

CLINICAL NOTE

Krukenberg tumor after gastric bypass for morbid obesity. Bariatric surgery and gastric cancer

Pablo Menéndez¹, Pedro Villarejo² and David Padilla²

Department of General and Digestive Surgery. ¹Hospital Gutiérrez Ortega. Valdepeñas, Ciudad Real. Spain.

²Hospital General de Ciudad Real. Ciudad Real, Spain

ABSTRACT

Gastric bypass is one of the most frequently performed surgical procedures in bariatric surgery. A neoplasm within the gastric pouch is a somewhat infrequent complication but with important survival consequences. We present the case of a 51-year-old woman who developed an adenocarcinoma in the bypassed stomach three years after bariatric surgery; the tumour was incidentally discovered after gynaecological surgery for uterine myomas. Various diagnostic modalities for the excluded stomach were analysed.

Key words: Bariatric surgery. Gastric cancer. Morbid obesity. Krukenberg tumour.

INTRODUCTION

Medical treatment for morbid obesity can be effective in the short and medium term, but usually ends in failure, making the surgical option necessary. Gastric bypass is one of the most frequently performed surgical procedures in bariatric surgery; a neoplasm is a somewhat infrequent complication. A Krukenberg tumour is a metastatic signet-ring adenocarcinoma of the ovary with variants of gastro-intesti-

nal primary, detected either synchronously or metachronously (1). We present a case of a Krukenberg tumour due to an adenocarcinoma in the bypassed stomach after bariatric surgery.

CASE REPORT

A 51-year-old woman suffering from Graves-Basedow disease, depressive disorder, right bundle branch, tubal ligation, cholecystectomy and obesity, had undergone a gastric bypass for morbid obesity three years ago; her initial body mass index (BMI) was 47.65 kg/m² (122 kg). She was taken to the Emergency Department due to a syncopal, dysphagia, vomiting and constitutional syndrome, with 55.5 kg weight (BMI 21.68 kg/m²). It was necessary to carry out a hemoderivative transfusion due to 4.2 g hemoglobin/dL (hematocrit 13.3 %). Computed tomography (CT) and gastrointestinal transit were carried out during her hospital stay, indicating an ulcerated stenosis at the gastroyeyunal anastomosis, which was treated by endoscopic dilatation. Patient was discharged, and later, a hysterectomy with bilateral salpingo-oophorectomy was performed due to uterine myomas; histopathology revealed a metastatic adenocarcinoma in the left fallopian tube and a Krukenberg tumour in the left ovary. Due to the histopathological findings, a CT scan was performed and revealed a stenosis in the gastric bypass due to a mass in the bypassed stomach (Fig. 1). Following eight neoadjuvant cycles of chemotherapy (epirubicin, cisplatin and flurouracil, every 21 days), a total gastrectomy was done, resulting in the removal of gastric adenocarcinoma (Lauren type) with infiltration of all the gastric wall and the intestinal segment, and with metastasis in 15 lymphatic nodes. The classification of this tumour was pT4N2Mx. There was no evidence of recurrence six months after surgery and adjuvant treatment.

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Correspondence: Pablo Menéndez Sánchez. Department of General and Digestive Surgery. Hospital Gutiérrez Ortega. Avenida de los Estudiantes, s/n. 13300 Valdepeñas, Ciudad Real. Spain
e-mail: pablomensan@hotmail.com

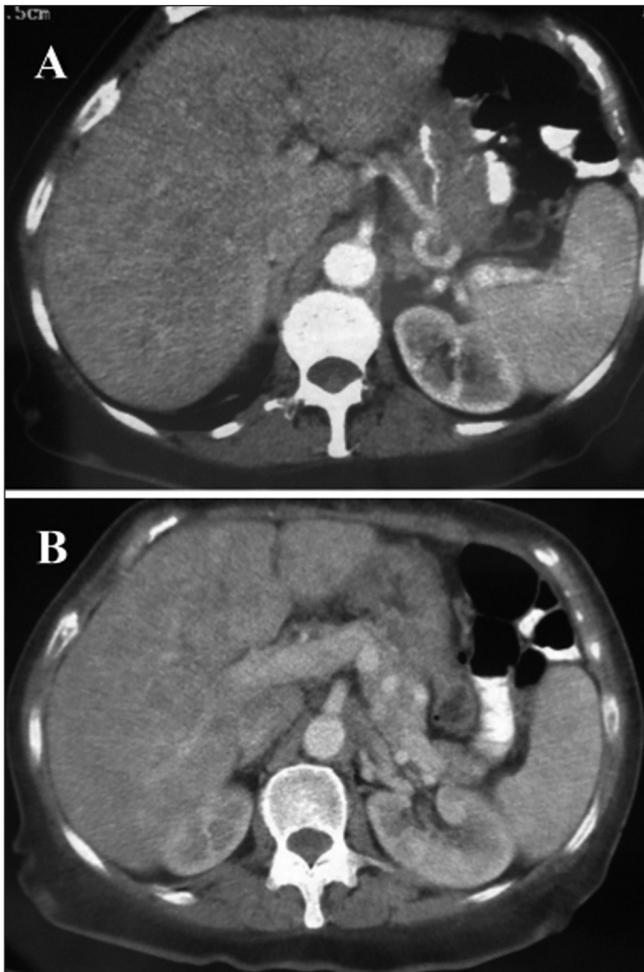


Fig. 1. A. CT showing a mass in the bypassed stomach near to the splenic artery. B. CT showing the gastric mass and the enhanced alimentary limb.

DISCUSSION

Neoplasias are somewhat infrequent after surgery for morbid obesity. Oesophageic neoplasms, neoplasms at the gastric pouch, and tumours at the bypassed stomach have been described; eight cases have been described in the latter location (2). Epigastric pain and upper digestive hemorrhage are the most common symptoms. The constitutional symptoms that could be related in these patients may go unnoticed due to the association between weight loss and the prior bariatric procedure. There are no descriptions in the medical literature of a Krukenberg tumour following bariatric surgery.

The combined results of a meta-analysis indicate that overweight and obesity are associated with an increased risk of gastric cancer (3). Besides a higher risk of developing gastric cancer due to the higher prevalence of *H. pylori* infection (4), obese patients may also have a greater risk of developing adenocarcinomas of the esophagus and stomach when the body mass index (BMI) is $\geq 35 \text{ kg/m}^2$ in comparison with BMIs ranging from 18.5 to 25 kg/m^2 ; the

strength of the association also increases with increasing BMI (4,5). The risk for adenocarcinoma of the gastric cardia has been found to be related to obesity, being the relative risks in the range of 1.5-2.0 (2).

The gastric bypass procedure excludes a segment of the proximal digestive tube, thereby making it difficult to diagnose pathological processes at this level. Various exploration techniques have been proposed for the evaluation of the stomach and duodenum in patients undergoing surgery for morbid obesity: a) in the Fobi's gastrostomy, a gastrostomy tube is located in the bypassed stomach, and also a radio-opaque marker is placed around the gastrostomy site enabling the radiological localization making an easily percutaneous access to the bypassed stomach (6); b) the use of a long retrograde endoscope (7); c) percutaneous puncture under endoscopic control to perform a gastrostomy and a later endoscopic control through the gastrostomy (8); d) double-balloon endoscopy and accessing to the bypassed stomach through the yeyuno-yeyunal anastomosis (9); or e) virtual CT-enabled gastroduodenoscopy (10). A PET-CT combination could be employed in the oncological study of the bypassed gastrointestinal segment without having to resort to the previously described invasive techniques. According to Chen et al., the use of PET in the diagnosis of primary stomach cancer has a sensitivity of 94% (11).

Detection of neoplastic lesions in patients who underwent surgery for morbid obesity requires a high clinical suspicion, but may sometimes go unnoticed. In precancerous lesions such as intestinal metaplasia, resection of the excluded stomach can be considered at the time of gastric bypass (12). Specific studies are needed to establish whether it is necessary to modify the current post-operative follow-up for early detection of diseases at the bypassed digestive tract.

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