Laparoscopic Hand-sewn Duodenal Switch. Video

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Introduction

The Duodenal Switch (DS) is one alternative to the Scopinaro Bilio-Pancreatic Division (BPD). Hess [1] performed the first open case in March 1988 (in a male BMI-60 and he was BMI-29 17 years later) and Marceau [2] made the first publication. Baltasar [3,4] increased the statistics. Rabkin [5] performed the first Lap DS (LDS) hand-assisted for the duodeno-ileum anastomosis in August 1999, Gagner [6] the first fully LDS in September the same year and Baltasar [7,8] published the second world experience.

LDS consist of 1) Vertical Gastric Sleeve (VGS) with pyloric preservation of less than 60 cc and 2) A BPD with a Common Channel (CC) of 65-100 cm, an Alimentary Loop (AL) of 235-300 cm and the remaining Bilio-Pancreatic Loop (BPL) as the proximal small bowel.

Patients:

412 MO patients have been treated with the LDS hand-sewn technique starting May 10, 2000. Mean BMI 51 (38-75). Conversion was required in the 12 out of the first 60 patients. No conversions have been done in the last 100 cases.

Description of the Video:

General endo-thracheal anesthesia is given. Fig 1 shows a drawing of the technique. The patient is supine with the separated legs.

Three surgeons perform the operation SA is in between the legs, SB in on the right side and SC on the right side through 6 ports. Direct vision approach is always used for the first port (1P) with an Ethicon Endopath#12 on the lateral border of the right rectus muscle, 3-4 fingerbreadths below the right costal margin. This is the only large port, the working port (WP1). Ports are positioned as shown in Fig.2. The camera is 30° and placed in the midline, P2, and all the other 4 ports are 5 mm. A silk suture passed from the right costal margin around the round ligament brings the liver and round ligament to the right and leaves the antro and duodenum well exposed. Cholecystectomy is done at this time.

The Harmonic Ultrasound Scalpel (HUS) is used by SA by T3 to divide the vessels of the greater curvature of the stomach, and with Coagulation Forceps (CF) in his T1 starting opposed from the incisure angularis, and progressing to the top and freeing the stomach from the left crura. Sometimes adhesions from the posterior stomach wall and pancreas have to be separated. Any bleeding is controlled by CF instead of the HAS.

SC divides front the right side, the distal stomach vessels down, passes the pylorus, for at least 3-4 cm, and creates a tunnel posterior to the pylorus and in between duodenum and the pyloric artery.

[Video Link: http://www.youtube.com/watch?v=egoBphA1s9o]
SB passes the stapler by the WT1, divides the duodenum with a single white 6 cm. cartridge firing. SA places a sero-serosa continuous running suture of 3/0 PDS to prevent duodenal leaks.

The anaesthetist inserts a #12 mm nasogastric tube (RUSCH) in the antrum and the tip down to the pylorus. The SB, the right placed surgeon, divides the antrum by the WT1, starting 1 cm proximal to the pylorus and firing a blue 4.5 cm. cartridge twice very close to the gastric stent. From at the incisure angularis he uses a 6 cm. long blue cartridge to divide sequentially and very close to the stent up to and lateral to the His angle fat pad.

The anaesthetist removes the bougie and then passes a small 7 mm regular nasogastric tube, to the antrum. SA places a running Lembert sero-serosa suture of 3/0 Prolene from the esophago – gastric junction (EGJ) to the middle of the suture line and then a second one to the distal end. This suture effectively 1) Controls bleeding at the pouch suture-line 2) Help to decreases leakages. The remaining lesser curvature based pouch is tested for leaks with less than 50 cc of diluted Methylene blue.

The surgical team changes position to the head of the patient. The patient is placed in a Trendelenburg. The greater omentum is split with the HUS in the middle up to the transverse colon.

The whole small bowel should be measured [9] and 10% is used for the first 65-100 cm of the Common Channel (CC) by using marked and curved smooth clamps, in 5 cm steps.

One distal clip and two proximal are placed to mark the place for the CC. Bowel. The AL is measured proximal to the CC (40% of the bowel) up to 300-350 cm from the ileo-cecal valve. The mesentery of the small bowel is divided with a bloodless field by the HUS. The bowel is divided transversally with a linear white 4.5 cartridge stapler, passed through the only WP1. The proximal AL is held by a clamp from the xifoid, pulled and kept identified and superior to the transverse colon.

The proximal BPL is identified again and measured (as 50% of the bowel) and open transversally near the divided end. The BPL-CC anastomosis is made of a single layer, end-to side, hand-sewn with two PDS threads united by the middle with knots. One is used for a continuous running suture of the posterior wall and the other for the extramucous anterior wall. The mesenteric defect is closed by a running 3/0 Prolene suture.

The patient and surgical team change position to reverse Trendelenburg situation as in the beginning. The Duodeno-ileal Anastomosis (DIA) is always done end-to-end in two layers by the SA. The first layer brings together the posterior wall of the duodenum to the posterior one of the ileum by interrupted stitches of silk to release tension at the suture-line. Both anterior aspects of both loops, ileum and duodenum, are divided transversally with the HUS. A double PDS 3/0 suture is used for a whole wall, water-tight, continuous suture of the posterior first and then the anterior wall. A second anterior suture line of interrupted silk adds the final second layer to the DIA.

The pouch is tested for leaks with using Methylene blue through the nasogastric tube placed in the antrum. Revision of the cavity and aspiration is done.

The stomach is removed by enlarging the #12 WP1, directly and without any bag. Two drains are placed under vision posterior and anterior to the stomach and the DIA. The WP1 opening is closed with Maxon@1/0 suture and the skin with silk.

Operating times range from 2.15 to 4 hours but with a mean of 2:45 hours.

Patients are extubated in the recovery room and usually transferred to a regular ward where they sit 2 hours after surgery and incentive spirometry and active legs exercises are encouraged.

They have a control GI series with Gastrografin first and then followed by a barium swallow the POD1 and then discharged POD2 with drains.

Patients drink a cup of diluted Methylene blue everyday to rule out leaks and drains are removed on the 7 PDO. They are allowed to drink liquids starting next day for two weeks, mashed food for another week and then in a free diet.

Supplementation with calcium, iron and fat-soluble vitamins (A, D, E and K) and labs control are recommended for life.

Results:

There were 21 leaks (5%), 11 of them at the GEJ, 9 at the DIA and one duodenal stump leak who died.

The GEJ leaks required: 4 of them several surgeries and 2 of them a total gastrectomy. Three of them had a RNY from the BPL and both healed. The DIA leaks were 4 asymptomatic, 3 well-drained and cured conservatively and 2 required resection and new DIA.
One patient had Roux-en-O (two unconnected circles – upper and lower small bowel) and required re-operation. One patient had gastroparesia and did not respond at any therapy and had finally a total gastrectomy. Two patients had functional stenosis at the jejuno-jejunostomy and were treated by interventional radiology by decompression of the whole AL with a long tube.

Two patients died within 30 days due to a duodenal stump leak (without sero-serosa reinforcement) and a pulmonary emboli, 0.66% mortality. Another patient BMI-69 died at home 34 days after surgery due to pulmonary emboli.

There were 4 patients with intestinal obstructions and required laparotomy and two of them bowel resection. None of them had internal hernias.

14 patients (3.4%) developed protein-caloric malnutrition (PCM) and 9 had a “kissing-X” (latero-lateral enterostomy), two a CC lengthening by moving the end of the BPD >120 cm proximally and two whole small bowel reversal as a lengthening procedure by laparoscopy. One patient had liver failure 1 year after surgery and required liver transplantation and partial reversal of the BPD and she is asymptomatic.

One patient died of undiagnosed acute appendicitis in a different community.

This is a short-term follow up and %EWL and %EBMIL [10] are expected to be similar than in the open surgery. Our long-term Open DS patients have a %EWL of 69 and %EBMIL of 73 at 5 years.

Conclusion: The hand-sewn LDS is a very complex procedure with a very difficult learning curve (more than with the LRNYGBP). Early complications are expected at the beginning of the experience, but it can be an excellent procedure with a good quality of life and weight loss.

References
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