Novel Trocarless, Scarless Technique for Left Lobe Liver Retraction in Laparoscopic Upper Gastrointestinal Surgeries: Simple, Cost-effective and with Better Cosmesis

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Abstract Surgeons always look for ways to reduce the size and number of ports in laparoscopy, where in today's era, we have single-incision laparoscopic surgery (SILS). While doing so, principal 'adequate exposure' should not be compromised. For upper gastrointestinal laparoscopic surgeries, we have adopted a novel technique for retraction of the left lobe of liver, which is described here. Device can be made both single sling and double sling, with help of an infant feeding

tube and any routinely used suture material. Placement of device does not require any incision, special energy source, or instrument. It can help in SILS. Detailed technique is described in the text. Operative times did not change significantly. Exposure was excellent. No special instruments or energy devices are required; thus, it is cost-effective. Reducing one port for liver retraction gives better cosmetic results. No liver injury due to the device was noticed in any of the cases. This technique is simpler and cheaper and also gives reasonable cosmetic results compared to other techniques described in the literature.

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Introduction

Upper gastrointestinal surgeries include surgeries performed on the distal oesophagus, gastro-oesophageal junction (GEJ) and stomach. Surgeries done for gastro-oesophageal reflux disease (GERD), achalasia cardia and morbid obesity are commonly performed upper gastrointestinal surgeries. In today's era, laparoscopic approach is a well-accepted and feasible method of performing these surgeries. While advancing to most minimum invasive procedures with time, surgeons are always looking for ways to reduce the size and number of ports in laparoscopy, but turning a blind eye to surgical principals is not acceptable while going for minimal invasive surgery. One of such basic principals is 'adequate exposure'. We have adopted a novel technique for retraction of the left lobe of liver, thus reducing one port for liver retraction, while maintaining adequate exposure.

Patients and Methods

We have been using this device routinely for last 6 months for upper gastrointestinal surgeries performed through laparoscopic approach at our centre. We use 5-FG infant feeding tubes (IFTs) to prepare this hammock device. Two pieces of 5-FG IFT of 12 cm in length are tied together with thread. We use polypropylene material for this, though any suture material with good knot holding and pliability can be used. We prefer polypropylene due to its good pliability and memory, and number 1 or 0 properly suits for this purpose. Tubes are threaded from the inside of lumen, both pieces of IFTs are tied on each side, and thread is kept long, approximately 15 cm in length (Fig. 1).

Hammock can be made of single sling or double sling according to the need. If the left lobe of liver is floppy and single-sling device (Fig. 2) does not give adequate exposure, then double-sling device solves the problem (Fig. 3). For double-sling device, method is same as for single-sling device, except that the end of two devices carries one separate thread on one side and one common thread on the other side.

After all ports required for a particular surgery are inserted, hammock device is inserted through one of the 5- or 10-mm ports inside the peritoneal cavity under vision. After having a look of the left lobe volume and its floppiness, one can decide which device to be used, single or double sling. After this, a small hole is created in the left triangular ligament with help of monopolar hook cautery or ultrasonic shears. Care should be taken to keep the hole 1 cm medial to the left lobe edge, so that the device does not slip away. Hole should not be more medial as it can injure the left hepatic vein. Then, one end of device is held with its thread, retracting the left lobe of liver upward, and thread is caught from the inferior surface of liver and pulled to a correct position. In case of double-sling device, two separate ends are pulled through the hole in the triangular

Fig. 2 Single-sling device in place retracting the left lobe of liver

ligament, as pulling from below upward is dangerous, and it can injure the liver and left portal vein.

Threads of both ends are pulled out through the abdominal wall, with help of polypropylene 2-0 loop made by passing it through the lumen of a 22-gauge spinal needle [1]. Polypropylene loop-carrying spinal needle is inserted through the abdominal wall at a required place, and the thread of device is passed through the loop, and after tightening the loop, it is pulled out, and the thread of device is secured with a haemostatic forcep. Proximal end of device is pulled out just below the xiphisternum. In case of single-sling device, distal end is pulled out through same wound of the right working port, in the right subcostal region, just medial to the right midclavicular line. When using a double-sling device, another distal end is pulled out through a wound of the left working port, just medial to the left midclavicular line. After adjusting the proper tension on device under vision, all threads are secured with haemostatic forceps.

Fig. 1 Both single-sling and double-sling devices outside abdomen

Fig. 3 Double-sling device exposing gastro-oesophageal junction and completed floppy Nissen's fundoplication

Insertion and extraction of this simple device is possible even through 5-mm-size ports. Intermittent loosening of device was required to avoid liver congestion.

Results

Laparoscopic fundoplication, being one of the commonest surgeries performed at our centre, was basically used for this surgery and then its use expanded to be used in laparoscopic Heller myotomy and laparoscopic gastric sleeve and other bariatric surgeries. We have used this device in 15 patients; in 11 patients, single-sling device was used, and in 4 patients, double-sling device was used.

The mean operative time for surgeries in which device was not used was 110 min, while it was 114 min for surgeries where device was used, so operative times did not change significantly between the two groups. Exposure of GEJ was excellent with the use of device. This helped in reducing one port for liver retraction and freed one assistant from the same. No conversion to conventional liver retraction was required in any surgery. No liver injury due to device was noticed in any of cases. Reduction of one port reduced one scar, thus making it better in terms of cosmesis also.

Discussion

After surgeons switched over to advanced laparoscopic work and SILS in the region of upper gastrointestinal tract, there are many different techniques described in the literature for left lobe liver retraction, namely Nathanson liver retractor, blunt rod, fan retractor, Istanbul technique [2], liver suspension device, V-LIST technique [3], triangle method [4] and so on. Conventional techniques like Nathanson, blunt rod and fan retractor mandate to insert a 5-mm port at least, while other techniques like triangle method and V-LIST were using a laparoscopic stapler or specialised energy sources, which used to increase the

cost of surgery. Described suspension tapes are cumbersome to use, while some of the techniques described use fixation of their devices to other intra-abdominal organs, increasing the chance of injury to them. This technique does not involve any intra-corporeal suturing or assembling as in other techniques.

Thus, device described here is better in terms of cost, cosmetic results, ease of use and safety. Apart from that, it gives freedom to choose between single sling and double sling according to need.

Conclusion

Using single- or double-sling Hammock device was feasible and safe in conventional laparoscopic or SILS upper gastrointestinal surgeries for left lobe liver retraction. The device described here is better in terms of cost, cosmetic results, ease of use and safety.

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