

Research Article

Laparoscopic Sleeve Gastrectomy Tips and Tricks to Optimise Outcomes

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Abstract

Laparoscopic sleeve gastrectomy (LSG) is becoming popular as a standalone bariatric procedure. The technique has evolved over years towards standardization. Better standardization has minimized complications like leaks, stricture and weight regain. Adequate posterior dissection up to the hiatus and the linear sleeve without a torque can be safely performed. This article refers to the international consensus document on LSG as well as the expert panel consensus summit published in SOARD (Surgery for Obesity and Related Diseases) where our centre's (Laparo Obeso Centre, Pune) data is shared. This article demonstrates step by step approach to a safe, standardized technique of LSG.

Key words: Laparoscopic sleeve gastrectomy, surgical technique.

Abbreviations: LSG- Laparoscopic Sleeve Gastrectomy; GOJ- Gastro Oesophageal Junction

Introduction

Worldwide obesity has become a major healthcare problem, reaching epidemic proportions. Initially thought to be a predominant problem in western countries, it is fast becoming a major health issues even in developing countries. Changing dietary patterns i.e calorie rich diet along with sedentary lifestyle is thought to be the predominant factor for this trend. Genetic factors, endocrine diseases e.g. hypothyroidism also act as contributing factors. With the recognition of obesity as a contributor to metabolic syndrome and obesity related risk factors such as Diabetes mellitus, hypertension, obstructive sleep apnoea, reflux disease, degenerative joint diseases, menstrual and fertility disorders it is important to recognise the magnitude of the problem at hand. Bariatric surgery has been shown to be the most effective method in the management of morbid obesity, compared to medical treatments for sustained weight loss and as well as amelioration of obesity associated comorbidities [1].

Laparoscopic sleeve gastrectomy (LSG) today is considered a valid option for management of morbid obesity, both as a primary or as a staged bariatric procedure. The concept of LSG was conceived initially as a part of procedure, working as restrictive component while performing a biliopancreatic diversion or duodenal switch. Later, LSG was proposed as the first step procedure in high-risk patients, so as to make them physically fit and control of comorbidities to be followed by a second step Roux-en-Y gastric bypass or biliopancreatic diversion and duodenal switch in super-obese patients [2]. It is only in the recent decade that LSG has been proposed as a standalone bariatric procedure. Comparable excess weight loss and remission of comorbidities have been reported when compared to other well-established procedures [3]. In addition, it avoids other nutrition associated complications seen with other bariatric procedures particularly the ones causing mal-absorption.

In our institution experience with LSG as a primary operation

for management of morbid obesity started over the last decade. As our knowledge of the procedure has evolved, so has our technique of performing LSG. Minor variation and technical manipulations in the surgical steps have led to a standard technique which has been followed as a routine over the last 5 years. The aim of this work is to report the experience of a single surgeon and a single center with LSG as a standalone operation for treatment morbid obesity and its associated comorbidities.

Methods

The bariatric surgery program in our institution started way back in 2004. Laparoscopic gastric banding was the first procedure performed. Over the years our experience with multiple bariatric procedures e.g gastric banding, laparoscopic Roux-en-Y gastric bypass, biliopancreatic diversion with duodenal switch, sleeve gastrectomy and minigastric bypass as well as re-operative bariatric procedures has grown. We performed our first LSG way back in 2000. Since then till date we have performed almost 5000 LSG as a primary procedure for morbid obesity.

After a detailed history, all patients are subjected to a detailed preoperative workup involving a multi-disciplinary team including specialist (surgery, endocrinology, internal medicine, psychiatry, anaesthesiology and dietician), upper gastrointestinal endoscopy, blood and radiological investigations and sleep study in selected cases. Patients are counselled in detail about the surgical procedure, with all potential advantages, possible complications and side effects and any alternative surgery if indicated. Indications for bariatric surgery were as per the guidelines laid down by the National Institute of health in 1992 [4]. In addition, LSG was offered as a first choice for patients refusing complex procedures like Roux-en-Y gastric bypass,

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Table 1: surgical technique used.

Step	Aim	Our Standardised procedure with tips and tricks
Position	Make surgeon comfortable, reduce number of assistants	Various positions are being used by different surgeons all over world. We prefer reverse trendelenburg with leg split position and surgeon standing in between legs, this reduces one assistant , scrub nurse on right hand and first assistant/cameraman on left hand side of surgeon
Access	Safe access; minimise ports for dissection & stapling	Carboperitonium- Veress needle (left supra umbilical region) We use two 12-10mm ports and two 5 mm ports. First 12-10 mm port placed using visiport in the supra umbilical and left mid abdominal area- this is camera port 2 nd 12-10mm port placed slightly superior to that of first 12-10 mm port and roughly 5 cm right lateral to midline--used for stomach retraction and later for stapeler (gun)placement . 5 mm port is placed in midclavicular line just beneath to the costal margin on left side -used for harmonic scalpel . The left lobe of the liver is retracted medially using various methods (5) we use a tooth needle holder through a 5 mm port placed in the sub xiphoid area catching left crura .Tooth needle holder is self-retaining retractor unlike other retractors (nathanson / fan retractor) where assistant is required and by reducing assistant we can avoid assistant induced liver injuries.
Port placement Devascularisation of greater curvature of stomach	Full mobilization of the greater curvature and posterior aspect of stomach	Gentle tissue handling and constant change in tissue traction is key for dissection with less working ports Omental attachment in lower 1/3 of greater curvature is thin –easy to creat window in omentum and proceed with further dissection Dissection of omentum close to the gastric wall will reduces the specimen size – easy for extraction of specimen Inferiorly dissection kept 4 cm away from pylorus ie roughly 3-4 vessels before visible pyloric ring or starting of congenital adhesions in pyloric region is landmark of being near to pyloric ring. If dissection is too close to the pylorus, the thick area can crack predisposing to leaks and/or the antral pumping mechanism will be affected The goal of superior dissection is to expose the cardia and the left crus., The spleen and the short vessels should be kept in mind and one should do very meticulous dissection in this area so as to avoid bleeding and pneumomediastinum, as there is no assistant port for tissue traction, tissue traction is surgeon controlled and not assistant controlled hence accidental mistraction related injuries in this area can be minimised. Adequate retrogastric mobilization may avoid the risk of leaving a large posterior stomach, flipping of stomach on its verticle axis may ease this dissection
Bougie insertion	To create adequate size 32/36 French (6) gastric pouch	bougie must lie on the lesser curve and it should be distal to the point of trasection. once crossed GOJ guide it under vision with right hand instrument to antrum along lesser curvature, generous jelly application to bouge and rotatory forward movement is the key of safe Bougie placement
Stapler firing	Create uniform gastric tube	By using endo GIA stapeler gun through 2nd 12-10 mm port sleeve gastrectomy is done by firing gun uniformly alongside of bougie constant lateral traction to greater curvature and visualising the anterior and posterior wall of stomach avoiding unequal walls is key to perform torque free uniform sleeve we follow standard protocol for use of stapeler as per international sleeve gastrectomy expert panel consensus statement (7) for first two firing we use either green or purple load (8) and rest blue load. First firing - Transection should begin 2–6 cm from pylorus Last firing - It is important to stay 1 cm away from GOJ/angle of his as at this region tissue is too thin for the cartridge load causing leak.
Staple line reinforcement	Reduce leak	we burry fundal cap which is danger area for leak and overrun entire staple line with v-lock /vicryl 2-0
Leak test and drain		Various intra operative leak tests are commonly being used. after our vast exp in LSG we found negative intra-op leak test will not predict delayed leak which is mainly due to ischemic necrosis and after following standard protocol of surgical steps our leak rate is very negligible hence at our centre we have stopped using intra op leak test we avoid placing drain in uneventful surgery and in patients with controlled hypertension, we keep drain by default in super obese cases with multiple co – morbidities and patients with uncontrolled hypertension.

patients with previous abdominal surgery involving the intestines, and young patients. Specific contra-indications, apart from the general contraindications to bariatric surgery, were severe and documented gastroesophageal reflux disease and previous gastric surgery [5].

LSG: The technique and how I do it?

Ren and colleagues were the first to perform laparoscopic sleeve gastrectomy in 1999 [6]. Since then Laparoscopic sleeve gastrectomy (LSG) has become one of the most common and popular bariatric procedures for the management of morbid obesity.

The principles of LSG involve excision of 75%–80% of the greater curvature, leaving behind a narrow stomach tube. Port placement may vary from surgeon to surgeon. Also, minor variations in the port placement are required depending on the BMI and abdominal contour of the patient. After creation of pneumoperitoneum (closed, open or optical viewing trocar), a general survey of the abdomen is done. Any doubt should warrant a thorough diagnostic laparoscopy. All working ports should be inserted under vision [7]. A point on the greater curve usually on the antrum, is chosen as the starting point. This in literature can range from 2 to 10 cm from the pylorus depending on surgeon discretion. The lesser sac is entered by opening the gastrocolic ligament and the short gastric vessels and the greater curvature ligaments (i.e. gastrosplenic and gastrocolic) divided using an energy device upto the left crus. Once done, a 32-40 French bougie is passed transorally into the pylorus against the lesser curvature. A laparoscopic stapler with a cartridge is introduced and multiple firing along the length of the bougie until the angle of His done [8]. This leads to separation of about 75%–80% of the stomach. After securing haemostasis the specimen is removed by enlarging one of the 12-mm ports. A drain is then placed alongside the staple line based on surgeon discretion. Technical variations involve port positioning and number of ports, liver retraction technique, the choice of start point on the greater curve for gastric devascularisation and subsequent separation of stomach sleeve, choice of energy source, size of bougie, choice of stapler and cartridge, suture line re-enforcement, use of drain, whether to perform leak test, technique used for leak test and port closure method.

Details of our surgical technique used are given in Table 1

Complications

The most drastic complications of this procedure are leak. [9]. Several techniques were utilized to prevent leak in many clinical studies despite the efforts to minimize leaks after LSG [10], they still occur. [11] The reported leak rate in the literature is up to 3%. [10] In our vast experience of more than 4000 LSG, we have standardised and modified surgical steps for LSG at our institute. In our 2015-2016 data, we found only 1 leak and 1 intra-abdominal abscess formation without any evidence of leak out of 350 LSG performed. In our institute leak rate is 0.285%. Other complications are e.g 10/12 mm port site minor

wound infections, chest complications. Hence, we recommend our standardised surgical steps along with tips and tricks for budding bariatric surgeons to reduce complication rates.

Conclusion:

The key for performing a safe LSG with minimum complications is gentle and meticulous tissue handling and dissection, uniform stapling, burying of fundal cap, invagination of staple line in addition to tips and tricks discussed above. Together this could be helpful in minimising complications after LSG particularly postoperative staple line leaks. We recommend following standardised steps with minor modifications as per the surgeon discretion. A good guide is to follow standard techniques of LSG given in literature [12] and as per the consensus guidelines. [7] It helps at great extent to simplify the procedure and make it almost complication free.

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