Brief Reports

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Massive Caudate Lobe in Laparoscopic Hiatal Hernia Repair: Tying and Wrapping outside the Box

The presence of anatomical obstacles in the limited operative field of laparoscopic hiatal hernia repair (LHHR) creates significant technical difficulties. This case presentation highlights the use of laparoendoscopic approach in these operative situations.

This patient is a 60-year-old female with past medical history of diabetes, anxiety, depression, hypertension, hyperlipidemia, hypothyroidism, and psoriasis. She had gastroesophageal reflux disease (GERD) and laryngopharyngeal reflux for 20 years. She was dependent on proton pump inhibitors for 20 years. Esophagogastroduodenoscopy showed 5 × 4 cm hiatal hernia and class B esophagitis. Esophageal manometry with impedance showed ineffective esophageal motility.

The typical laparoscopic 5-port technique (camera, liver retractor, 2 working ports, and assistant port) was used. We found a massive caudate lobe which was comparable with the size of an already enlarged left lobe of the liver. The following three operative strategies were entertained. The first option was to terminate the procedures. The second option was to proceed with the standard approach and take the risk of bleeding from the caudate lobe itself or the inferior vena cava with possible catastrophic outcome. The third option was to use a creative strategy utilizing the laparoendoscopic approach. The following three steps facilitated the performance of safe and effective surgery.

We added another 5 mm trocar and placed a mounted laparoscopic snake retractor to retract the caudate lobe. This gentle retraction increased the size of the operative field and reduced manipulation of the caudate lobe (Fig. 1).

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A recent report highlighted the utility of using extracorporeal sliding arthroscopic knots in the presence of an aberrant left hepatic artery.[1] These knots are commonly used in arthroscopic surgery for limited joint spaces. They are tied extracorporeally [outside the box] and require a single insertion of the knot pusher as they do not unravel. This reduces the risk of injuring the caudate lobe and allows for expedient hiatoplasty. These knots, such as Roeder's knot and Duncan loop can be precisely placed and allow the surgeon to navigate obstacles using a knot pusher.

Performing transoral incisionless fundoplication (TIF) after LHHR was first described in 2011 by Ihde et al.[2] We used this technique to avoid a limited operative field and to prevent excessive tissue manipulation associated with laparoscopic fundoplication.

TIF reconstructs the gastroesophageal valve [outside the box]. This avoids the risk of bleeding from the short gastric vessels or splenic capsular tears. TIF also preserves the angle of His and produces partial fundoplication, which has less side effects of dysphagia and gas bloat syndrome.[3] Finally, this technique does not burn bridges for future antireflux surgery as the fundus is spared.[4]

The operative time was 98 minutes (LHHR 78 minutes and TIF 20 minutes). Hiatoplasty using four interrupted stitches took nine minutes. There were no intraoperative or postoperative complications. Hospital stay was two days. The patient discontinued proton pump inhibitors for 18 months and she is presently using them as needed. At 18 months follow-up, her GERD questionnaires continued to demonstrate significant objective improvement. The GERD-related quality of life (HRQL) and GERD symptom scores (GERSS) were 2 *versus* 30 and 7 *versus* 40, respectively. The Heartburn Score and Regurgitation Score were 0 *versus* 25 and 0 *versus* 4, respectively. A postoperative triple phase CT of the liver revealed a massive caudate lobe, as large as the left lobe of the liver (Fig. 2). There was no vascular

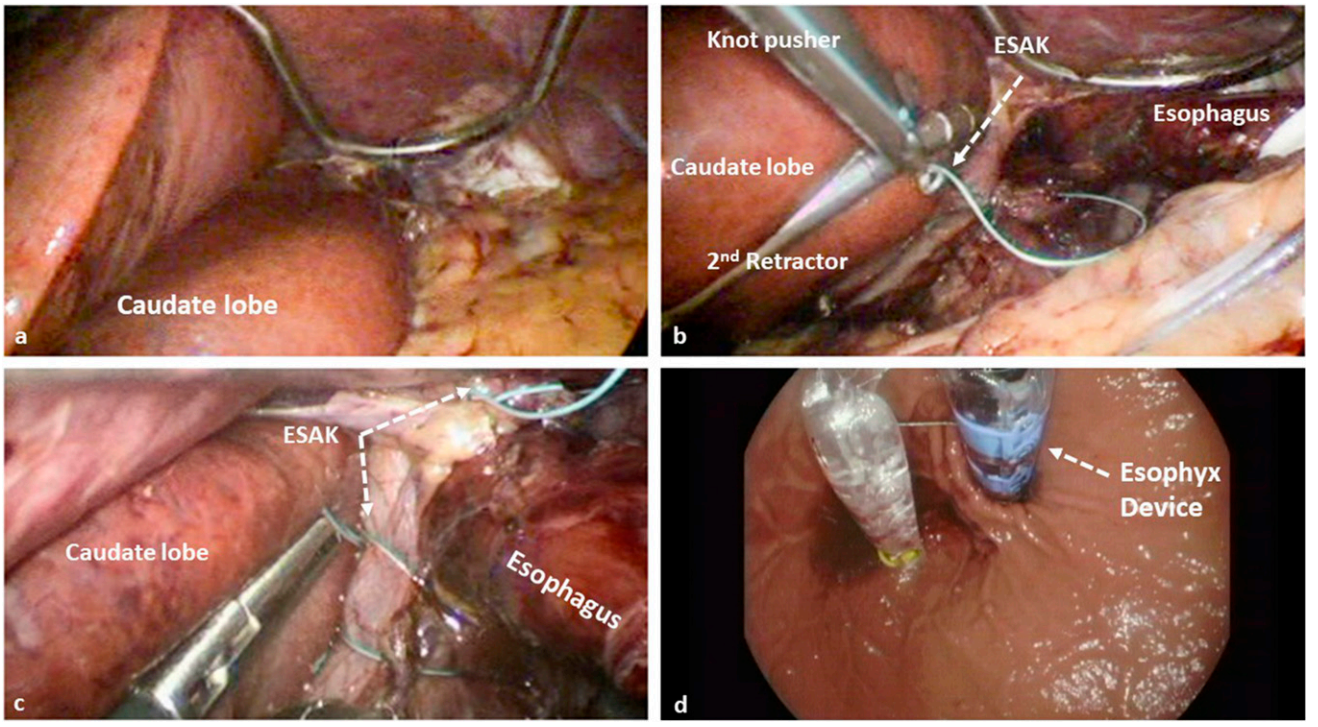

FIG. 1. (*a*) Initial operative view; (*b*) second liver retractor in place and knot pusher is advancing extracorporeal sliding arthroscopic knots (ESAK) knot; (*c*) hiatoplasty; *(d)* retroflexed view for endoscopic fundoplication.

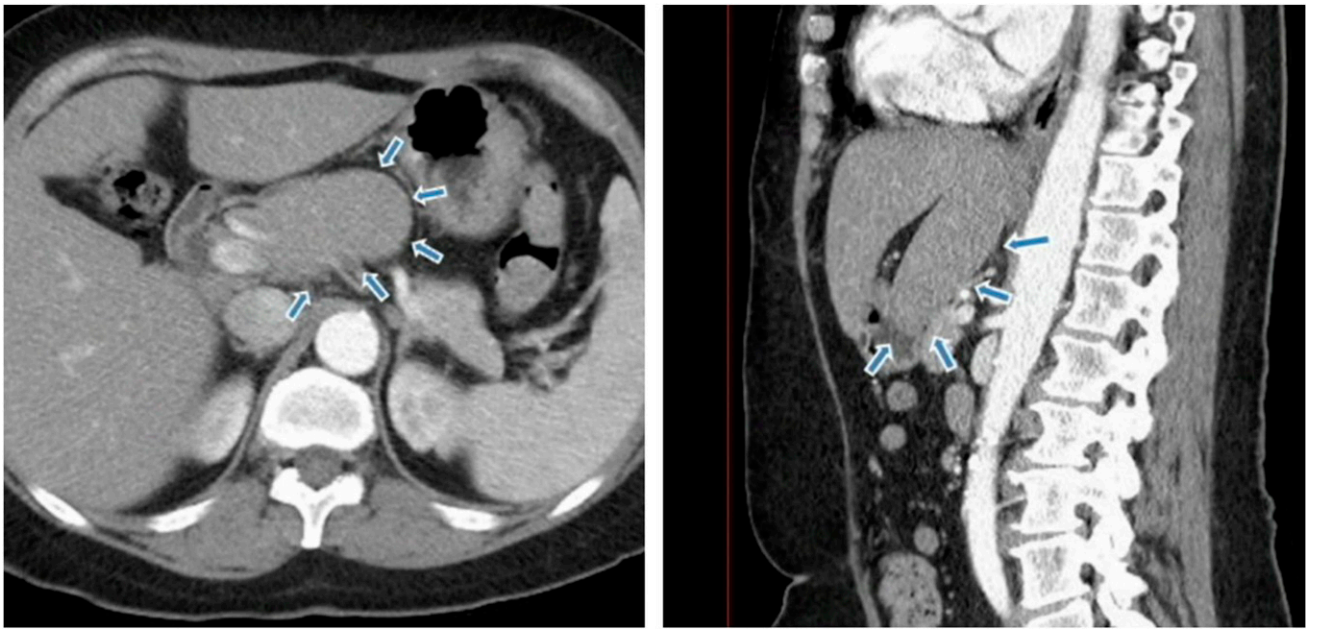

FIG. 2. CT of the liver with arrows indicating the caudate lobe.

abnormality. The patient had extensive work-up and no cause was identified.

This rare incidental finding of a massive caudate lobe in LHHR required a creative strategy consisting of the use of an additional liver retractor, utilization of extracorporeal arthroscopic knot tying, and endoscopic fundoplication. This strategy is safe, effective, and can be applied in similar operative scenarios.

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