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Giant hiatus hernia: closure of the difficult hiatus

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Summary
Background Repair of the large hiatus hernia has been troubled by diaphragmatic hiatal repair failure and recurrence. Use of mesh repair may reduce recurrence at a cost of increased reoperative complications and mesh fistulation. Methods of hiatal closure facilitation are described.
Methods Techniques and accompanying intra-surgery pictures are discussed here based on personal experience from within a service performing variable 100 giant hernia repairs annually.
Results Techniques for closure of a large hiatus without mesh repair are described with illustration, the purpose to expose various techniques utilized in a service performing more than 100 giant hernia repairs annually.
Conclusion Techniques adopted and described in this article may facilitate both mesh and non-mesh repair of crural hiatal defects associated with giant hiatus hernia.

Keywords Giant Hiatus Hernia · Para-oesophageal · Recurrence · Hiatus repair · Technique

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Background

Repair of giant hiatus hernia has been troubled by diagrammatic hiatus repair failure and recurrence [1–3]. This has led to the development of multiple techniques in an effort to reduce recurrence rates. The use of added mesh repair is frequent [4]. Because of the recognized problems of erosion and resection and poor outcome with reoperative surgery in mesh implants, it has been our preferred option to perform repair of the diaphragmatic hiatus by a suture alone. Disappointing experiences using Teflon pledget-buttressed fundoplication highlighted the problems associated with foreign material around the hiatus [5, 6]. Several publications have highlighted reoperative difficulties with mesh, the largest being that of Stadlhuber and colleagues [7].

Method

Techniques have been developed by the author for non-mesh closure of large hiatal defects. This may be useful to other practitioners confronting similar problems. Personal experience is discussed.

All pictures were obtained during surgery using digital USB downloads from Stryker laparoscopic camera.

Results

Techniques utilized in our service over many years are described in this brief report with pictures to facilitate use by others.

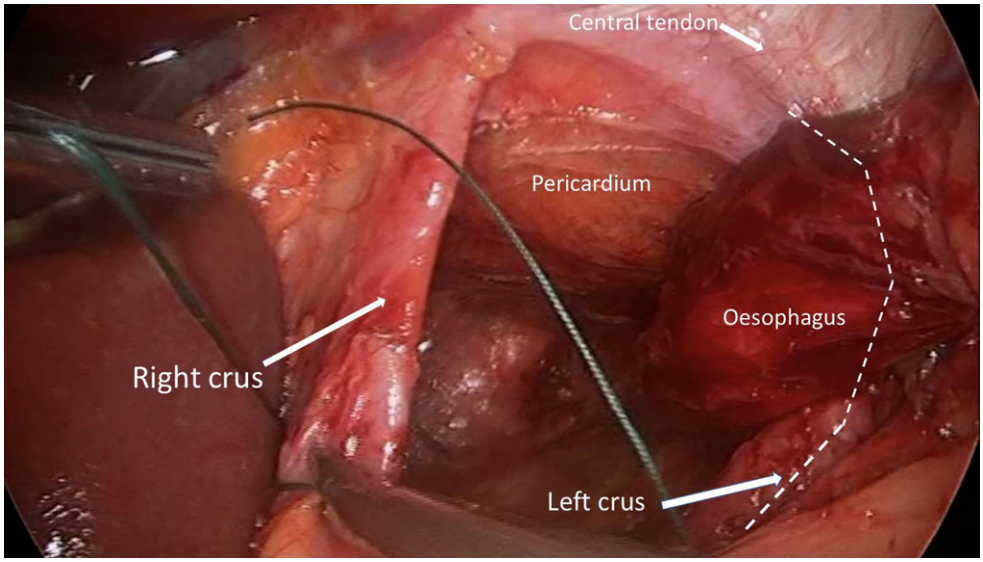

Fig. 1 Intra-surgery image of pericardium due to anterior central tendon diaphragm defect. Image was taken using Stryker video camera

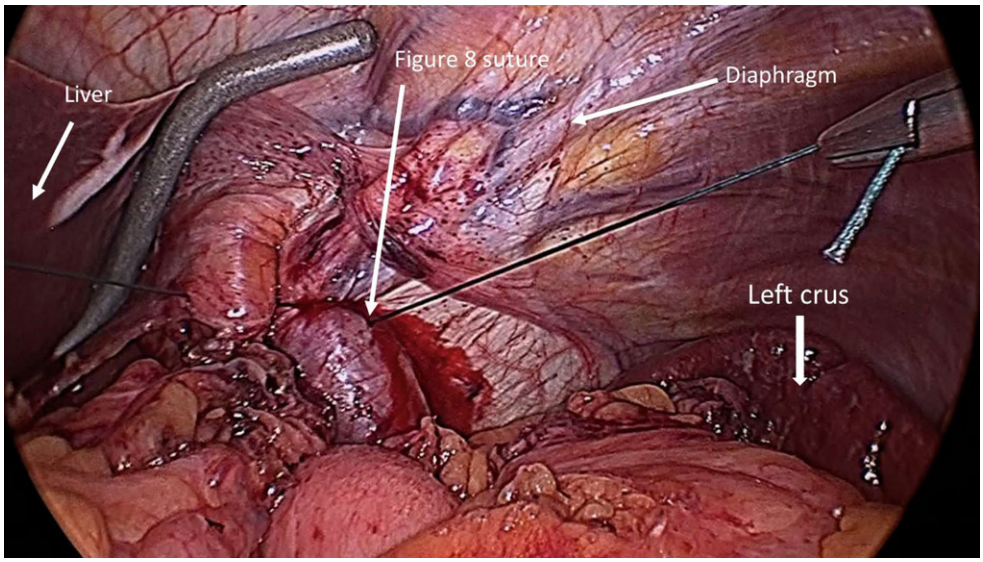

Fig. 2 Intra-surgery image of anterior suture large diaphragmatic defect. Image was taken using Stryker video camera

Retraction of the hiatus During exposure and retraction of the liver in the laparoscopic repair of giant hiatus hernia, the pillars of the crus are tensioned by the anterior and caudal placement of the retractor (Fig. 1). Once dissection is complete and esophageal and gastric mobility ensured, the retractor may be detensioned to allow for greater movement of the hiatal pillars and less tension in the approximation of the crura.

Intra-abdominal pressure The intraperitoneal gas at laparoscopy distracts the tissues and tensions the diaphragm. Reduction in pressure following full dissection reduces tension in the diaphragm and the diaphragmatic crura and may be altered dependent upon exposure for suturing.

Anterior plication of the crura In large hiatus hernia there is frequently distraction of the anterior crural mechanism well into the central tendon. This is obvious upon dissection where the pericardium is well in view unlike in smaller hiatus hernia (Fig. 2). Closure of the defect in the central tendon relieves pressure on the posterior repair and is quite advantageous. Sutures are placed to avoid pericardium but are through dense fibrous tissue. The figure-of-eight technique is especially technically helpful.

Left diaphragm recruitment It is noticeable that the left crural pillar moves across to fill the diaphragmatic gap during repair of the hiatus. The movement of the left diaphragm is obliquely anterio-medial and not transverse. This understanding is important for suture placement. Dissection of the sulcus posterior to the gastro-phrenic ligament facilitates the anterior movement of the left diaphragm (Fig. 3 and supplementary video). Movement of the left hemi diaphragm is well demonstrated in the supplementary video. Su-

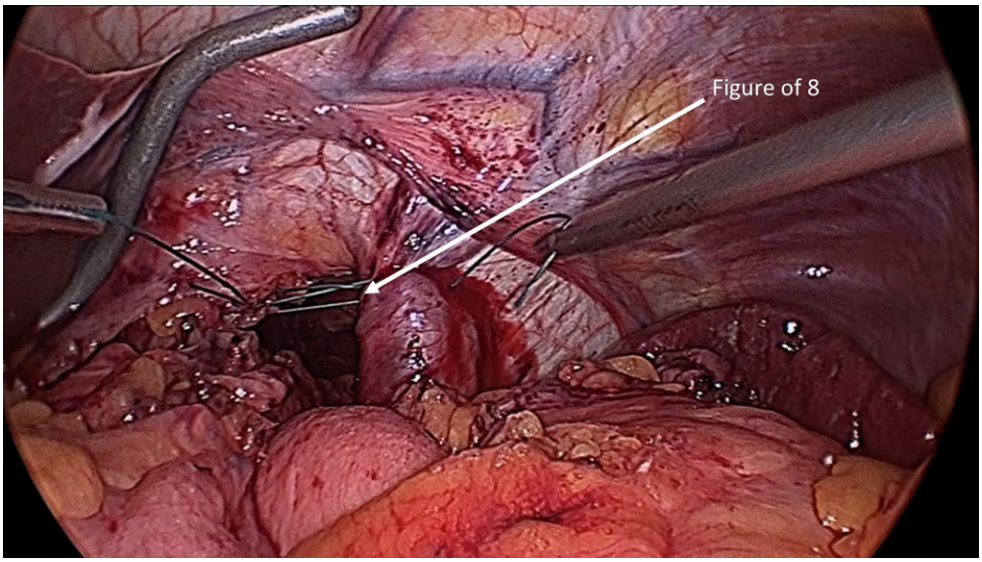

Fig. 3 Image of sutures placed in anterior repair during surgery. Image was taken using Stryker video camera

tures are necessarily placed to approximate the pillars obliquely.

Suture The use of a figure-of-eight suture is very advantageous in allowing the apposition of tissues. Less tension and less tissue ischemia are apparent by comparison with multiple single sutures. Closure of the anterior defect first may reduce tension in the posterior repair in some patients with very large hiatus defects.

Pneumothorax The use of pneumothorax in the left chest as an aid to hiatus closure has been described [8]. We have found accidental pneumothorax (capnothorax [9]) can lead to sudden cardiopulmonary decompensation and hypotension best avoided. One would recommend judicious and facile performance of such a technique at lower installation pressure of the peritoneal CO_2 cognizant of its potential risk. There is little doubt, however, that pneumothorax allows flattening of the left diaphragm and easier approximation of the crural pillars.

Releasing incision Release has been performed in the authors' series of 785 patients having surgery for giant hiatus hernia a total of three times to allow for hiatus repair. On each occasion it has been a calculated incision posterior in the left lateral diaphragm, performed vertically and transversely closed with O-Ethibond, usually situated behind the upper splenic pole. It is also associated with pneumothorax. The site of diaphragmatic incision was chosen to possibly lessen the risk of bowel hernia through a potential diaphragmatic weakness. Right crural releasing incision has been recommended [10], but is potentially fraught owing to the poor tissues for placement of mesh fixation and the minimal area of tissue for adherence of the mesh. Additionally, such an incision will separate the muscle from the fibrous tissue in the crural pillar potentially weakening the whole apparatus. Reports of this technique are currently quite short-term and in a small number of cases.

Recurrence rates of hernia in this difficult patient group utilizing these techniques have been reported. The recurrence rate of any size was 35.6% at a median of 42 months [1], with more than half of patients being asymptomatic. In this cohort there was a reoperation rate of 4.8%. Another cohort at 2 years showed a 9% recurrence with only 2% of symptomatic patients [11]. We have more recently reported improved recurrence rates in the shorter term using a more complex technique of cardiopexy fixation with similar hiatus repair [12]. These techniques have obviated the need for mesh augmented repair and have facilitated diaphragmatic repair.

Discussion

A variety of surgical techniques have been utilized in the prevention of recurrent giant hiatus hernia and have similar recurrence rates [13–18].

These include mesh in a variety of positions, biological or synthetic, esophageal lengthening and, in some, diaphragmatic releasing incision resulting in similar recurrence rates.

Because of experiences of mesh-related reoperative complications (unpublished data, [7, 18]) we have included repair without mesh. Herein is a description of techniques utilized that have been effective and offer reasonable recurrence rates [1, 19].

Conclusion

Techniques adopted and described in this article may facilitate both mesh and non-mesh repair of crural hiatal defects associated with giant hiatus hernia.

Compliance with ethical guidelines

Conflict of interest G.L. Falk, T.J. D'Netto, and S.C. Little declare that they have no competing interests.

Ethical standards Prospective patient data were collated from a password-protected practice database and collated for publication. The database was approved by the institutional ethics (CH62/6/2011-092).

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