



## Gastric Body Adenocarcinoma after Laparoscopic Sleeve Gastrectomy (LSG): Are Really Needed the Postoperative Endoscopy and a Correct Follow Up after Bariatric Surgery?

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### Abstract

Gastric body cancer after bariatric surgery is rare. Premalignant lesions in preoperative Esophagogastroduodenoscopy (EGD) should warn of the risk of excluding the gastric body with derivative techniques.

A case of 51-year-old woman is presented, who suffered severe obesity (BMI 51 kg/m<sup>2</sup>), arterial hypertension, SAHS, fibromyalgia, depressive syndrome and psoriasis. Preoperative EGD without alterations (biopsies: Chronic gastritis with moderate activity, complete intestinal metaplasia and positive *Helicobacter pylori*). Laparoscopic Sleeve Gastrectomy (LSG) was performed with adequate weight loss over 2 years (BMI 35 kg/m<sup>2</sup>, TWL 31%) and resolution of comorbidities. Due to progressive weight recovery, revisional surgery was proposed. Incisura angularis tumor was detected in EGD (biopsy: High-grade dysplasia). CT ruled out local infiltration and metastasis. The symptoms had started 3 months before EGD.

A D1 Subtotal Gastrectomy with laparoscopic Roux-Y reconstruction was performed (Pathological anatomy: Adenocarcinoma of intestinal type pT1apN0 on a 60 mm adenoma with free margins). Not adjuvant treatment was required.

Scientific societies advise all patients undergoing bariatric surgery to undergo a preoperative EGD; as well as in the postoperative period of patients at risk of gastric cancer. Despite this, routine postoperative EGD remains a mild recommendation with a low level of evidence. IFSO and ASMBS advise the performance of postoperative EGD in all patients undergoing LSG surgery until the actual risk of gastric cancer in these patients is determined. Early detection can avoid the need for adjuvant treatment or distant lesions. It is essential to report all cases to create clinical guidelines with a higher level of scientific evidence.

### Introduction

Gastric cancer is on the fifth position worldwide, with an estimated incidence of 4.8% (Figure 1) and an estimated mortality of 6.8% (Figure 2), according to the latest statistics published by Globocan in 2022 [1].

Specific incidence of gastric cancer in obese patients is unknown, although obesity has classically been related to a higher risk of cancer due to its pro-inflammatory state; as in the case of esophageal, breast, gallbladder, and kidney, pancreatic and colorectal cancer [2]. The real incidence in obese patients after receiving bariatric surgery is difficult to extrapolate. However, bariatric surgery has been shown to reduce the risk of cancer and mortality in patients with obesity [3]. Specifically, a cohort study has recently been published in a sample of more than 900 thousand obese patients that demonstrates a significant reduction in the incidence of esophagogastric cancer in patients undergoing bariatric surgery [4].

Preoperative Esophagogastroduodenoscopy (EGD) allows the detection of premalignant lesions

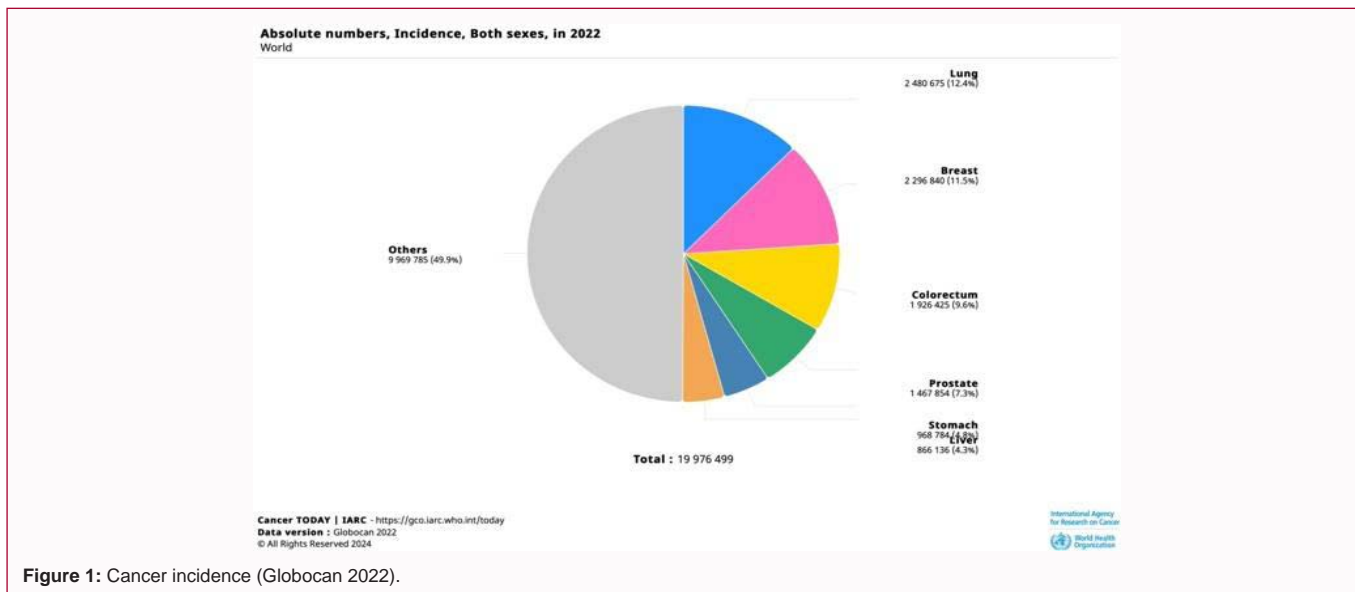


Figure 1: Cancer incidence (Globocan 2022).

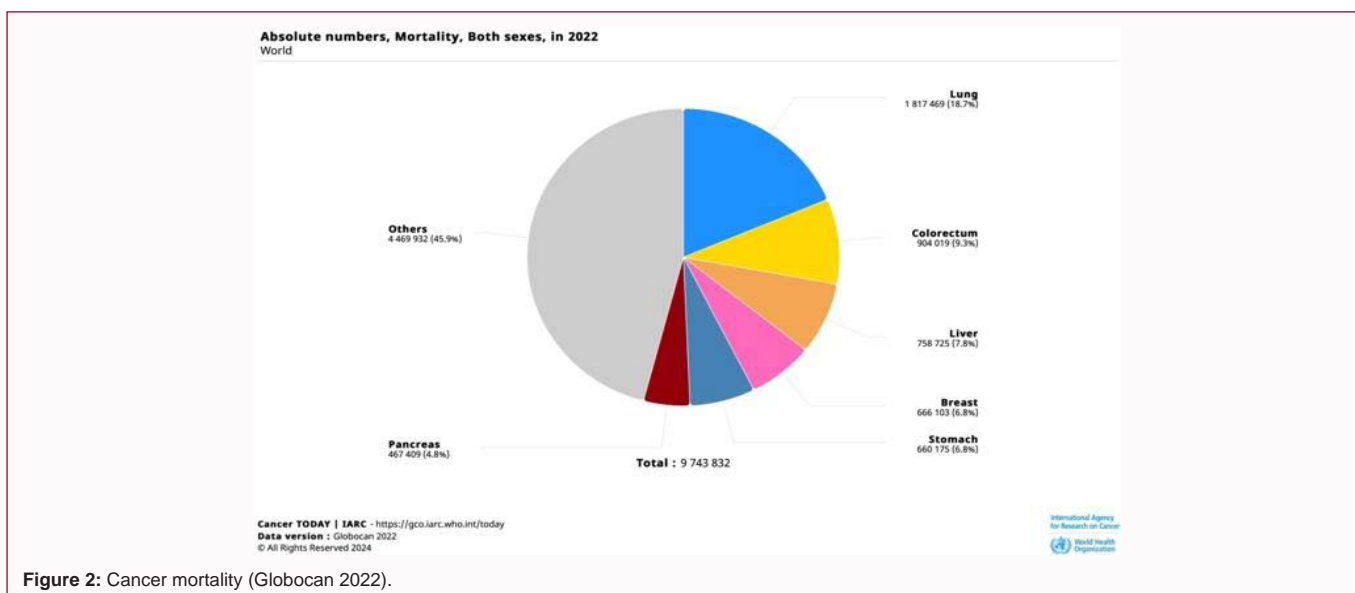


Figure 2: Cancer mortality (Globocan 2022).

that require subsequent endoscopic controls, such as incomplete metaplasia, persistent *Helicobacter pylori* gastritis, extensive atrophic gastritis, and autoimmune gastritis. It is estimated that 25.3% of asymptomatic patients present histopathological alterations that may condition or contraindicate the surgical technique, taking into account that derivative techniques exclude the gastric body and make future endoscopic studies difficult. In this sense, the international scientific societies of bariatric surgery, IFSO and ASMBS, recently took a position advising performing a preoperative EGD in all patients before performing bariatric surgery [5,6].

However, endoscopic follow-up of bariatric surgery patients is controversial. It is clearly indicated, as in the rest of the general population, in patients at risk of gastric cancer, either due to a family history of gastric neoplasia or due to previous detection of premalignant lesions (presence of incomplete metaplasia, gastritis due to persistent *Helicobacter pylori*, extensive atrophic gastritis, autoimmune gastritis or Barrett's esophagus). On the other hand, for the rest of the patients undergoing bariatric surgery, routine postoperative EGD continues to be highly criticized, especially by

endoscopist gastrologists [7-11].

Laparoscopic Vertical Gastrectomy (LSG) is the most widely used bariatric surgery worldwide in recent years [12], which has led to multiple exhaustive analyzes of its long-term effects and complications. The worsening or *de novo* appearance of gastroesophageal reflux, Barrett's esophagus, and neoplasms of the esophagogastric junction are being the most critical focus in the latest literature reviews. In 2021 Chen et al. published a systematic review of 795 articles, of which only 15 articles reported esophagogastric cancer after LSG. In total, 17 cases had been published (4 esophageal, 4 esophagogastric junction, and 9 gastric), with adenocarcinoma being the most frequent (88.2%) and with a diagnostic debut between 4 and 96 months after bariatric surgery [13].

Gastric body-antrum cancer is very rare after LSG. Currently there are only eight cases published in the literature [14-21]. These patients have a mean age of them is 45.5 years old, 75% are female, the mean BMI prior to LSG is 52 kg/m<sup>2</sup> and any of them had presence of *Helicobacter pylori* before LSG. Only 6 patients had performed a

previous endoscopic study and the findings were variable: One case of chronic atrophic gastritis, one case of duodenal ulcer that was treated before surgery, one case of erosive gastritis with small hiatal hernia, one case with significant plasma cell infiltration in the lamina propria, and two cases without pathological findings. The diagnosis of cancer was made between 8 and 96 months after LSG, with the average being 48 months. The mean BMI at the time of diagnosis is 31.5 kg/m<sup>2</sup>. The histology of the tumor is 100% adenocarcinoma, being signet-ring cell adenocarcinoma in 37.5% and poorly differentiated in 25% (Table 1).

## Material and Methods

### Case presentation

A 51-year-old female patient with grade IV morbid obesity (BMI 51 kg/m<sup>2</sup>) of android distribution, with arterial hypertension, sleep apnea-hypopnea syndrome, fibromyalgia, depressive syndrome and psoriasis is presented. No family history of gastric cancer. In the usual preoperative study at our center, a contrast-enhanced Esophago Gastro Duodenal Transit (TEGD) was performed, which showed no morphological or motility alterations, and an Esophagogastroduodenoscopy (EGD) was performed without pathological findings, with antral biopsies that showed chronic gastritis with moderate activity, intestinal complete metaplasia and presence of *Helicobacter pylori*. Eradication treatment was completed prior to surgery and a Laparoscopic Sleeve Gastrectomy (LSG) was indicated, which was performed without incident. The pathological anatomy of the excised stomach showed persistence of *Helicobacter pylori* in the sample, with signs of chronic gastritis and focal intestinal metaplasia, without evidence of dysplasia or signs of malignancy. Eradication was repeated after surgery.

In the postoperative period, the patient presented a correct clinical evolution with resolution of comorbidities and a correct weight loss, achieving her nadir weight at 12 months (BMI 33 kg/m<sup>2</sup>). At 18 months, a routine endoscopic control was performed, which was normal. The patient presented a slight initial gain with weight stability 24 months after surgery (BMI 35 kg/m<sup>2</sup>), having then reached a percentage of Total Weight Loss of 31% (%TWL). However, in the context of very serious family health problems with the impossibility of maintaining adequate eating habits and physical activity, the patient began to progressively regain weight until she reached a BMI of 40 kg/m<sup>2</sup>. During this period, psychological and dietary support was intensified, achieving weight stabilization with mood improvement of patient's dietetic and physical activity habits. After verifying correct compliance with the recommendations and persistence of weight stabilization, the possibility of conversion surgery to a derivative technique was proposed and preoperative tests were asked for.

In the TEGD, a slight dilation of the gastric tube was observed with a polylobulated lesion at the level of the lower gastric third (Figure 3), which was confirmed with the EGD observing a large mamelonated and ulcerated tumor at the level of the incisura angularis with a malignancy. Biopsies of the tumor showed a lesion with high-grade dysplasia.

When patient was re-interrogated, confessed that digestive symptoms began 3 months before the EGD was performed, but she didn't consulted. Described symptoms were: Feeling of fullness, indigestion, occasional nausea, postprandial belching and a sensation of reflux without heartburn; there was no alteration in the depositional rhythm or melena.

A radiological extension study was completed with thoracoabdominal CT without other findings, apart from the tumor described as an endoluminal soft tissue mass in the gastric body without signs of extramural infiltration (Figure 4, 5), and tumor markers within normal limits.

Case was presented to the multidisciplinary Esophago-Gastric and Bariatric Committee, and surgical treatment was proposed: D1 Subtotal Gastrectomy with laparoscopic Roux-en-Y reconstruction. Surgery was performed uneventful and pathological results showed an intestinal type adenocarcinoma pT1a pN0 on a 60 mm adenoma with free margins (Early Gastric Carcinoma). No adjuvant treatment was necessary. The patient had a good postoperative evolution with good oral tolerance and a slight weight loss. There is no evidence of tumor recurrence to date.

## Results and Discussion

Gastric cancer continues to be a cause of important morbidity and mortality in our population, and early diagnosis is truly necessary to increase the chances of cure and reduce the current mortality and the need for adjuvant treatment.

Although latest published studies show that risk of cancer in patients with obesity is reduced after bariatric surgery, it must be taken into account that the anatomical modifications that we cause can also generate histological alterations in the esophageal, gastric or intestinal mucosa that can finally degenerate to malignance if not detected and treated correctly.

Performing a preoperative EGD is well advocated by most bariatric surgeons in order to rule out injuries prior to the intervention that may require treatment, condition the surgical technique, or even contraindicate surgery. However, endoscopic follow-up after bariatric surgery is not indicated in all patients.

Currently, bariatric surgery scientific societies can only advise routine postoperative EGD as a mild recommendation, given that the level of evidence is low as the real incidence of gastric cancer in bariatric surgery patients is not known. IFSO position statement recommends routine EGD after LSG or OAGB (One Anastomosis Gastric Bypass) to detect Barrett's esophagus or malignant lesions of the upper digestive tract after 1 year follow-up and thereafter every 2 to 3 years; and patients undergoing Roux-Y-Gastric Bypass (RYGB) would only be advised if upper digestive symptoms appear [5]. On the other hand, ASMBS position statement recommends performing a follow-up EGD in all patients who underwent LSG surgery 3 years or more ago, with the aim of ruling out the presence of Barrett's esophagus, whether or not they have symptoms. It is also considered



Figure 3: TEGD after LSG: polylobulated lesion at the level of the lower gastric third.

**Table 1:** Case reports of body-antrum gastric cancer after sleeve gastrectomy.

	Angrisani, 2013	Masrur, 2016	Vladimirov, 2017	Seki, 2018	Yamashita, 2019	Muamar, 2020	Najjari, 2021	Orellana, 2021
<b>Patient characteristics:</b>								
Age	51	44	47	64	42	26	36	59
Sex	F	F	F	F	F	F	M	M
<b>Before LSG:</b>								
BMI before LSG	61	38.2	47.7	35.3	-	52	45	38.8
Preop EGD	yes	not	yes	yes	not	yes	yes	Yes
Endoscopic findings	significant infiltration of plasma cells in the lamina propia	-	small hiatal hernia and erosive gastritis	chronic atrophic gastritis	-	normal	duodenal ulcer (treated)	normal
Preop H Pylori	HP-	HP-	HP-	HP-	HP-	HP-	-	-
<b>Diagnosis of cancer:</b>								
BMI at diagnosis of cancer	47	31	32	12	35.9	32.7	24.2	31.7
Months after LSG	48	8	48	29.3	96	63	15	72
Cancer localization	body and antrum	body	antrum	antrum	body and antrum	antrum	antrum	extended from cardias to antrum
Histology	signet-ring cell adenocarcinoma	adenocarcinoma	mucinos adenocarcinoma	well-differentiated adenocarcinoma	signet-ring cell adenocarcinoma	signet-ring cell adenocarcinoma	poorly differentiated adenocarcinoma	poorly differentiated mucinos adenocarcinoma
TNM stage	pT4aN1	pT4b pN3a	pT1b pN0	pT1a (m)	pT4aN0	ypT1N0	linitis plastica + peritoneal carcinomatosis (exitus)	pT4a N3b M0
Therapy	Total Gastrectomy, Roux-en-Y reconstruction chemotherapy and radiotherapy	Robot-assisted extended total gastrectomy, Roux-en-Y reconstruction	Total Gastrectomy, Roux-en-Y reconstruction	Endoscopic submucosal dissection	Total Gastrectomy with lymphadenectomy and omentectomy	Neoadjuvant chemotherapy + Total Gastrectomy	non	Total Gastrectomy, Roux-en-Y reconstruction
Adjuvant therapy		chemotherapy	-	-	chemotherapy	chemotherapy	-	Chemotherapy



**Figure 4:** CT after LSG: endoluminal tumor in the gastric body without signs of extramural infiltration.

appropriate to repeat the EGD every 5 years even if it is normal, until more studies are available. For the rest of the surgical techniques, it would be advised only if upper digestive symptoms appear [6].

**Conclusion**

It is advisable to perform preoperative EGD in all patients before undergoing Bariatric Surgery; however, postoperative EGD is not indicated in all patients. Until the real risk of gastric cancer in these patients is determined, both the IFSO and the ASMBBS advise performing a surveillance EGD in patients undergoing SG, whether they have symptoms or not, given the high percentage of asymptomatic patients. However, it is not clear at what time or frequency post-LSG EGD should be performed.



**Figure 5:** CT after LSG: Endoluminal tumor in the gastric body without signs of extramural infiltration.

Early detection of gastric cancer can avoid the need for adjuvant treatment or distant lesions. It is essential that cases of gastric cancer after bariatric surgery be published to analyze the real incidence and thus facilitate the preparation of clinical guidelines and follow-up recommendations with a higher level of scientific evidence.



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