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An Overview on Laparoscopic Cruroplasty

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Abstract:

Hiatal hernia occurs when contents of the abdominal cavity protrude through the esophageal hiatus of the diaphragm. Factors that contribute to its development include enlargement of the hiatus, increased abdominal thoracic pressure gradient, depletion of elastic fibers in the phrenoesophageal membrane with aging and deterioration of the crura muscle fibers. In addition, changes in spinal curvature may be an important pathogenic factors. The stomach is the most commonly involved viscera and pathologic gastroesophageal reflux disease (GERD) may be associated. Laparoscopic hiatal hernia repair with fundoplication has been shown to be a valuable option in symptomatic patients. Reconstruction of the diaphragmatic crura cannot exempt from a careful evaluation of the complex anatomical conformation of the esophageal hiatus. Different techniques have been described for posterior cruroplasty ranging from simple suture repair to simple suture buttressed with mesh. However, these techniques are not standardized and left to the surgeons' preference and "feeling" of weak crura.

Keywords: Laparoscopic Cruroplasty**,** Hiatal Hernia, Reconstruction.

Introduction:

Laparoscopic surgery provides the advantages of a minimally invasive approach, which consists of shorter hospital stays, faster time of recovery, reduced post-operative pain and reduced pulmonary complications. There are, of course, certain disadvantages of laparoscopic surgery which include two-dimensional imaging, limited motion of laparoscopic instruments and poor ergonomics for surgeons **(1).**

The technical considerations have remained mostly the same, however, new data has been brought to light regarding the use of mesh during paraesophageal hernia repair. The current position of the SAGES Gudelines regarding this topic is uncertain; there is inadequate data on the long-term to formulate a recommendation either for or against the use of mesh repair **(2).**

Although controversy still revolves around paraesophageal hernia repair, the general opinion seems to favor the use of mesh reinforcement. Zaman et al. have found a decrease in recurrence after laparoscopic paraesophageal hernia repair and mesh reinforcement, with similar results in both synthetic and biologic mesh **(3).**

Regarding the use of synthetic mesh, concerns have arisen as it has been associated with the development of esophageal erosion, stricture, dysphagia, obstruction and esophageal stenosis **(4).**

Zhang et al. (5) and Huddy et al. (6) have all found a reduced rate of hernia recurrence after mesh reinforcement compared to primary suture repair at short-term follow-up (up to 12 months)**.**

Moreover, **Oelschlager et al. (7)** have demonstrated that a lower recurrence rate is associated with short-term follow-up for biologic mesh reinforcement, while with long-term follow-up the benefit is lost**.**

As a result, the short-term benefit may justify the use of biologic mesh among surgeons, but more studies will be needed in order to establish a clear recommendation as a guideline **(8).**

One topic that is not mentioned at all in the 2013 SAGES Guidelines is represented by the role of robotic surgery in hiatal hernia repairs. The development of the DaVinci telemanipulation system might overcome some of the limitations of standard laparoscopic approach by providing increased visualization through three-dimensional and stereoscopic vision and optimized ergonomics **(9).**

Vasudevan et al. have found in their study that the robotic approach to paraesophageal repair is effective and safe, with low complication rates, even in patients of older age and risk of complications. However, Gehrig et al. concluded that there is no significant advantage of the DaVinci system over the conventional laparoscopic technique **(10).**

Their study found no significant difference regarding the operating time, intraoperative and postoperative complications and hospital stay between the robotic assisted surgery group and the laparoscopic surgery group. Moreover, the issue of cost remains an important drawback related to robotic surgery. General recommendations cannot be made yet regarding this field, as there are no large randomized trials comparing efficacy, outcomes and cost effectiveness of both robotic and laparoscopic paraesophageal hernia repairs **(11).**

It is difficult to accurately identify the incidence of hiatal hernia, as asymptomatic hiatal hernia often goes undetected. However, symptomatic hernia should be examined in association with gastro-esophageal reflux disease (GERD) in terms of its pathophysiology, as the incidence of GERD is on the rise worldwide **(12).**

Indeed, the incidence of GERD is lower in the east compared to that in the west; nonetheless, based on diagnosis rate, its incidence is increasing in our country. Although medical treatment, including proton pump inhibitors, is the preferred treatment for controlling symptoms, surgical interventions may be needed, depending on the severity of symptoms and type of hernia involved **(12).**

Recently, laparoscopic repair has been widely performed because it has multiple benefits. It is generally performed by a general abdominal surgeon because it usually involves an abdominal approach. However, it is also performed by thoracic surgeons who have accumulated relevant experiences in laparoscopic surgery, and successful surgical outcomes have been reported. Here, as thoracic surgeons with experience in minimally invasive esophageal surgery (MIES: thoracoscopic esophagectomy laparoscopic gastric mobilization) for esophageal cancer, we share our experiences in laparoscopic repair of hiatal hernia and analyze our surgical outcomes **(1).**

Aims of surgery:

- Reduction of contents.
- Excision of sac.
- To achieve minimum of 3 cm intra-abdominal length of oesophagus.
- Division of short gastric vessels to mobilize gastric fundus.
- Prosthetic repair of crural gap in hiatus more than 5 cm wide.
- Short, floppy 360 degree wrap or partial wrap **(13).**

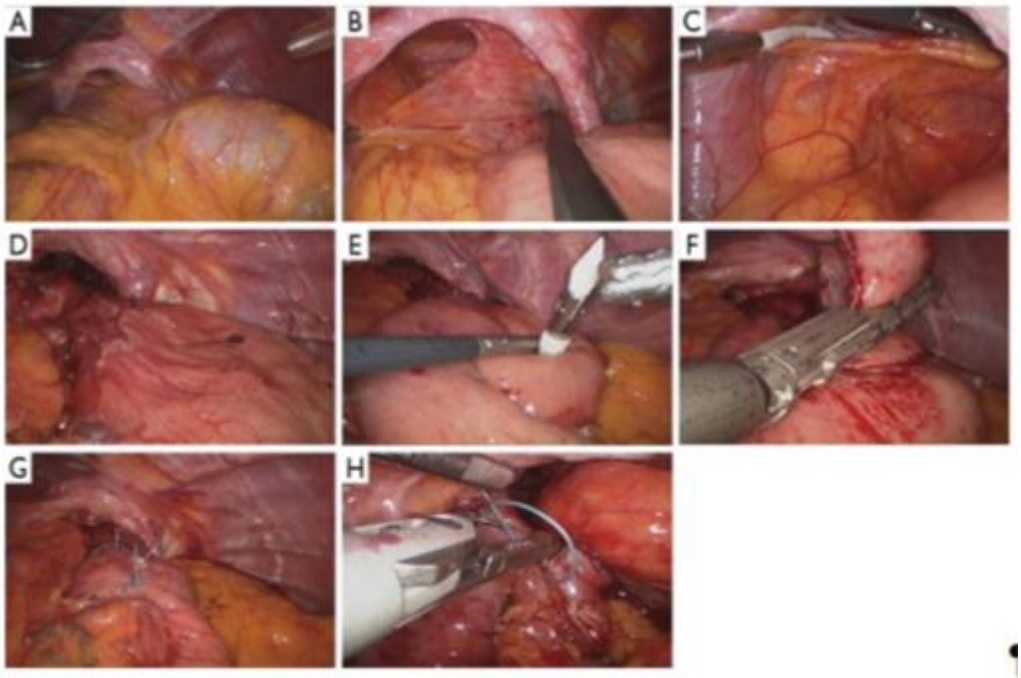

Figure (1): Intraoperative laparoscopic views with pneumoperitoneum. (A) Sliding gastroesophageal junction above the diaphragm and a herniated part of the gastric fundus (type III); (B,C) excision of the hernial sac with preservation of the crural peritoneal lining; (D) identification of inadequate length of the intra-abdominal esophagus after mediastinal esophageal mobilization; (E,F) modified Collis gastroplasty; (G) complete Nissen fundoplication; (H) crural re-approximation **(14).**

Postoperative care:

Analgesia: postoperative pain is often mild, and no special treatment is required. Give pain medication as necessary **(15).**

Diet: the patient may begin taking small amounts of water 6 hours after the operation; gradually transition to a liquid and semi-liquid food diet. Because early postoperative consumption of an obstruction is commonly seen in patients, it is generally recommended to have a semi-liquid or soft-food-based diet in the first month after surgery and to avoid both eating too fast and eating large pieces of food. If the patients can smoothly transition to a semi-liquid diet, they can be discharged **(16).**

Complications of surgery:

Complications from surgery are typically minor and not directly related to the surgery itself. It is estimated that the overall 30-day mortality rate associated with antireflux surgery is 0.19%. Complications that are specific to antireflux surgery include the following:

Pneumothorax: This is the most common intraoperative complication. However, this is reported to occur in less than 2% of patients.

Gastric and esophageal injuries: Reported to occur in approximately 1% of patients undergoing Nissen fundoplication.

Splenic and liver injuries: This can result in bleeding and occurs in about 2.3% of patients. Major injury is rare.

Dysphasia: This typically resolves without further intervention and is most commonly caused by postoperative edema **(17).**

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