Obesity Surgery (2019) 29:642–644
https://doi.org/10.1007/s11695-018-03645-y

LETTER TO THE EDITOR

# Our Experience Regarding the Association Between Gastrointestinal Stromal Tumor and Bariatric Surgery: a Response to a Letter "Gastrointestinal Stromal Tumor After Laparoscopic Sleeve Gastrectomy: Be Awake Before, During, and After a Bariatric Procedure"

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Published online: 15 December 2018


We would like to express gratitude to Bilecik T. et al. and to Chiappetta S. et al. for their articles regarding the gastrointestinal stromal tumor (GIST) as a bariatric surgery incidental finding [1, 2]. By these means, we would like to share our experience regarding this relationship and, as already mentioned, to try as a surgical team to be aware and even search the connection between them.

The strong prevalence of the cells of Cajal at the gastric level, specifically in the fundus [3–5] so as the quick development of bariatric surgery, derives in a higher incidence of these diagnoses, either during or postoperatively through the biopsy results. Worldwide references talk about a prevalence between 0.3 and 1.2% of GIST in the biopsy specimen [6–13] and 35 described observations [1, 2, 12, 14–18].

We present to you 12 cases which were retrospectively analyzed from a group of 50 well-experimented European laparoscopic surgeons. Demographic data (sex, age, body mass index (BMI)) and the surgery choice as well the need of any perioperative modification, the anatomic tumoral localization, and their pathological characteristics (size, margins, CD117 marker, and mitotic index) were collected. All the results are shown in Table 1.

Average age and BMI were respectively 53.8 years and 42.9 kg/m$^2$. All were candidates for a laparoscopic bariatric procedure. Eight patients had a normal upper gastrointestinal tract radiography, the others did not have these exams. All had preoperative esophagogastroduodenoscopy (EGD); in two cases, it showed a submucosal mass in the posterior wall of the fundus; one of these cases had a preoperative endoscopic ultrasound (EUS) discordant with the EGD lecture; no biopsy was made. The others lesions were perioperatively discovered. Eleven cases were in the fundus and one was in the antrum: two cases in the lesser curvature, central in four cases, and in the greater curvature six times; seven of these cases were in the posterior wall. The surgery technique had to be modified in three cases in consequence of three lesions measuring from 2 to 5 cm. Two were planned as a bypass, but the discovery of the mass—and its confirmation as GIST—at the lesser curvature nearby the gastroesophageal junction obliged us after tumoral resection in a first procedure, to transform into

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**Table 1** Demographic, surgical, and pathologic data

| Patient number | Sex | Age (years) | BMI (kg/m$^2$) | Type of surgery | Tumoral localization | Size interval (cm) | Preoperative suspicious | Perioperative modification | Mitotic index | CD117 marker | Negative margins |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | F | 50 | 42 | BP-Y | Fundus/LC | 2–5 | No | Yes | < 5pf | Yes | Yes |
| 2 | F | 48 | 49 | BP-Y | Fundus/center | 2–5 | No | Yes | 0 | Yes | Yes |
| 3 | F | 62 | 43 | BP-Y | Antrum | 2–5 | No | No | < 5pf | Yes | Yes |
| 4 | F | 51 | 42 | S | Fundus/GC | 2–5 | No | No | < 5pf | Yes | Yes |
| 5 | F | 48 | 43 | S | Fundus/GC | 0–2 | No | No | < 5pf | Yes | Yes |
| 6 | F | 62 | 50 | BP-Y | Fundus/center | 2–5 | Yes | No | > 15pf | No | Yes |
| 7 | M | 65 | 41 | BP-Y | Fundus/center | 0–2 | No | No | 0 | Yes | Yes |
| 8 | F | 37 | 40 | S | Fundus/GC | 0–2 | No | No | 0 | Yes | Yes |
| 9 | F | 43 | 39 | S | Fundus/GC | 2–5 | No | No | < 5pf | No | Yes |
| 10 | M | 61 | 39 | S | Fundus/LC | 2–5 | No | Yes | < 5pf | Yes | Yes |
| 11 | F | 66 | 44 | S | Fundus/center | 0–2 | No | No | < 5pf | Yes | Yes |
| 12 | F | 53 | 41 | BP-Y | Fundus/center | 0–2 | Yes | No | < 5pf | Yes | Yes |

*F*, female; *M*, male; *BP-Y*, Roux-en-Y gastric bypass; *S*, sleeve; *GC*, greater curvature; *LC*, lesser curvature; *pf*, per field

a total gastrectomy after the patient's approval at the 7th and 8th postoperative day. One of these two cases presented other two GISTs of 12 and 15 mm. The last modified case was planned as a sleeve; it was made in an atypical manner to construct the pouch. A suspicious case, planned as a bypass, was suggested to apply to a sleeve; it was refused.

Only one histologic analysis found more than 15 mitoses per field; adjuvant treatment with imatinib was proposed; however, the patient refused this option; she is being observed (nowadays 39 months of follow-up) every 6 months with control images. At the moment, any relapse has been observed in any cases, with an average follow-up of 27.1 months.

Our conclusions, about the overall good prognosis and the complete excision of the lesion, are similar with those made by Chiappetta et al. [2]. Consequently, we would like to make three observations.

Our cases are older than those normally operated for bariatric reasons in France (53.8 vs 40.4 years) [19], as well as the global reported cases (mean 49.4 years) [1, 2, 12, 14–18, 20, 21].

The localization is preferentially in the gastric fundus: 91.6% in our cases series and 77.7% in the others described [1, 2, 12, 15, 18, 20].

The perioperative discovery of the lesions (almost four of every five cases in our series) is made in 87.8% of cases [1, 2, 12, 14–18, 20, 21]; it was also showed that tumors near the gastroesophageal junction can lead to modify the operative strategy [13, 16], as it happened in three of our cases. Even, it will be necessary to consider a two-stage surgery to observe other possible masses, like one of our cases. Maybe the resection of these type of lesions suggests the necessity of a radiologic surveillance (e.g., endoscopic) in the long term, given the fact that secondary lesions have already been discovered in the gastric remnant [22, 23].

Better diagnosis methods [24, 25], the ageing of the population [24], and the development of the bariatric surgery [19] must make us pay attention over the GIST discovery, before, during, and after the surgery.

## Compliance with Ethical Standards

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

**Ethical Statement and Consent Statement** For this type of study, formal consent is not required.

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