

# Gastric Carcinoid Tumor—Incidental Finding on Endoscopy Prior to Bariatric Surgery

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**Abstract** A 32-year-old female patient with morbid obesity (body mass index 44.4) was submitted to upper digestive endoscopy performed routinely as a preoperative procedure in bariatric surgery. The examination identified multiple small polypoid lesions in the upper portion of the gastric body, some with small ulcerations. Anatomic-pathological findings were compatible with carcinoid tumor of the stomach. The patient was submitted to extended subtotal gastrectomy with loco-regional lymphadenectomy. Upper digestive endoscopy is performed routinely in some services for bariatric surgery, but its value has been questioned by some authors. In this case, endoscopic examination was of great importance, being responsible for a change in the surgical procedure. We did not find any report in the literature of a carcinoid tumor of the stomach in morbidly obese patients.

**Keywords** Gastric carcinoid · Morbid obesity · Endoscopy

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## Introduction

Although there is still some controversy, upper digestive endoscopy is recommended and performed routinely in preoperative evaluation by various services for bariatric surgery [1–5]. The main endoscopic findings in this group of patients include hiatal hernia, polyps, ulcers, esophagitis, gastritis, and duodenitis [1–3, 6].

Patients submitted to Roux-en-Y gastric bypass (RYGBP) lose endoscopic access to the bypassed stomach excluded from the food flow, and therefore, upper digestive endoscopy is important for diagnosing disease of this region before surgery [1, 6]. Some diagnoses can lead to changes in surgical procedures [1–4], necessity for preoperative clinical treatment, marking of the bypassed stomach near the wall for future examination, or even the indication of surgical techniques that do not isolate the rest of the stomach.

Carcinoids are rare tumors that originate from neuroendocrine cells which secrete various hormones and biogenic amines [7]. The majority of the patients with such tumors are asymptomatic, and therefore, their diagnosis is often incidental [8].

## Case Report

A 32-year-old female patient with Turner syndrome and morbid obesity, having a body mass index (BMI) of 44.4 kg/m<sup>2</sup>, was submitted to routine upper digestive endoscopy in preoperative evaluation for bariatric surgery on our service. The examination resulted in the identification of multiple small polypoid lesions in the upper portion of the gastric body where some had a small central ulceration. Biopsies revealed a histologic picture compatible with carcinoid tumor (well-differentiated neuroendocrine

carcinoma) in 4 of the 13 fragments examined. Immunohistochemical studies of chromogranin (LK2H10), Ki-67 (HB11), and synaptophysin confirmed the diagnosis of well-differentiated neuroendocrine carcinoma. The patient was asymptomatic from a gastrointestinal viewpoint and did not show comorbidities. Ultrasonography and computed tomography (CT) scans of the abdomen showed no evidence of alterations. Preoperative serum gastrin level was 798 pg/ml (normal, 13–115 pg/ml).

The patient underwent laparotomy, which identified lymphadenomegaly in the paraesophageal region and next to the lesser gastric curvature. A high subtotal gastrectomy (preservation of the proximal 2.0 cm of stomach) with loco-regional lymphadenectomy was performed. The anatomopathological finding for the resected tissue confirmed the diagnosis of carcinoid tumor (well-differentiated neuroendocrine carcinoma) in two nodular lesions, the larger being 0.4 cm invading the mucosa and submucosa. The surgical margins were tumor-free, and the 18 lymph nodes examined showed no metastasis.

The patient showed a good outcome in the immediate postoperative period. One month after surgery, she had lost 28.7% of excess weight and her serum gastrin level was 15 pg/ml. Currently, the patient is in the eighth month of the postoperative period, showing excellent clinical and laboratory outcomes, with a BMI of 30.3 kg/m<sup>2</sup> and a loss of 72.2% of excess weight. Follow-up is by CT and serum gastrin.

## Discussion

The purpose of preoperative upper digestive endoscopy is to detect alterations that need treatment before surgery or long-term follow-up or that could lead to modification of the surgical plan (type of surgery) or even contraindicate the proposed procedure. Its importance is even greater in the preoperative phase of RYGBP because after this type of surgery is performed, access to the bypassed stomach is not possible by conventional endoscopy [1]. Some surgeons opt for placing a radiopaque marker around the gastrostomy, permitting percutaneous access to the bypassed stomach through radiologic localization [9]. Upper digestive endoscopy is performed routinely by some services in the preoperative phase of bariatric surgeries [1–4, 10], but some authors [5, 6] believe that endoscopy is not absolutely necessary in all patients in preoperative evaluation because of high cost and low impact of endoscopic findings in surgical management.

The majority of carcinoid tumors are gastrointestinal in origin, but represent only 1.5% of all gastrointestinal neoplasms [8]. The diagnosis of carcinoid tumor is difficult because it is a disease with low prevalence [7, 11] where the majority of patients are asymptomatic or have non-specific symptoms (only 10% of carcinoid tumors show a

carcinoid syndrome) [11]. The majority of carcinoid tumors are actually diagnosed incidentally during endoscopy or surgery [8].

The gastric carcinoid tumor is divided into three types [8, 12]:

- Type 1 is associated with hypergastrinemia and chronic atrophic gastritis, originate from enterochromaffin-like cells, and can produce and store histamine. It is the most frequent type and has a more benign outcome. The tumors are generally small (<1 cm), polypoid, and located in the gastric body and fundus.
- Type 2 is associated with hypergastrinemia due to Zollinger–Ellison syndrome in combination with type 1 MEN (multiple endocrine neoplasia).
- Type 3 includes sporadic tumors, generally single, larger than 2 cm, preferentially localizing in the region of the antrum and pylorus, and is not associated with hypergastrinemia. These tumors have a worse prognosis.

Therapeutic management depends on the type of carcinoid, size, number of lesions, and presence of symptoms and metastases where in many cases, treatment is still controversial [8]. The treatment can vary from endoscopic resection, with or without antrectomy, up to total gastrectomy with lymphadenectomy [8, 12, 13].

The case reported here was a type 1 carcinoid, considering the large number of lesions, location of the tumors in the gastric body, and high serum gastrin level. The multicentricity of the lesions and the need for treatment of morbid obesity were important in determining the treatment. Although type 1 carcinoid is considered the most benign, it still is associated with some incidence of metastasis to the liver and lymph nodes [8]. If we were to perform the standard surgery for the treatment of obesity, less invasive options for the treatment of the carcinoid tumor, such as endoscopic resection, could not be performed because of the future difficulty of access to the bypassed stomach for follow-up of the lesions. Therefore, the decision was made to perform the gastric bypass for the treatment of morbid obesity and an extended subtotal gastrectomy as treatment for the carcinoid.

In 2002, Keshishian et al. described three cases of carcinoids of the small intestine in morbidly obese patients which were diagnosed in the trans-operative period. In 2006, Zeni et al. found one patient with carcinoid of the duodenum in preoperative evaluation for bariatric surgery. We found in the literature no reports of gastric carcinoid in this group of morbidly obese patients.

In the case described, upper digestive endoscopy provided the diagnosis of a rare but serious disease, and it was fundamental in determining the conduct of the surgical team. We believe that upper digestive endoscopy has an important role and that perhaps it should be performed

routinely in the preoperative evaluation of morbidly obese patients who are candidates for bariatric surgery.

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