

## Laparoscopic Redo Fundoplication – Indications and Challenges: A Case Report with Review of Literature

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**Abstract:** Herein, we report the case of a 72 year old female patient who underwent surgery for hiatus hernia – Laparoscopic Nissen’s Fundoplication in some other hospital. She developed progressively worsening dysphagia in the postoperative period. Multiple sessions of Endoscopic balloon dilatation were attempted, but to no lasting symptomatic relief. She then underwent a successful redo laparoscopic surgery, after due investigations.

**Keywords:** Balloon Dilatation, Dysphagia, Endoscopic, Fundoplication, Hiatus Hernia, laparoscopic.

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### INTRODUCTION

Laparoscopic fundoplication (LF) has fast emerged, as the treatment of choice for uncontrolled gastro-esophageal reflux disease refractory to a conservative line of management. However, like any other surgery, LF too has possibility of failures and/or complications. Failures of antireflux procedures occur in about 5% to 10% of the patients [1]. Some of these patients can be treated conservatively. However, if a conservative line of management fails or if there is an overt anatomical crisis, a redo surgery may be required.

### CASE REPORT

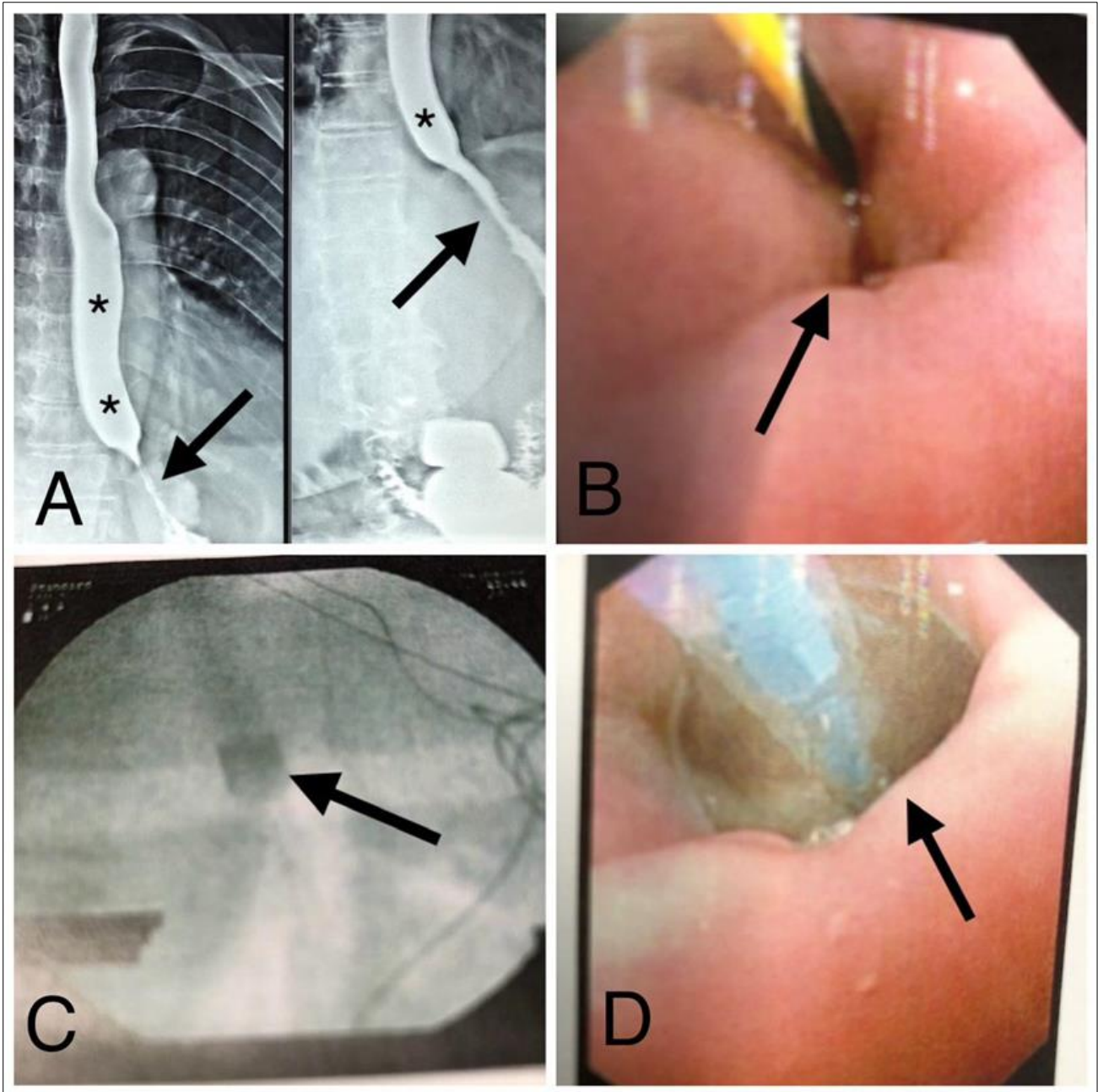
A 72 year old female patient presented to the surgical out patients department (OPD) with chief complaint of dysphagia since 9 months. It had progressively worsened over the last 3 months. She had undergone surgery for hiatus hernia (Laparoscopic Nissen’s Fundoplication) 1 year back. She gave history of dysphagia only to solids in the first 3 post-operative months of the first surgery. But progressively it had worsened to dysphagia to liquids over the last 3 months. In the interim she was referred by the first surgeon to the gastroenterologist for endoscopic dilatation. She had undergone 4 sessions of endoscopic balloon dilatation (Fig 1B, C, D) over the last 6 months, with no sustained resolution of her symptoms. On examination, her vitals

were within normal limits. She was then advised to undergo a Barium swallow examination. It showed a tight stricturing effect at the site of the wrap with delayed emptying of oral contrast into the stomach (Fig 1A). The wrap had not migrated into the chest. However, on imaging, it seemed to be too low; the lower reaches being onto the stomach. After due counseling of the patient party, she was taken up for redo surgery – an undoing of the 360 degree Nissen’s wrap followed by a 270 degree Toupet’s wrap. The said procedure was performed with the patient in supine position with lower limbs straight but split up and the surgeon standing in between them. On entry, adhesions were noted between the wrap and the under surface of the left lobe of the liver (Fig 2A). These were carefully lysed (Fig 2B). The Nissen’s wrap was then carefully taken down with ‘cold’ cutting, taking due care not use any energy source for the same (Fig 2C-F). The lower half of the wrap was found to be distal to the esophago gastric junction i.e. over the body of the stomach. With meticulous dissection and avoidance of energy sources, iatrogenic trauma was prevented. After completely undoing the previous wrap and mobilizing the 2 lips of the wrap (Fig 3A-D), a posterior 270 degree Toupet’s fundoplication was then fashioned using 2-0 Prolene as the suture material (Fig 4A-D). The patient had an uneventful postoperative recovery. She was started on liquids on post-operative day (POD) 1 and semisolid diet on POD 3. She was discharged from the

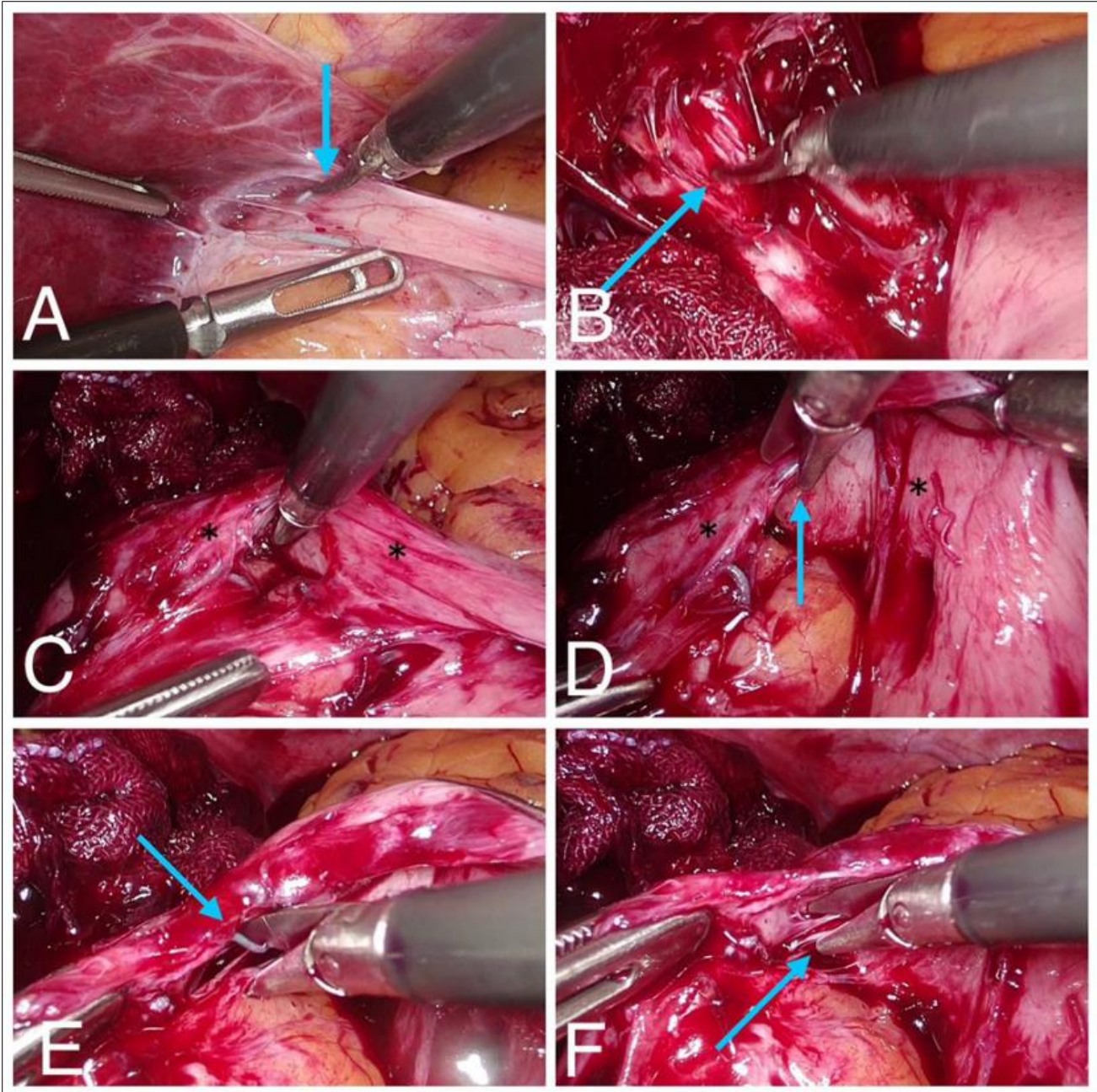
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hospital on POD 4. On her POD 10 OPD visit, all her operative wounds had healed well and she was asymptomatic. She reported mild gastro-esophageal reflux related symptoms 3 months after her second surgery. However, they were treated successfully with a

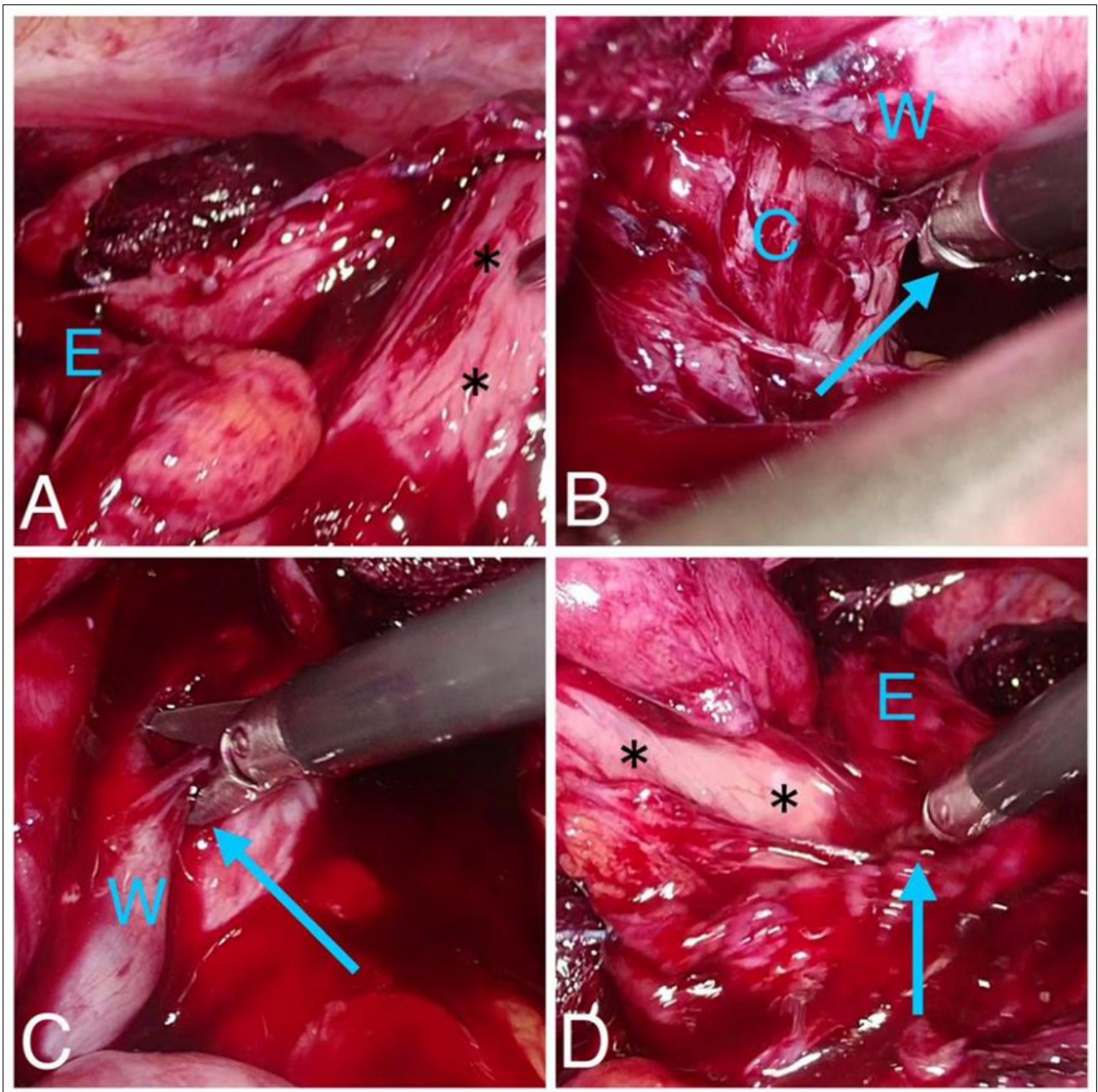
short course (2 weeks) of proton pump inhibitor (Tablet Pantoprazole 40 mg). She has not since felt the need to take the same. At the time of writing this paper, she was interviewed telephonically. Twelve months after her redo surgery, she remains asymptomatic.



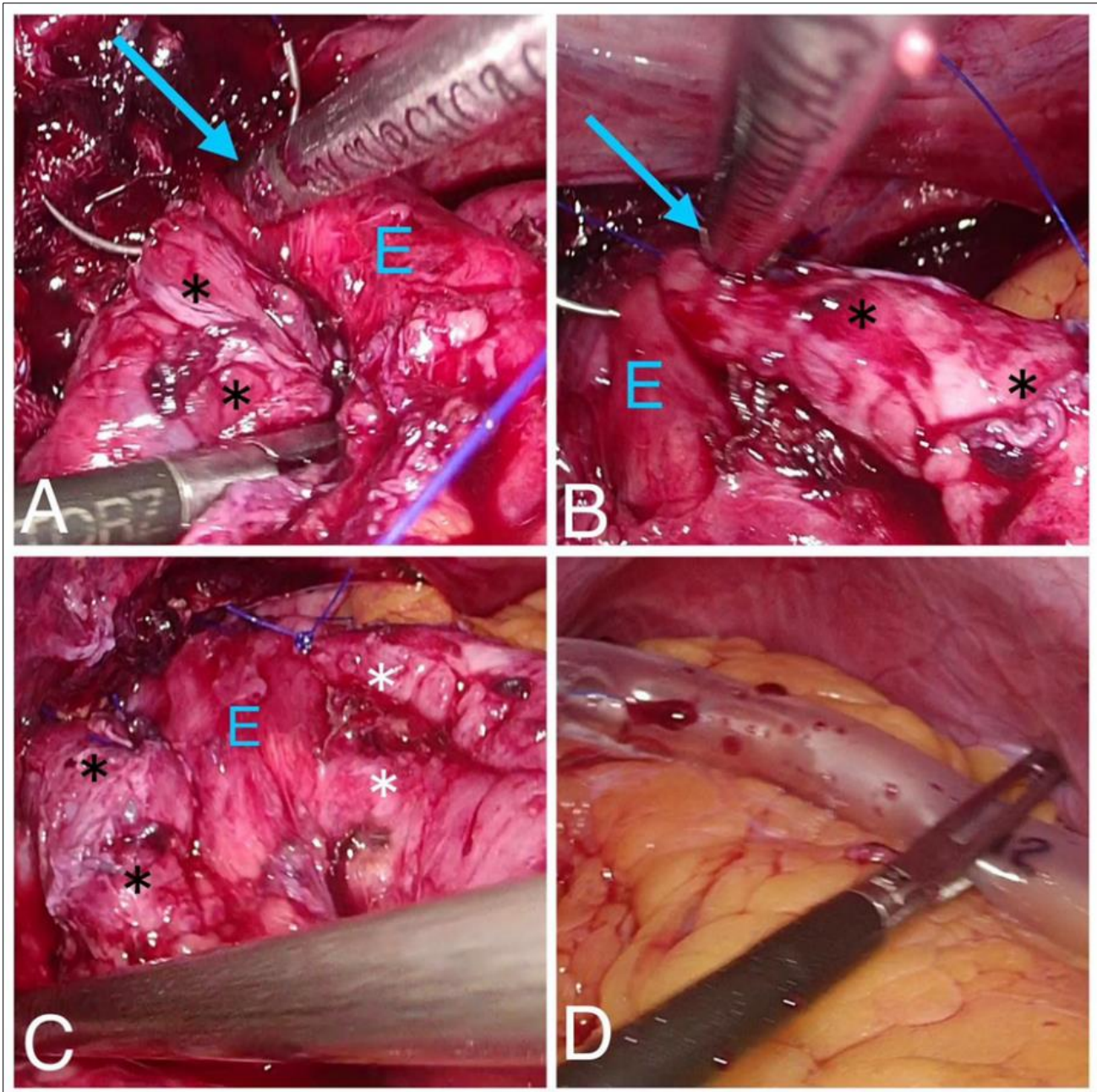
**Fig. 1: A) Barium esophagogram shows the constriction (black arrow) caused by the Nissen’s wrap of the 1st surgery and the dilated proximal esophagus (black asterisks), B) Zebra guide wire passed through the area of the wrap (black arrow) during endoscopic dilatation of the overly tight 1st wrap, C) Fluoroscopic image of the endoscopic balloon dilatation (black arrow), D) Endoscopic image of the balloon dilatation (black arrow)**



**Fig. 2:** A) 1<sup>st</sup> look at laparoscopy reveals adhesions of stomach with inferior surface of left lobe of liver (blue arrow), B) Lysis of adhesions in progress (blue arrow), C) Nissen wrap of 1<sup>st</sup> surgery comprising of right & left lips (black asterisks) being lifted off the esophagus, D, E, F) Nissen wrap being undone after lysing of its adhesions with esophagus (blue arrows)



**Fig. 3:** A) Lysis of adhesions betn left lip (black asterisks) & esophagus, B) Lysis of posterior adhesions betn the Nissen wrap & right crus (blue arrow), C) Lysis of adhesions betn the Nissen wrap & left crus, D) Lysis of adhesions betn right lip (black asterisks) & esophagus (blue arrow)



**Fig. 4:** A) Suture fixation (blue arrow) of right lip of Toupet wrap (black asterisks) to esophagus, B) Suture fixation (blue arrow) of left lip of Toupet wrap (black asterisks) to esophagus, C) Completed Toupet wrap with right (black asterisks) & left lips (white asterisks) suture-fixed to esophagus, D) Tube drain in situ

## DISCUSSION

The esophagogastric junction is a complex anatomical area that is subject to mechanical stress related to the gastroesophageal pressure gradient and its dynamic nature that allows it to move axially during swallowing and reflux. Thus, over time the durability of a fundoplication weakens and is exacerbated by intermittent abdominal strain such as from nausea, vomiting, coughing, trauma, abdominal exercises, heavy lifting and weight gain/obesity. Given these anatomical and physiologic issues, it is not surprising that patients can present with post-fundoplication symptoms and structural complications [2]. The complications of LF

can be divided into acute and chronic. The acute complications are defined as those occurring within 30 days of surgery and include infection (1.1%), bleeding (0.9%), and oesophageal perforation (0.9%) [3]. Chronic complications following fundoplication can be classified into structural complications and functional abnormalities. Structural complications following fundoplication occur in up to 30% of cases and are often related to surgical positioning or construction of the wrap [3].

Structural complications include structural laxity and post-fundoplication stenosis. Mechanisms of functional complications following antireflux

surgery are often not well understood [4, 5]. These include dysphagia due to esophageal dysmotility, Gas-Bloat syndrome, chest pain and diarrhoea. As described by the Hinder and Horgan classification, laxity of the fundoplication can progress to various structural dysfunctions of the fundoplication [6,7]. Of these the frequent dysfunction is hiatal herniation where the esophagogastric junction is displaced proximally through the hiatus. Herniation can result from partial or complete wrap disruption, or slippage of stomach proximal to the fundoplication in the setting of an intact or partially disrupted wrap. Due to the disruption of the crural repair the fundoplication itself may also herniate into the chest and redundancy of a fundoplication can also progress to a paraesophageal hernia component [7].

Patients with a failed fundoplication mostly complain of recurrent heartburn, dysphagia or both [8]. Persistent nausea and vomiting, diarrhoea, severe gas bloat symptoms and shoulder or chest pain are usually the less frequent complaints [8]. Not all patients with this condition have symptoms. Asymptomatic patients may be managed expectantly [8]. However, the need for emergency surgery must be explained to the patient for a possible acute complication like volvulus of the incarcerated stomach [9]. Upper gastrointestinal endoscopy and barium esophagogram are the primary diagnostic modalities used to evaluate for a structural complication following fundoplication. Endoscopy helps in assessing for the presence of esophagitis and also in appraising the location, orientation and integrity of the post-fundoplication valve. Barium esophagogram provides valuable and complimentary information to endoscopy. It is useful in defining the anatomy and location of the fundoplication, better appreciate a paraesophageal hernia and provide valuable information on esophageal emptying [10]. Further the chest CT scans and MRI can be helpful in defining anatomy, the degree of crural disruption and the extent and type of herniation. When persistent GERD is suspected, esophageal pH monitoring is an useful tool to assess the pattern and burden of reflux, and to establish a congruence between reflux episodes and symptoms as recurrent symptoms may not be due to recurrent acid reflux. Endoscopy may not be able to determine whether the wrap is tight in the context of a normal appearing wrap and the functional lumen imaging probe (FLIP) can be used to document abnormal distensibility of the esophagogastric junction. In addition, esophageal manometry may be useful to assess post-operative integrated relaxation pressures. While there are limited data on normal manometric values after fundoplication, integrated relaxation pressure values are slightly higher after a normal fundoplication without symptoms [11]. Thus, the interpretation of integrated relaxation pressure in the evaluation of post-fundoplication symptoms can be difficult and using cut-off to diagnose esophagogastric junction outflow obstruction may be problematic. However, if the values are very high (e.g., greater than 25 mmHg) with an elevated intraboli pressure, and the

elevation in integrated relaxation pressure persists despite position change, a diagnosis of obstruction can be made.

The management options for the post-fundoplication symptoms due to persistent gastroesophageal reflux include medical antireflux therapy, endoscopic dilation of peptic stricture if present, and surgical revision of the fundoplication [10]. Patients with significant symptom burden that is not controlled by PPI and/or endoscopic therapy and evidence of structural abnormality, are the candidates for surgical revision. If symptoms and complications are controlled by PPI therapy, surgical revision may not always be necessary unless there is an overt surgical indication. Surgical revisions are more complex than the primary fundoplication, in part related to adhesion formation and altered anatomy, and the proportion of reoperation interventions that can be performed laparoscopically declines with each subsequent reintervention [10].

After re-operative fundoplication, the reported satisfactory outcome was as low as 50% (range 42–94%), and the possibility of a new failure after redo Nissen fundoplication is observed in 40% of cases. After the second reoperation, the results are even worse in terms of incomplete relief of symptoms (12–50%), with the satisfaction rate being about 42% [13, 14]. The mortality rate for reoperation is approximately 1%, however complications of all types (perforation, postoperative leak, gastrotomy, vagal nerve injury and treatment failure) is significantly increased, particularly for multiple time redos [15, 16].

The various modalities of surgery include redo fundoplication alone with hiatal hernia repair if needed, and conversion to distal gastrectomy with Roux-en-Y gastrojejunostomy either alone or in combination with redo fundoplication. The decision depends after taking into account various factors like obesity, grade of esophagitis, presence of Barrett's esophagus, type of anatomic abnormality, presence of stricture or hiatal hernia, type of surgery performed before, number of reoperations performed, gastric emptying, and the presence of acid and bile reflux. Thus, there is no single ideal treatment option which fits all the above diverse factors [17].

It is not clear as to which procedure is the best for redo fundoplication - Nissen or Toupet fundoplication. There was no marked difference in the recurrence rate between the two procedures with equivalent satisfaction rate. Nevertheless, dysphagia early after operation has been observed at a higher frequency with the Nissen procedure (although this appears to resolve, in most cases), compared to the Toupet procedure. Laparoscopic Nissen Fundoplication (LNF) patients had higher Eckardt dysphagia scores 1 year after surgery compared to Laparoscopic Toupet Fundoplication (LTF) patients, but this difference is not

found at 3 or 5 years postoperatively. Comparison of laparoscopic 270° posterior partial fundoplication versus total fundoplication suggests that although LTF and LNF could be recommended for the treatment of GERD, LTF might be superior by inducing less dysphagia [18]. In contrast, Toupet procedure may not be as durable [13,14]. Recent studies have suggested to perform distal gastrectomy plus a redo fundoplication in order to correct the possible anatomical alterations of the previous fundoplication [19]. It is necessary to dissect the previous fundoplication in order to correct anatomic abnormalities causing symptoms, mainly dysphagia and pain. If this maneuver is not performed, persistence of these symptoms can occur [19]. Although the Toupet technique reduces the risk of postoperative dysphagia in patients with indication for revision surgery after Nissen, it does not ensure better LES pressure, which could result in recurrence of reflux and esophagitis. Therefore, adding a distal subtotal gastrectomy could possibly avoid both acid and bile refluxes [13].

Despite seemingly encouraging results reported for laparoscopic redo fundoplication [20]. Extreme caution is recommended during laparoscopic redo because dissection is tedious and anatomic landmarks are distorted. Successful completion of laparoscopic redo fundoplication requires familiarity with the anatomy of the hiatus as viewed laparoscopically and the appearance of likely findings associated with failed fundoplication such as migration of the wrap through the hiatus and paraesophageal herniation of the stomach. In addition, dense adhesions and scar tissue may also require sharp dissection [21]. Thus, a redo procedure will be facilitated if there are fewer adhesions, tissue planes can be identified and structures can be visualized. In particular, younger trainees should be carefully supervised by surgeons with sufficient experience of redo fundoplication.

## CONCLUSION

As seen in this report, laparoscopic redo fundoplication is feasible in an advanced setup complemented by requisite advanced laparoscopic surgical skills. Also, as seen here, limited to no use of energy source/s in and around the previous surgical scar/s takes us a long way in avoiding iatrogenic visceral injury. This report also underscores the importance of a perfect understanding of anatomy of the failure. This then enables the surgical team to perform the optimum procedure; thereby also facilitating longevity of the positive result, vis-a-vis satisfactory symptom control.

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**Conflict of Interest:** Nil

**Contribution Details:**

1. Dr. Nikhil Agarwal: writing-original draft, visualization.

2. DR. Abhijit S Joshi: Conceptualization, Validation, Resources, Writing- review and editing, Supervision, Project administration.

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