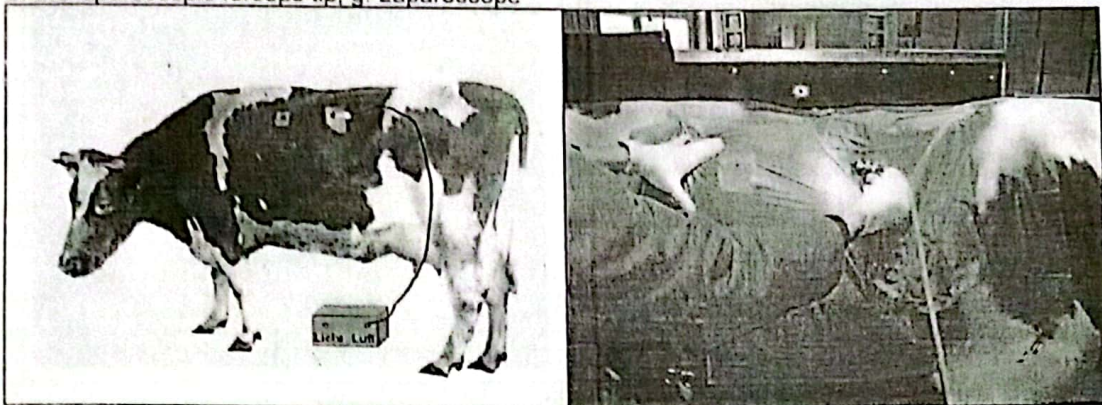


Fig. 3: Establishment of a pneumoperitoneum in the left flank using the Verres needle

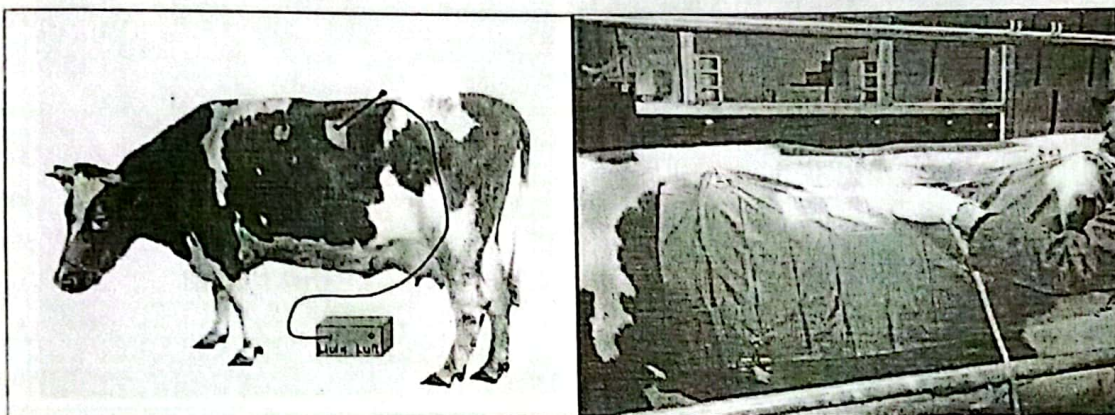


Fig. 4: Laparoscopic control of the abdominal cavity and the left displaced abomasum

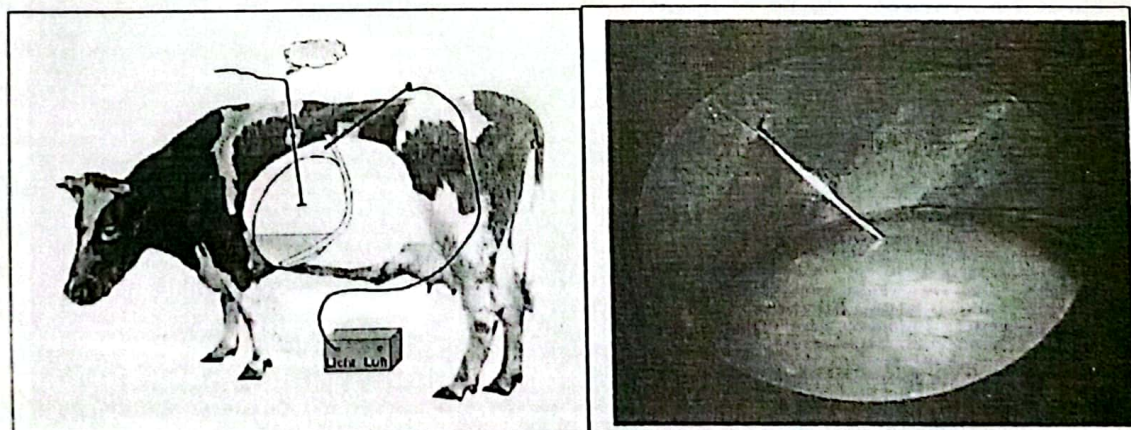


Fig. 5: Insertion of the toggle placing trokar and deflation of the displaced abomasum under laparoscopic guidance

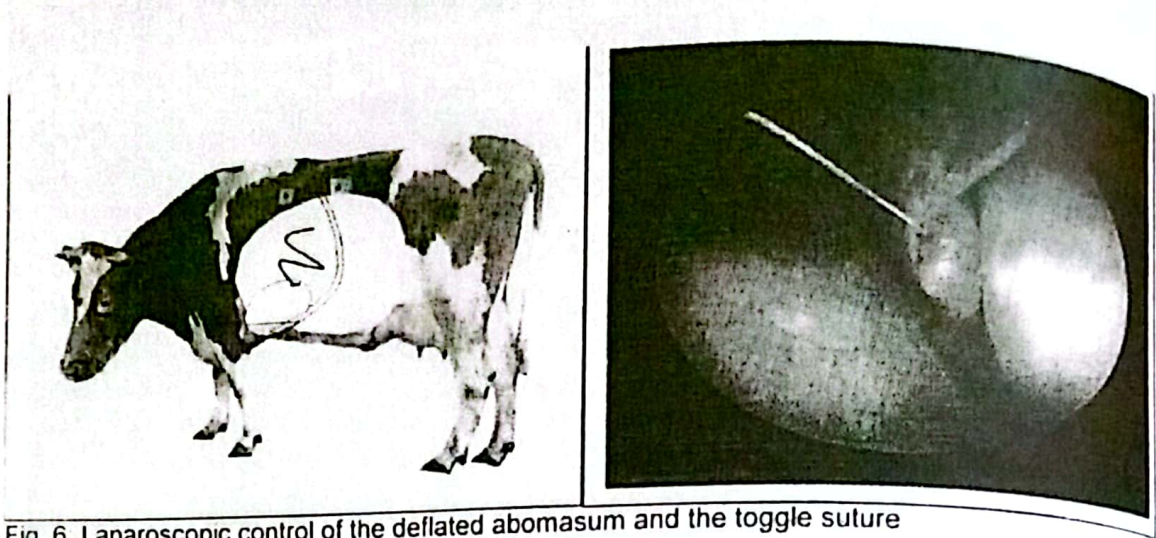


Fig 6 Laparoscopic control of the deflated abomasum and the toggle suture

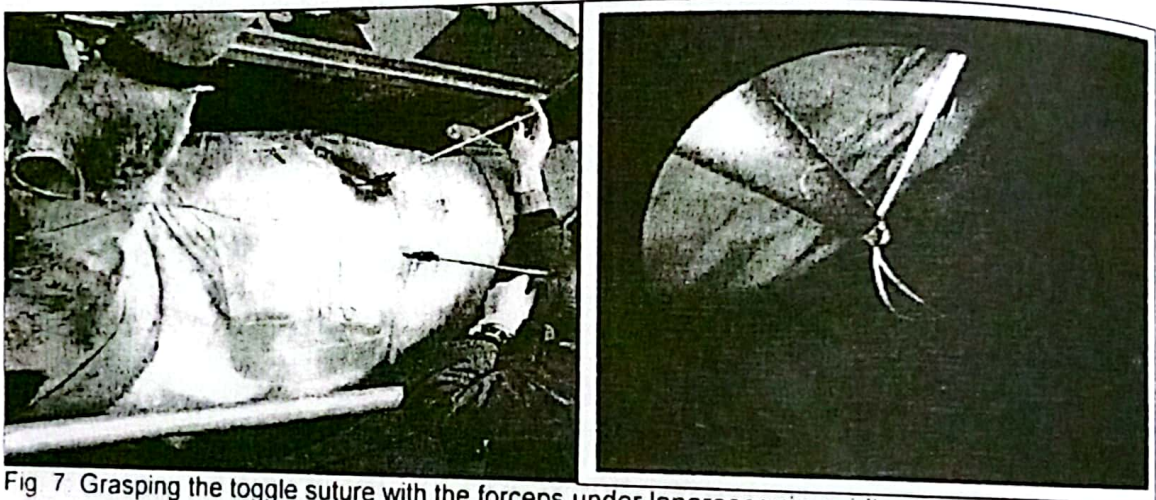


Fig 7 Grasping the toggle suture with the forceps under laparoscopic guidance

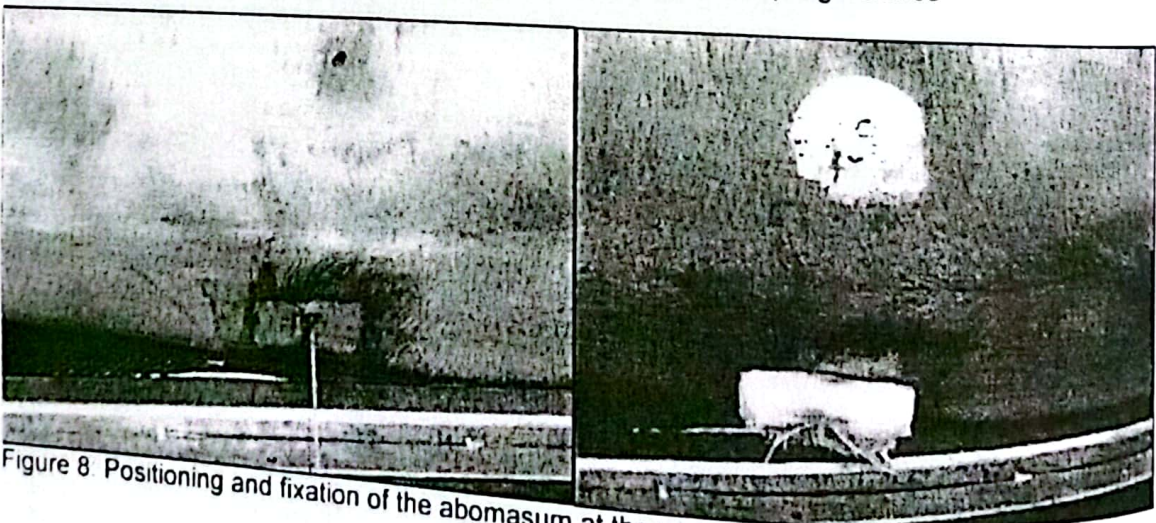


Figure 8 Positioning and fixation of the abomasum at the ventral abdominal wall

DISCUSSION

The treatment of a displaced abomasum is one of the most common surgical interventions in dairy cows. In the last five decades different procedures of surgery were developed. Until today in Germany the "gold-standard"-method is the right-flank laparotomy with omentopexy (Dirksen method; Dirksen, 1967).

Due to the high costs of this surgery in the last years the "Blind-stitch-technique" (Hull, 1972) and the "Bar-suture-technique" (Grymer and Sterner, 1982) were performed more common under field conditions. Depending on the economic situation of the farmers these transcutaneous fixation techniques without laparotomy are preferred because of their faster performance and lower costs. Another advantage of the "Bar-suture-technique" is the minimal postoperative pain with a faster increasing food intake and milk yield after surgery compared to the Dirksen method (Heimberg, 1999). However, these methods have also some disadvantages in comparison with the methods including laparotomy. In a number of cases (low degree of abomasal displacement, low rumen filling) it is not possible to fix the abomasum (Kehler, 1999 and Heimberg, 2001). Any intraoperative control of the abdominal organs and a diagnosis of adhesions of the abomasum are not possible with a following higher risk of complications like the fixation of the pyloric part of the abomasum or other abdominal organs (Kehler, 1999; Tithof and Rebhun, 1986).

The laparoscopic controlled abomasopexy was first described by Janowitz in 1998 as a method which combines the fast performance and the minimal postoperative pain of the transcutaneous fixation techniques with the high success rates and the low complication rates of the methods with laparotomy (Janowitz, 1998).

The performance of the Janowitz method did not depend on the degree of abomasal displacement and rumen filling (Koch, 2003 and Seeger 2004a). Only in case of adhesions of the abomasum the method is not successful (Koch, 2003 and Seeger, 2004a), but the laparoscopic control during the surgery allows the diagnosis of adhesions just in time. This control avoids also a fixation of the pyloric part of the abomasum or other abdominal organs. In addition to some modifications this method allows the fixation of a not displaced abomasum (Janowitz, 2001).

In comparison to the Dirksen method the laparoscopic treated animals have a significantly higher intake of food in the first days after surgery (Koch, 2003; Rehage et al. 2004 and Seeger, 2002 and 2004a) and the serum-concentration of total bilirubin and the GLDH-activity decrease significantly faster during the first 5 days after surgery (Seeger, 2002 and 2004a). Also the postoperative increase of milk yield is higher in the first 5 days (Seeger, 2002 and 2004a) and in the first 6 weeks (Koch, 2003 and Seeger, 2004a) after laparoscopic surgery. Less postoperative pain as consequence of the minimal-invasive technique may be the reason for these results. The significantly faster performance of surgery (Koch, 2003 and Seeger,

er, 2004a) and the fact that even under field conditions laparoscopic treatment can be performed without the routine use of antibiotic drugs are further advantages of the Janowitz method compared to laparotomy (van Leeuwen et al., 2000).

The published success rates concerning the Janowitz method are high. The success rates under field conditions are always more than 90% (Janowitz, 1998 and 2001; van Leeuwen, 2000 and 2002). The authors also describe a fast performance of surgery, a good convalescence of the cows and a high satisfaction of the farmers (Janowitz, 1998 and 2001; van Leeuwen 2000 and 2002). In a controlled clinical trial the success rate 6 months after laparoscopic surgery was 88.3%. This result was similar to the success rate according to Dirksen method with 90% (Seeger, 2004a).

Intraoperative complications of laparoscopic surgery are the puncture of organs like the rumen (Koch, 2003 and Seeger, 2004a) and the spleen (Janowitz, 1998). But in all cases no problems based on this puncture are reported. In common the incidence of peritonitis after laparoscopy is very rare and no severe complications at the incision wounds for trocarization are reported (Anderson, 1993). After laparoscopic surgery of left displaced abomasum cases of peritonitis or wound complication at the site of abomasopexy can happen in rare cases (Janowitz, 1998; Koch, 2003 and Seeger 2004a), but in all these cases an antibiotic treatment was successful (Janowitz, 1998 and Seeger, 2004a).

Relapses in the first weeks after laparoscopic surgery can occur in rare cases due to early loss of abomasopexy (Janowitz, 1998; Koch, 2003 and Seeger, 2004a). Relapses after the next calving or later are also possible. Reason for this could be a modification of the fibrotic tissue at the site of abomasopexy with the consequence of a flexible fixation (Kehler and Stark, 2002). But preliminary data show, that the risk of relapses after laparoscopic surgery (incidence 4.2%) is not higher than after other surgical techniques for correction of displaced abomasum (Seeger, 2004b).

In conclusion the Janowitz method is a safe and well suitable technique for the treatment of left displaced abomasum. It can be performed regardless of the degree of the abomasal displacement, has low incidence of complications combined with a fast performance of surgery and a fast post-operative recovery of the animals.

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Zusammenfassung: Laparoskopische Reposition und Abomasopexie (Methode nach Janowitz) des nach links verlagerten Labmagens beim Rind

In diesem Artikel wird ein minimal-invasives Operationsverfahren zur Behandlung der linksseitigen Labmagenverlagerung beim Rind beschrieben. Das Verfahren wurde erstmals 1998 von Janowitz vorgestellt. Es handelt sich um eine Operation, welche in zwei Teilschritten durchgeführt wird. Während des ersten Teils wird der verlagerte Labmagen am stehenden Tier von der linken Flanke aus mittels eines Laparoskopes kontrolliert und mit einem Spezialtrokar punktiert. Unter laparoskopischer Kontrolle wird durch den Trokar ein Spezialtoggle in das Lumen des Labmagens eingebracht und der Labmagen wird entgast. Für den zweiten Teil der Operation wird das Tier in Rückenlage verbracht. über die ventrale Bauchwand werden das Laparoskop und eine endoskopische Faszange in die Bauchhöhle eingeführt.

Die Togglefäden werden identifiziert und mittels der Faszange aus der Bauchhöhle herausgezogen. Anschliessend wird das Tier in die rechte Seitenlage verbracht und der Labmagen an die ventrale Bauchwand herangezogen. Nach Durchstechung einer Mullbinde werden die Togglefäden miteinander verknotet und der Labmagen so in seiner physiologischen Lage fixiert. Die Fäden und die Mullbinde werden 4 Wochen nach der Operation wieder entfernt.

Erfahrungsberichte aus der Praxis und zwei kontrollierte klinische Studien sind bisher zu dieser Operationsmethode veröffentlicht worden. Diese wird darin als ein schnell durchführbares Verfahren zur Behandlung der linksseitigen Labmagenverlagerung bewertet, welches unabhängig vom Grad der Labmagenverlagerung und vom Fällungszustand des Pansens sicher durchführbar ist. Durch die endoskopische Kontrolle kann eine fehlerhafte Fixation des Labmagens oder anderer abdominaler Organe vermieden werden und Verklebungen des Labmagens mit der Bauchwand oder dem Pansen können diagnostiziert werden. Weitere Vorteile der Methode nach Janowitz sind eine geringe Komplikationsrate und eine schnelle postoperative Rekonvaleszenz der Tiere.

Schlüsselworte: Rind, linksseitige Labmagenverlagerung, laparoskopisches Operationsverfahren

إستخدام المنظار الضوئى (طريقة يانوفيتس) فى تعديل وضع وتثبيت الأنفحة المنحرفة ناحية اليسار فى الأبقار الحلوب

وحيد سلامة الجوهري الغول * تورستين زيجير **

* قسم الجراحة والتخدير والأشعة - كلية الطب البيطرى - جامعة القاهرة - مصر
** مستشفى أمراض الأبقار والأشعة- كلية الطب البيطرى - جامعة جيسين - ألمانيا.

فى هذه الدراسة تم تعديل وضع وتثبيت الأنفحة المنحرفة ناحية اليسار بإستخدام طريقة جراحية ذات تدخل جراحي بسيط بإستخدام المنظار الضوئى (طريقة يانوفيتس) فى الأبقار الحلوب . فى هذه الطريقة تم إجراء العملية على خطوتين . فى الخطوة الأولى تكون البقرة فى الوضع واقفاً ومن المنطقة الشمالية للبطن تم إدخال المنظار الضوئى لإظهار الأنفحة المنحرفة ناحية اليسار . وحت سيطرة المنظار الضوئى تم تفريغ الأنسجة من الغازات بإستخدام special toggle تم إدخاله فى تجويف الأنفحة . و فى الجزء الثانى من العملية تم وضع البقرة فى الوضع نائمة على ظهرها وأدخل المنظار الضوئى مع ماسك خاص فى التجويف البطنى من خلال فتحات فى جدار البطن السفلى . وحت سيطرة المنظار الضوئى تم البحث عن الـ toggle sutures والتي تم سحبها بالماسك إلى خارج التجويف البطنى . وتم تثبيت الأنفحة بواسطة الـ toggle sutures بعد لضمهم خلال رباط شاش وربطهما والتي تم قطعهما بعد ٤ أسابيع من العملية.

وأظهرت هذه الدراسة أن هذه الطريقة تعتبر سريعة ومناسبة لتعديل وضع وتثبيت الأنفحة المنحرفة ناحية اليسار وأنه يمكن إجرائها دون النظر إلى درجة إنحراف الأنفحة أو درجة إمتلاء الكرش كما هو مذكور فى الخبرات الحقلية والمحاولات الإكلينيكية لهذه الطريقة . ومن مميزات هذه الطريقة أنه بإستخدام المنظار الضوئى يمكن تجنب تثبيت الجزء البوابى للأنفحة وكذلك الأعضاء الأخرى الموجودة فى التجويف البطنى كما أنه يمكن تشخيص التصاقات الأنسجة . كميزة أخرى لهذه الطريقة من العلاج لوحظ أنها ذات معدل ضعيف من المشاكل وغالباً متبوعة بنقاها سريعة للأبقار .