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A NOTE ON THE USE OF THE PHRENOSOPHAGEAL LIGAMENT IN THE REPAIR OF HIATUS HERNIA

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Although Allison in his now classical article on hiatus hernia repair described in detail his use of the phrenoesophageal ligament as an important step in the technique of repair, many surgeons do not utilize it. In this respect it has occupied a similar position to an analogous structure in the groin, the transversalis fascia. Its existence has been denied or a quality of mystery has been ascribed to its use. For example, Barrett said that it must be dissected out “with the eye of faith”. Surgeons such as Effler and others, however, find it a practical structure to use in anchoring the esophagogastric junction beneath the diaphragm.

This difference of opinion may have part of its origin in anatomic definition. The statement that the ligament is just a scrap of peritoneum is not completely false, for it consists of a fusion of the peritoneum and pleura. Grossly it is a short, tough and resilient membrane which surrounds the root of the esophagus and separates the negative pressure mediastinum from the positive pressure peritoneum. Microscopically, it consists of collagen fibers abundantly interlaced with elastic fibers and some smooth muscle fibers. The central attachment of the ligament marks the junction of the esophagus and stomach while peripherally it attaches to the margins of the esophageal hiatus. In the presence of a hiatus hernia the ligament is elongated, its attachments remaining the same but the distance between them being increased.

In repairing a hiatus hernia the contents of the hernia may be assessed through a counter incision in the diaphragm as originally described by Allison. In many cases this can be done just as conveniently without the counterincision through an incision in the phrenoesophageal ligament itself. Kay in his discussion of the paper of Lam and Kenney advocated cutting the ligament where it attaches to the esophagus and resuturing it after reducing the hernia. Since this attachment is so strategically placed, however, it is probably better to preserve it and cut the ligament as far away from the esophagus as possible. When the operator’s finger is placed through the incision in the ligament and directed up toward the esophagus it is limited by the attachment of the ligament to the esophagus. This point is the upward limit of the

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The double needles are placed through the ligament and the diaphragm with one motion without remounting the needles. Traction upon the sutures reduces the hernia, pulling the stomach down from between the crura of the hiatus. The second step in the repair is approximation of the crura posterior to the esophagus.
hernia and marks the esophagogastric junction, which must be fixed below the diaphragm at the conclusion of an adequate hernia repair. When the radial incision of the ligament is completed the esophagus and stomach can be moved easily up or down through the hernia except in cases in which advanced esophagitis fixes the esophagus in the mediastinum, requiring extensive mediastinal dissection to achieve mobility. The first step in the repair of the hernia can then be executed by fixing the free edge of the ligament well under the diaphragm. This is facilitated by the use of a special double needle holder designed by Mr. William Loechel and made by Mr. Gordon Bartrum (Figure 1). Heavy silk sutures with curved round needles* are then passed through the ligament and beneath the hiatal margin in one motion to be brought out as the two ends of a horizontal mattress suture on the surface of the diaphragm anterior to the hiatal margin. Usually 4 to 6 of these sutures are placed in a radiating pattern. When traction is placed on the sutures they reduce the hernia, acting as a series of guy ropes. They are then tied in place. When this step is carried out the herniated stomach is removed from its interposition between the crura. The crura then often lie almost in approximation behind the esophagus where they are easily sutured together with interrupted silk sutures, as depicted in the illustrations in the paper by Lam and Kenney.

In addition to the action of the ligament in holding the esophagogastric junction beneath the diaphragm, we have reason to believe that it is important in preventing reflux by pulling the esophagus up against the anterior rim of the hiatus. The collar muscle of the gastric cardia* then lies in apposition to the sling formed by the diaphragm. Dr. Joseph Rinaldo and Dr. Max Clark are now collaborating in a postoperative study of patients in whom these structures have been marked by radiopaque markers to assess their relative position with respect to prevention of reflux.

In some hernias particularly very large one, it is helpful to make a counterincision in the diaphragm. In large hernias, of course, the phrenoesophageal ligament is also quite lengthy. After the primary approximation to the diaphragm, the very edge of the ligament may then be sewn anterior to the counterincision prior to the counterincision closure. This provides a second layer preventing abdominal contents from entering the chest.

It probably would be well to mention the relationship of the size of the hiatus in the problem of hiatus hernia. Some of the most troublesome hernias from the standpoint of esophageal or gastric complications, are those in which the hiatus is not enlarged. The diaphragmatic muscle in these cases partially obstructs the outflow from the herniated portion of the stomach providing a situation where the stomach can digest itself, producing an ulcer in the herniated segment or creating back pressure in the herniated stomach so great that reflux into the esophagus is inevitable. Palpation of the hiatus in exploring the abdomen is of little value in making a decision about hiatus hernia repair.

*Ethicon D — 7212, D-0418.
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SUMMARY AND CONCLUSIONS

The phrenoesophageal ligament is a useful structure in the repair of hiatus hernia, both as a landmark to the esophagogastric junction and as an anchoring structure to reduce the hernia and hold the esophagogastric junction beneath the diaphragm.

REFERENCES