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Obesity Surgery

The Journal of Metabolic Surgery and
Allied Care

ISSN 0960-8923

OBES SURG

DOI 10.1007/s11695-020-04700-3



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Sleeve Gastrectomy and Gastric Cancer: Is It Really Rare?

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Sleeve gastrectomy (SG) is currently the most frequently performed bariatric procedure worldwide [1]. Although incidental stromal tumor diagnosis of the SG specimen has been occasionally found [2, 3], gastric adenocarcinoma has been rarely reported.

A 45-year-old woman with a body mass index (BMI) of 37.95 kg/m², with sleep apnea and osteoarthropathy, and without cancer familiarity underwent laparoscopic SG in January 2020. A routine preoperative upper gastrointestinal endoscopy (UGIE) was performed showing an antral mucosal hyperemia without evidence of any pathological findings, erosions, or ulcerative lesions. Biopsies were performed for histological examination according to the Sydney System and resulted negative for *Helicobacter pylori* infection.

At the time of surgery, by using the Covidien Signia™ Stapling System, the first antral stapler fire was performed with a black reinforced reload (60 mm lengths). Signia™ Stapling System technology can adapt firing speed according to tissue thickness variability. By observing a very slow firing progression, an unusual tissue resistance was suspected. However, SG was completed without intraoperative complications.

During specimen retrieval through the 15-mm trocar incision without the plastic bag, abnormal antral thickness and rigidity were appreciated. Therefore, the gastric specimen was opened through the staple line and antral mucosa appeared completely normal as well as the serosal surface. By

manual palpation of the gastric wall, an intramural 20–30-mm solid lesion of the greater curvature, in the antral region, was detected.

The patient had an uncomplicated postoperative course and was discharged on the second postoperative day.

The postoperative histological diagnosis of the gastric specimen demonstrated a poorly differentiated signet-ring cell carcinoma according to the World Health Organization (WHO) classification at the antrum. The resection margins were positive for tumor presence. A full-thickness infiltration of the gastric wall was detected (pT4a). Total-body computed tomography (CT) was performed with the evidence of a gastric wall thickening, perigastric adipose tissue densification with some small lymph nodes (maximum diameter = 5 mm), and a 10-mm peritoneal nodule very close to the rectum abdominis muscle. The positron emission tomography (PET) did not confirm this pathological finding and no distant metastases were recorded. An area of tracer uptake was found at the antrum.

To the best of our knowledge, ten cases of esophagogastric cancer following SG have been reported in the international literature [4–8]. Among these, in only two cases, the cancer diagnosis was performed on the gastric specimen. Data are reported in Table 1.

Di Palma et al. demonstrated an abnormal finding warranting a change in postoperative management or follow-up in 8.6% of gastric specimens of patients submitted to SG. Among them, a case of signet-ring cell carcinoma was reported in a patient who had not performed the preoperative UGIE [5]. Although UGIE was performed in the present case, it did not reveal any pathological finding. Routine UGIE prior to bariatric surgery remains controversial. Recent guidelines by the American Society for Metabolic & Bariatric Surgery (ASMBS) suggested that it should be performed on an individual basis. [9]

Furthermore, this case raises several controversial points and stimulates some reflections.

- The presence of gastric cancers diagnosed during or after SG, although rare, is probably underestimated since

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Table 1 Reported cases of esophagogastric cancer following sleeve gastrectomy

Author (year)	Age	Gender	Previous UGIE	Specimen histology	Time to diagnosis*	Tumor location	Tumor histology	Tumor stage	Type of treatment
Sheepers et al. (2011)	57	Female	No	-	4 months	Distal esophagus	Adenocarcinoma	T2N1Mx	Chemoradiotherapy
Angrisani et al. (2014)	51	Female	Yes	HP-	4 years	Body and antrum of the stomach	Adenocarcinoma	pT4aN1	Total gastrectomy
Mastur et al. (2016)	44	Female	No	HP-	8 months	Gastroesophageal junction	Adenocarcinoma (HER2/NEU)	pT4bN3a	Total gastrectomy
Vladimirov et al. (2017)	47	Female	Yes	-	4 years	Antrum of the stomach	Adenocarcinoma	pT1bN0	Total gastrectomy
Sohn et al. (2017)	44	Female	No	HP-	2 years	Gastroesophageal junction	Adenocarcinoma	T3N0M0	Chemotherapy + esophagogastrectomy
Wright et al. (2017)	48	Male	Yes	-	5 years	Distal esophagus	Adenocarcinoma	-	Chemoradiotherapy
Seki et al. (2018)	64	Female	Yes	HP-	1 year	Antrum of the stomach	Adenocarcinoma	pT1a	ESD
Di Palma et al. (2019)	-	-	No	Signet-ring cell carcinoma	Operative**	Specimen	Signet-ring cell carcinoma	-	-
Yamashita et al. (2019)	42	Female	No	-	8 years	Body and antrum of the stomach	Signet-ring cell carcinoma	pT4aN0	Total gastrectomy
Current case (2020)	45	Female	Yes	Signet-ring cell carcinoma	Operative**	Specimen	Signet-ring cell carcinoma	pT4a	-

*Time to diagnosis: time interval from bariatric procedure to tumor diagnosis

**Operative: sleeve gastrectomy specimen

postoperative histology is not routinely performed. Are we recognizing only the “tip of the iceberg”?

- The manipulation of the gastric specimen, in addition to the already suggested inspection [10], could improve the macroscopic evaluation performed by the surgeon and consequently addressing the pathologist to detect incidental tumors.
- Although plastic bag is generally recommended for stomach extraction, it is routinely not used in the majority of practices, probably due to the very rare occasion of malignant lesions. However, in the reported case showing the presence of a stage IIIa/b gastric adenocarcinoma with incomplete cancer resection margin, the risk of trocar site insemination cannot be excluded. Routine use of plastic bag for SG remains controversial.
- Accurate postoperative histopathology is very important for patient undergoing vertical gastric resection for obesity. By this kind of approach, life-threatening undiagnosed condition can be discovered and adequately treated.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval This article does not contain any studies with human participants or animals performed by any of the authors.

Informed Consent An informed consent was obtained from the patient.

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