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Mesh is a Useful Adjunct in Para-Esophageal Hernia Repair

*Constantine T Frantzides**

Department of Surgery, University of Illinois, USA

Introduction

Numerous studies have demonstrated the efficacy of laparoscopic surgery for the treatment of hiatal hernia in comparison to traditional open surgery. In many cases, the data suggests that the minimally invasive approach is superior to the open approach, particularly in terms of perioperative morbidity. For an uncomplicated but symptomatic Type II-IV hiatal hernia (i.e., paraesophageal hernia), elective operation may be pursued after appropriate preoperative evaluation and optimization of patient.

Whether performed open or laparoscopically, hiatal hernia repair with primary closure of the crural bundles has a high recurrence rate. A review paper of 10,489 anti-reflux procedures has reported that the most common peri-operative complication after such procedures was early recurrence of hiatal hernia [1]. Furthermore the most common intra-operative finding during re-operations for failed primary anti-reflux operations was wrap herniation into the mediastinum. Crural closure, however, when supplemented with prosthetic mesh results in a substantially lower rate of recurrence compared to simple sutured cruroplasty.

Use of surgical mesh at the hiatus

Currently there is little agreement on a number of issues involving mesh-reinforced hiatal hernia repair. Debate exists regarding when surgical mesh is indicated, the type of mesh to be employed, the shape and size of mesh in relation to the defect, the method of mesh fixation, and even if mesh should be employed at all. There is however amble evidence, through at least 38 publications with large series three of which are prospective randomized, that the utilization of non-biologic mesh in the repair of large hiatal hernias may eliminate recurrences. The pro-mesh data is tempered by a body of case reports of erosion and stricture with mesh-reinforced hiatoplasty.

Our policy has been to employ permanent (non-biologic) mesh (polytetrafluoroethylene/PTFE or light-weight coated polyester/LCP) in a circumferential fashion in specific patients. Our main indication for mesh reinforcement of a sutured cruroplasty was a hiatal defect with a transverse diameter of 8 cm or greater (1991-2000). Since the completion of our prospective randomized trial, the utilization of mesh for hiatal hernia defects was reduced to 5 cm. We also would apply mesh reinforcement in cases where the crural bundles were weak. Regarding the choice of biologic vs. non biologic mesh, the retrospective and surgeon-survey data does suggest that long-term sequelae of erosion and stricture have been less common with biologic mesh. Unfortunately, this advantage is offset by the fact that hiatal hernia recurrence rate with biologic mesh is greater than with the non-biologic mesh [2]. In our practice, we would consider employment of biologic mesh in the presence of controlled contamination; for example, a gastric perforation that was immediately repaired. In the absence of such extenuating circumstances, we have continued to prefer PTFE/LCP mesh for repair of the large hiatal defects. Currently there are a number of lightweight permanent meshes (made with polyester or polypropylene) available that have more benign long-term implantation effects than the older heavyweight permanent meshes.

Surgical Technique

Mesh-reinforced hiatal hernia repair

There have been a number of techniques described for the placement of mesh during hiatal hernia repair. The technique we have utilized [3] is to place a circumferential sheet of permanent mesh (PTFE or LCP) around the gastro esophageal junction and against the diaphragm. We advocate routine excision of the hernia sac; without such excision, the subsequent dissection can be difficult and confusing. The esophagus should be mobilized such that the distal 5 cm lies within the abdomen without tension. We prefer to employee a lighted esophageal bougie during this part

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Correspondence:
Constantine T Frantzides, Department of Surgery, Chicago Institute of Minimally Invasive Surgery, University of Illinois, 4905 Old Orchard Center Skokie, IL 60077, Chicago, USA, Tel: 847-676-2200;
E-mail: cfrantzides@cimis.info

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of the procedure; this can aide in the identification of the esophagus, which can be a difficult task, and prevents undue constriction of the esophagus both during the cruroplasty as well as the placement of the mesh. A circular sheet of mesh is cut 15 cm in diameter, and a 3 cm "keyhole" with slot is cut from the center. The mesh is inked with an indelible marker at three and nine o'clock (the "equator"). Three 0-polyglactin sutures are placed for orientation and grasping; one at the upper corner of each leaf of the keyhole, and one at six o'clock. The mesh then is rolled up and passed through a trocar into abdomen.

Once inside the abdomen, the mesh is unfolded and the medial leaf of the keyhole is passed underneath the esophagus from right to left; care should be taken to avoid introducing a twist in the mesh as it passes underneath the gastro esophageal junction. Using the ink marks and polyglactin sutures for orientation, the mesh is positioned with the keyhole slot oriented vertically. For anchorage of the mesh, the surgeon can employ a multi feed hernia stapler. The first staple or tack is fired at the superior corner of the medial leaf of the keyhole and, progressing in a counterclockwise fashion, the medial mesh perimeter is secure down to the six o'clock position. Firing staples (or tacks) into the diaphragm should be done with prudence, especially in the region of the cardiac impulse, as there have been case reports of fatal cardiac injury [4].

After the medial perimeter of the mesh has been secured, the medial margin of the keyhole is secured to the underlying right crural bundle, again progressing from twelve to six o'clock. Crural fibers should be allowed between the mesh and the esophagus thus avoiding direct contact of the mesh to the esophageal wall. The lateral leaf of the keyhole then is secured to the diaphragm/left crural bundle with the stapler in a similar fashion, but this time going in a clockwise fashion from twelve to six o'clock. The two leaflets of the keyhole then are secured to each other along the vertically-oriented slot. An alternative method of mesh hiatoplasty is to use of a V-shaped, U-shaped, or rectangular LCP or PTFE mesh which is slipped underneath the gastro esophageal junction and applied to the primary cruroplasty as a buttress. Upon completion of the hiatoplasty, the surgeon then has the option of performing an anti-reflux procedure.

Discussion

It has been well documented that primary hiatal herniorrhaphy (laparoscopic or open) without mesh, has a high recurrence rate (up to 42%). Since the 1990's, however, both randomized controlled trials [5] and large retrospective series [6] have shown that mesh-reinforced hiatal hernia repair has a much lower recurrence rate (0% to 10%) compared to primary repair. The opponents of mesh repair have argued that prosthetic utilization at the esophageal hiatus is prone to complications such as erosion and stenosis [7]. While these risks appear to be supported by a number of case reports and small retrospective series, there is little documentation of the techniques utilized during these procedures. There is little or no information whether the above described guidelines have been observed during the primary procedures. We do acknowledge the criticisms of the opponents to mesh utilization, but in our more than 25 years' experience (which includes a randomized trial) we have found no discernible adverse effects with the use of modern mesh material at the esophageal hiatus. In addition a survey of SAGES members [8] has shown that the vast majority of surgeons are using mesh for the repair of large hiatal hernias. Thus statements like "mesh should never be used in paraesophageal hernia repair" are aphoristic and dogmatic. The focus should rather be on what we can do to avoid such complications, and how can we develop better prosthesis for more durable and uncomplicated results.

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