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Surgical Approach After Failed Enteryx Injection for GERD

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ABSTRACT

Objective: We report on 3 patients who underwent laparoscopic antireflux procedures for persistent symptoms of GERD after biopolymer injection.

Methods: Experienced laparoscopic surgeons completed all 3 procedures laparoscopically. In 2 patients, there was an extramural extravasation of the polymer outside and adherent to the esophageal wall. In these patients, a partial posterior fundoplication was used. The third patient, who had the polymer material deposits removed preoperatively by endoscopic mucosal resection, underwent a Nissen fundoplication.

Results: Postoperative recovery was uneventful in all cases. At follow-up of 6 to 12 months, all patients were symptom free, off medical therapy, and experiencing no dysphagia.

Conclusion: Surgical therapy for patients after failed biopolymer injection is safe and effective. The choice of surgery may depend on whether the polymer mass can be removed preoperatively.

Key Words: Enteryx®, Laparoscopic fundoplication, Endoscopic mucosal resection, Reflux.

INTRODUCTION

Endoscopic treatment of gastroesophageal reflux disease (GERD) has gained popularity over the last several years as an alternative to long-term medications for patients with confirmed GERD. All techniques attempt to augment the antireflux barrier at the lower esophageal sphincter. Some techniques, such as the Plicator and the Esophyx attempt to create a partial fundoplication at the cardia, while the Stretta procedure uses radiofrequency to create intramural fibrosis and reduce transient lower sphincter relaxation. Yet another class of therapies was based on injection of biocompatible polymers into the distal esophageal wall to produce a mechanical effect of narrowing the lumen and hoping to prevent acid reflux. Enteryx was among the latter group and was approved by the US Food and Drug Administration in April 2003. The treatment was based on endoscopic injection of 8% ethyl vinyl alcohol dissolved in dimethyl sulfoxide directly into the lower esophageal sphincter region. The product is injected in a liquid form and thickens into a permanent spongy lump.

Early clinical studies suggested that Enteryx might improve symptom control and allow discontinuation or reduction of pharmacotherapy for GERD in carefully selected patients.[1,2] While long-term studies were underway, a number of serious complications including 2 deaths were reported with its use, and the product was quickly withdrawn from the market by Boston Scientific the proprietary makers of Enteryx.[3,4] Both deaths were due to complications arising from injection of the polymer outside the esophageal wall. In the few years that Enteryx was clinically available, over 3800 patients underwent the injection. No clear data exist that the patients who had the therapy need to seek removal; however, several patients with failed therapy are now seeking a surgical solution to their chronic GERD problem. The surgical strategy for treatment of these patients is poorly described. Two previous reports have utilized a Nissen fundoplication after Enteryx failure.[5,6] In one study, the polymer was excised intraoperatively, but in the other study, the fate of the polymer mass is not clear. Clearly, if left in place, the mass effect of the polymer may increase the postoperative dysphagia in patients undergoing a full Nissen fundoplication. We have taken the position that patients who are

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amenable to removal of the esophageal submucosal deposits with endoscopic mucosal resection (EMR) should consider this before antireflux surgery. In those in whom a preoperative CT scan shows extramural deposits, this is not possible, and we should attempt to remove it intraoperatively or perform a partial posterior fundoplication. We report on 3 patients treated with the above strategy by experienced laparoscopic surgeons in 2 different institutions.

CASE ONE

The first patient was a 26-year-old male who was referred to the surgeon 3 months after being treated with Enteryx injection (7 mL injected) for GERD due to recurrent symptoms. He required high doses of proton pump inhibitor (PPI) therapy with a partial response.

A preoperative workup included upper gastrointestinal endoscopy, which showed grade II esophagitis and a small hiatal hernia. A new preoperative pH study and manometry were not repeated because the patient refused. Intraoperatively, evidence was present of extramural injection of Enteryx with marked inflammatory reactions and fibrosis around the lower esophagus, posteriorly and to the left side, with the Enteryx polymer mass clearly identifiable outside the esophageal wall but very adherent and encasing the posterior vagus. It was impossible to dissect the polymer mass off the esophagus without risk of perforation **(Figures 1 and 2)**. The mass was separated from the left crus and left in situ. An adequate length of intraabdominal esophagus was obtained after careful hiatal and mediastinal dissection. To avoid the risk of post-

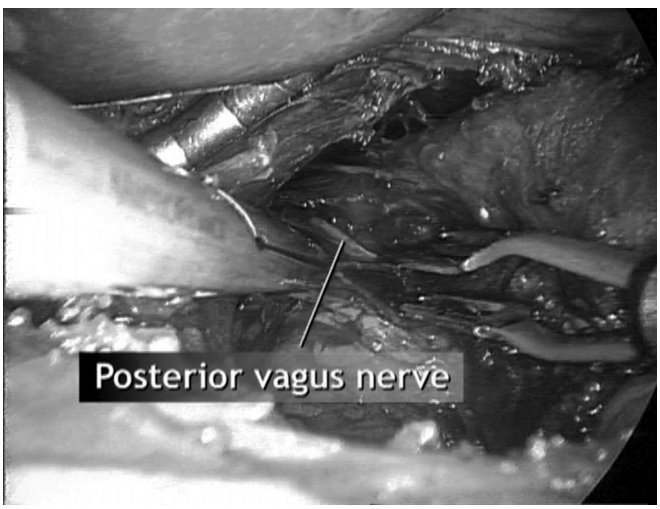

Figure 1. The posterior vagus nerve encased by the Enteryx.

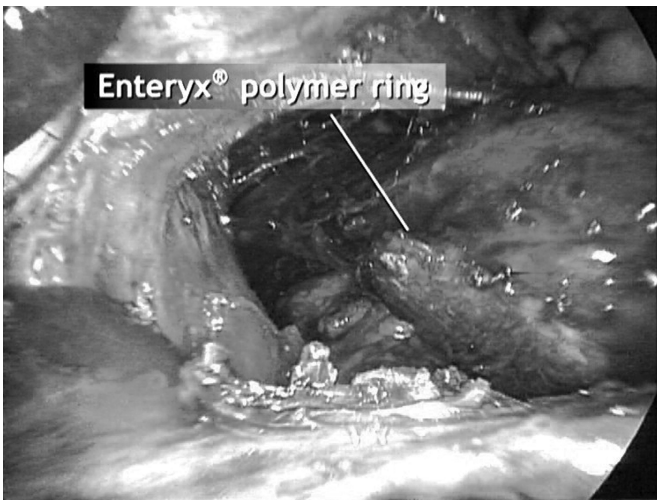

Figure 2. The Enteryx polymer mass adherent to the esophagus.

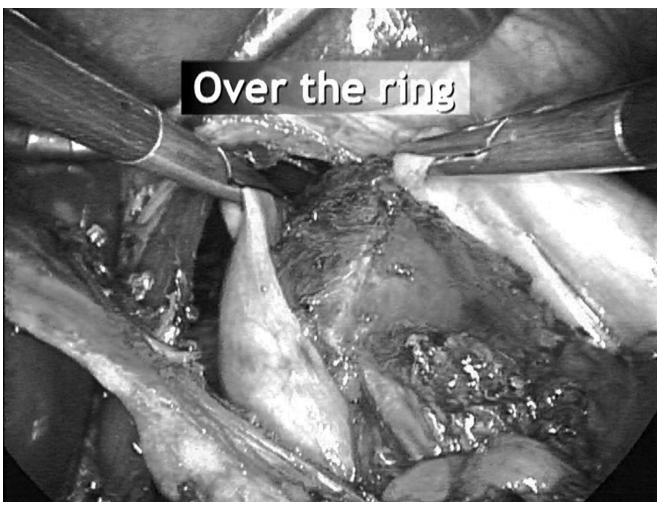

Figure 3. The picture shows how difficult trying to do complete wrap.

operative dysphagia because the Enteryx mass was left in place, the decision was made to perform a partial posterior fundoplication, including approximation of the crus and fixation of the wrap on these **(Figures 3 and 4)**. The surgery was completed in one hour, and no intraoperative complications occurred. The patient had a smooth postoperative recovery. At 6-month follow-up, the patient was asymptomatic, off medications, and the upper gastrointestinal barium study showed the valve nicely in place.

CASE TWO

The second patient was a 36-year-old male who was referred 6 months after Enteryx injection (8mL) with persistent reflux symptoms that failed to respond completely

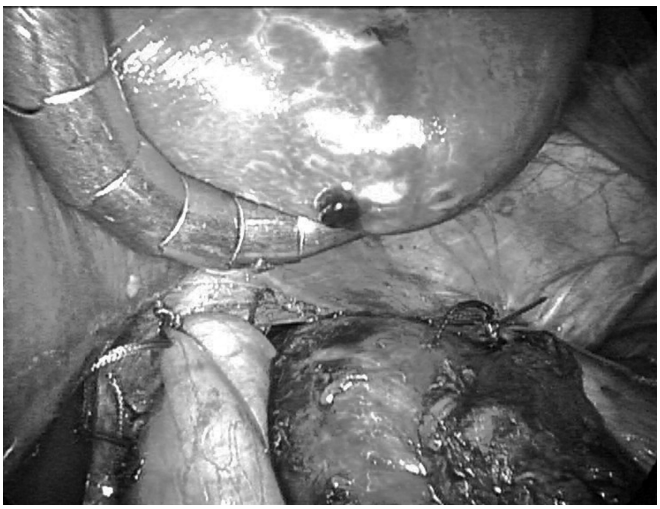

Figure 4. Completed Toupet fundoplication with wrap sutured to the esophagus above the polymer.

to high doses of PPI. 'Bravo' pH monitoring over 48 hours showed excessive acid reflux with a Demester score of 29 on day 1 and 33 on day 2. An abdominal x-ray showed a radio-opaque material at the level of the cardia. Endoscopic examination revealed relaxed cardia. The finding during surgery was of mild inflammatory changes at the gastroesophageal junction and a hard mass adherent to the esophageal wall close to the fat pad and the angle of His. Hiatal dissection was carried out in the usual manner with no problems. Two centimeters of intraabdominal esophageal length was achieved. The Enteryx material was left attached to the esophagus. Both vagi where identified. Complete mobilization of the stomach fundus was done. A partial posterior fundoplication was performed to avoid the risk of persistent postoperative dysphagia. The operative time was 45 minutes. The procedure and postoperative recovery were uneventful. At one-year follow-up after surgery, the patient was symptom free, and upper gastrointestinal endoscopy showed competent lower esophageal sphincter.

CASE THREE

The patient was a 46-year-old male with a 3-year history of GERD symptoms on PPI. He was seen in the surgical clinic 12 months after Enteryx injections with recurrent reflux symptoms. His symptoms were relieved by medical treatment, but he did not want long-term medical therapy, and that was the reason he chose the Enteryx injection initially. Preoperatively, he underwent an upper gastrointestinal endoscopy that showed no esophagitis or hiatal hernia. The Enteryx material was bulging into the lumen of the distal esophagus and was removed by endoscopic mucosal resection (EMR). The surgery was performed 3 months later. Intraoperatively, no extramural foreign material was seen, and there was no unusual thickening or fibrosis around the gastroesophageal junction. A laparoscopic Nissen fundoplication was performed with no complications. The operative time was 52 minutes. Postoperative recovery was uneventful. At 6-month follow-up, the patient was symptom free and off medication.

DISCUSSION

This study reports on the surgical approach used in 3 patients with failed Enteryx therapy. As with previous reports, we have found that extramural injection is associated with significant fibrosis and the presence of material adherent to the esophageal wall creating a mass effect. Although it is preferable to remove the extramural polymer completely, it may not be possible due to dense adherence to the esophageal wall or adjoining structures, such as the vagus nerve. In these patients, we recommend a partial posterior fundoplication as a means of preventing the possibility of postoperative dysphagia and need for further intervention in a patient with already significant fibrosis in the region.

Two previous articles have reported about the performance of laparoscopic Nissen fundoplication after failed Enteryx therapy. In one study,[6] the black polymer material was dissected off the esophageal wall and removed. In the other study,[5] 3 patients had evidence of extramural material causing severe fibrosis. While the text does not specifically state it, it appears that the authors were able to remove all or part of the polymer before completing the Nissen. In our 2 cases, removal of the polymer was deemed dangerous due to the encasement of the vagal trunk in one and close adherence to the esophageal wall in the other.

The third patient in our series had a submucosal injection primarily. In this case, we elected to have the polymer deposits removed by the gastroenterologist using the endoscopic mucosal resection technique. This was uneventful, and subsequently the patient underwent a standard laparoscopic Nissen fundoplication. It is interesting that in this case there were no significant fibrotic changes.

It is clear that while the Enteryx polymer was injected under fluoroscopic control and the gastroenterologists were trying hard to follow the recommended path to inject it into the muscle layer, in practice this proved to be difficult. We suspect that in many patients there was some

extramural injection of the compound as the complaint of chest pain postinjection was a common one. Of interest, the third patient in our series who mainly had submucosal injection had no complaints of chest pain following the injection but did not experience much symptom control.

Surgical studies have shown that both laparoscopic partial posterior and Nissen fundoplications are effective long-term therapies. While Nissen fundoplication may be associated with slightly better symptom control, it is also associated with a higher incidence of postoperative dysphagia and bloating. We use a laparoscopic Nissen fundoplication as our primary antireflux operation of choice, except in patients with severe esophageal dysmotility or in revision of a previous fundoplication for dysphagia or gas bloat syndrome. We propose that a partial fundoplication may be a prudent choice in patients in whom a large polymer mass has to be left in situ either extramurally or intramurally in the region of the distal esophagus and included within the wrap. If, on the other hand, the bulk of the polymer can be removed then a laparoscopic Nissen fundoplication is the surgery of choice.

CONCLUSION

Many more patients are likely to require antireflux surgery for failed Enteryx therapy. The surgical strategy may be dependent on the ability to remove some or all of the polymer mass. If so, we recommend a Nissen fundoplication, but if not, a partial wrap may be the most prudent approach to avoid postfundoplication symptoms of dysphagia and bloating brought on by the presence of an 8-mL to 10-mL mass inside a 360° wrap.

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