



## Laparoscopic Sleeve Gastrectomy: Ensuring Safety and Achieving an Aesthetic Gastric Tube Shape

Ba Ool Seong<sup>1</sup>, Chang Seok Ko<sup>1</sup>, Seul-Gi Oh<sup>2</sup>, Seong-A Jeong<sup>3</sup>, Jeoung Hwan Yook<sup>1</sup>, Moon-Won Yoo<sup>1</sup>,  
Beom Su Kim<sup>1</sup>, In-Seob Lee<sup>1</sup>, Chung Sik Gong<sup>1</sup>, Sa-Hong Min<sup>1</sup>

<sup>1</sup>Division of Gastrointestinal Surgery, Department of Surgery, Asan Medical Center, University of Ulsan College of Medicine, Seoul, Republic of Korea

<sup>2</sup>Department of Surgery, Inha University Hospital, Inha University College of Medicine, Seoul, Republic of Korea

<sup>3</sup>Department of Surgery, Gangneung Asan Hospital, University of Ulsan College of Medicine, Gangneung, Republic of Korea

Sleeve gastrectomy was first performed in Korea in the 2000s, and its frequency has gradually increased thereafter. It is now the most commonly performed procedure for bariatric surgery today. However, there are few detailed reports on this surgical method, and, in particular, no papers that include accompanying videos. Herein, we present the case of a 29-year-old male with a preoperative body mass index of 44 kg/m<sup>2</sup>, who also had hypertension and hyperlipidemia. A conventional laparoscopic sleeve gastrectomy was performed using a 5-port technique. The surgeon employed two methods to ensure a consistent and aesthetic gastric tube, as well as patient safety: the non-tension method and a Lembert suture on the staple line at the neo-greater curvature. By utilizing the aforementioned two tips effectively, even inexperienced surgeons can perform laparoscopic sleeve gastrectomy relatively safely and effectively.

**Keywords:** Laparoscopic surgery; Sleeve gastrectomy; Morbid obesity

### Introduction

In Korea, since 2019, bariatric surgery has been covered by national health insurance, with the procedure being performed on patients with a body mass index (BMI) of 35 kg/m<sup>2</sup> or above, or a BMI of 30 kg/m<sup>2</sup> or above with various accompanying conditions such as hypertension, diabetes, dyslipidemia, and others. Similar to the global trend in bariatric surgery, sleeve gastrectomy in Korea has gradually increased since its introduction in the 2000s, and is currently the most frequently performed surgery for obesity treatment [1-3]. Recently,

laparoscopic sleeve gastrectomy is primarily performed by upper gastrointestinal surgeons with a certain level of experience in laparoscopic gastric cancer surgery. However, there is little domestic reporting on this surgical method, and particularly no papers with attached videos. Therefore, we aim to share not only the detailed procedure of conventional laparoscopic sleeve gastrectomy but also important tips for achieving a reproducible and consistent gastric tube shape.

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**Corresponding author:** Chang Seok Ko, MD

Division of Gastrointestinal Surgery, Department of Surgery, Asan Medical Center, University of Ulsan College of Medicine, 88 Olympic-ro 43-gil, Songpa-gu, Seoul 05505, Republic of Korea

Tel: +82-2-3010-0550, E-mail: [kochs815@amc.seoul.kr](mailto:kochs815@amc.seoul.kr)

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## Case Presentation

### Patient and preoperative evaluation

The patient is a 29-year-old male with a preoperative BMI of 44 kg/m<sup>2</sup>. He had accompanying comorbidities of hypertension and hyperlipidemia for which he was taking medication. There were no significant findings in her past medical history, surgical history, or family history. Referred to our institution for surgical treatment through a private bariatric clinic, the patient underwent preoperative evaluations including endoscopy, computed tomography scan, and laboratory tests. Following a comprehensive assessment, including a general anesthesia evaluation, laparoscopic sleeve gastrectomy was determined to be the optimal surgical intervention for the patient.

### Surgical setting and procedure details

The operator and the second assistant (scopist) are positioned on the patient's right side, while the first assistant and scrub nurse are positioned on the patient's left side. Energy devices and laparoscopic instruments should be prepared to be at least 45 cm in length. Additionally, trocars should be prepared in lengths appropriate to the thickness of the patient's abdominal wall. The patient must be securely fastened beforehand to prevent slipping.

Typically, a 2 cm incision is made above the umbilicus, and a 12 mm camera port is inserted using the open method. Before port insertion, Vicryl 1-0 is used to place at least four stitches in advance. This is done at this point to ensure precise identification of the fascia, which aids in secure wound closure. Five ports are used: 15 mm in the right lower quadrant, 5 mm in the right upper quadrant, 5 mm in the left lower quadrant, and 5 mm in the left upper quadrant. The triangle method was used for liver traction [4]. The surgical technique involves utilizing energy devices to carefully dissect branches of the gastroepiploic vessels along the greater curvature of the stomach, starting from the antrum to the Angle of His. The posterior fundus is completely mobilized, with adhesions in the lesser sac and anterior to the pancreas being meticulously divided. Subsequently, attention is directed towards exposing the left crus to assess for the presence of a hiatal hernia. Mobilization of

fat tissue near the gastro-esophageal junction facilitates thorough examination of this region and ensures proper stapling. A bougie with a diameter of 38 French is then introduced orally and positioned adjacent to the lesser curvature.

Stapling commences approximately 4 to 6 cm proximal to the pylorus along the lateral aspect of the bougie. During stapling, the 1st assistant utilizes graspers in both hands to grasp the greater curvature, ensuring that they are perpendicular to the direction of stapling. It is crucial to minimize tension as much as possible to maintain consistent stapling, a method referred to as the non-tension method. At this point, if the first assistant does not consistently apply force when retracting the stomach to be removed, the remained stomach may become irregularly shaped, which can directly cause stricture or leakage after surgery. Particularly during stapling of the fundus, where it is important for effective removal, the 1st assistant's right-hand grasper should grasp and pull the posterior aspect of the fundus with adequate force.

Following each stapling, the anesthesiologist is requested to manipulate the bougie to confirm its unrestricted movement. The final stapling occurs approximately 1cm distal to the Angle of His. When removing the specimen, positioning the tip of the specimen at the top of the bag allows for easier extraction. Subsequently, upon specimen removal, reinforcement of the staple line is performed to minimize the risk of bleeding and leakage. An anchoring suture was placed at the mesocolon fat to prevent gastric torsion.

## Discussion

The current case report holds significance in its detailed description of the surgical procedure, including actual surgical [video](#), providing insights into intricate aspects of the procedure. This surgery employed a highly conventional sleeve gastrectomy technique utilizing five ports, with careful attention to safety considerations.

Regarding safety, two critical aspects were addressed. Firstly, a non-tension method was employed for the assistant during stapling to ensure consistent removal of the greater curvature and fundus, creating a uniform "banana shape" without irregularities. It is noted that

if traction force applied by the assistant varies during resection while utilizing a bougie, it may lead to uneven shapes and occasional strictures or leakage, as observed in some cases. In the United States, overcoming this challenge involves using a long stapler for resection. This device, called the Titan SGS stapler, is a novel stapling device with a 23 cm single-fire staple mechanism. Its potential benefits include the elimination of junctions and angulations in the staple line [5,6]. However, in Korea, the single long stapler is not yet widely available, thus necessitating the use of multiple 60 mm laparoscopic staplers. Nonetheless, employing this technique for stapling can maintain a consistent resection shape.

Secondly, the Lembert suture along the stapling line was implemented. A well-known randomized controlled trial reports that the rates of bleeding and leakage following sleeve gastrectomy are 1.2%–4.9% and 0.7%–3.3%, respectively [7]. Preventing bleeding and leakage is crucial as they can lead to life-threatening conditions such as reoperation, intensive care, or death [8]. Diab et al. [9], in a recently published meta-analysis, reported that staple line reinforcement could reduce postoperative bleeding by 0.25 times and leaks by 0.43 times. Various methods for staple line reinforcement have been developed and introduced. Notably, Rogula et al. [10] claimed that the Lembert suture method results in fewer leaks compared to other methods. Additionally, Lembert suture may be useful not only for reinforcing the staple line but also for adjusting the volume of the remnant stomach, similar to gastric plication. Therefore, for beginners, this can be a favorable choice for reducing postoperative bleeding and leakage.

Utilizing the aforementioned two tips effectively, even inexperienced surgeons can perform laparoscopic sleeve gastrectomy relatively safely and effectively.

## Disclosure

In-Seob Lee is an editor-in-chief and Sa-Hong Min is an associate editor of the journal, but they were not involved in the peer reviewer selection, evaluation, or decision process of this article. No other potential conflicts of interest relevant to this article were reported.

## Author contributions

Conceptualization: BOS, CSK, SGO, SAJ, JHY; Data curation: MWY, BSK, ISL, CSG, SHM; Formal analysis: BOS, CSK, SGO; Investigation: SAJ, JHY; Methodology: MWY, BSK; Software: ISL, CSG, SHM; Validation: BOS, CSK; Writing–original draft: BOS, CSK, SGO, SAJ, JHY; Writing–review & editing: MWY, BSK, ISL, CSG, SHM.

## ORCID

Ba Ool Seong, <https://orcid.org/0009-0000-1202-8471>  
 Chang Seok Ko, <https://orcid.org/0000-0002-4155-4312>  
 Seul-Gi Oh, <https://orcid.org/0000-0001-6920-2805>  
 Jeoung Hwan Yook, <https://orcid.org/0000-0002-7987-5808>  
 Moon-Won Yoo, <https://orcid.org/0000-0003-0346-9042>  
 Beom Su Kim, <https://orcid.org/0000-0002-3656-2086>  
 In-Seob Lee, <https://orcid.org/0000-0003-3099-0140>  
 Chung Sik Gong, <https://orcid.org/0000-0002-5116-609X>  
 Sa-Hong Min, <https://orcid.org/0000-0002-6150-7935>

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