

## Case Report

# Small neuroendocrine tumor of the duodenal bulb: Endoscopic submucosal dissection, laparoscopic and endoscopic cooperative surgery or surgery?

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## Abstract

Neuroendocrine neoplasms of the gastric tube are less common than adenocarcinomas. Topography includes stomach, small intestine, Vater ampulla, and gross intestine. They are graded as neuroendocrine tumors grade I and II (NETs GI and GII) and neuroendocrine carcinomas GIII based on Ki-67 index and mitotic count.<sup>[1]</sup> Endoscopic treatment for GI NETs  $\leq 1$  cm that does not extend beyond the submucosal layer and does not demonstrate lymph node metastasis is recommended. Tumors  $\geq 2$  cm, with lymph node metastasis, are indicated for surgical treatment. The treatment strategy for tumors between 10 and 20 mm in size remains controversial.<sup>[2]</sup> We present a rare case of a 60-year-old male patient with end-stage renal failure who underwent a screening pretransplantation endoscopic control. Colonoscopy had no pathological findings. Gastroscopy reveals an abnormal mucosa in the anterior upper part of the duodenal bulb that was described as a micronodular mucosa and a central nodule of 6 mm with erythematous mucosa. Histology of the micronodular mucosa reveals a heterotopic gastric mucosa and a small hyperplastic polyp. Biopsies from the nodule reveal a carcinoid tumor (NET GI). Immunohistochemistry: Positive chromogranin levels, low mitotic index (1/10 HPF), and Ki-67 index  $< 1\%$  [Figure 2]. Gastrin levels were normal and chromogranin levels were abnormal (314 ng/ml, ULN  $< 120$  ng/ml). Spiral tomography of the thorax and the abdomen were normal. Endoscopic submucosal dissection is indicated for small NETs ( $\leq 1$  cm). Laparoscopic and endoscopic cooperative surgery is a novel method, but the experience is limited. Surgery is the best choice for large NETs ( $> 2$  cm) and those of the duodenal bulb with histological extensions and the lack of assessing depth invasion.

## Key words

Endoscopic submucosal dissection, laparoscopic and endoscopic cooperative surgery, neuroendocrine tumors, surgery

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## Introduction

Gastrointestinal cancer includes several malignant disorders. Adenocarcinomas are the most common type of gastric cancer.

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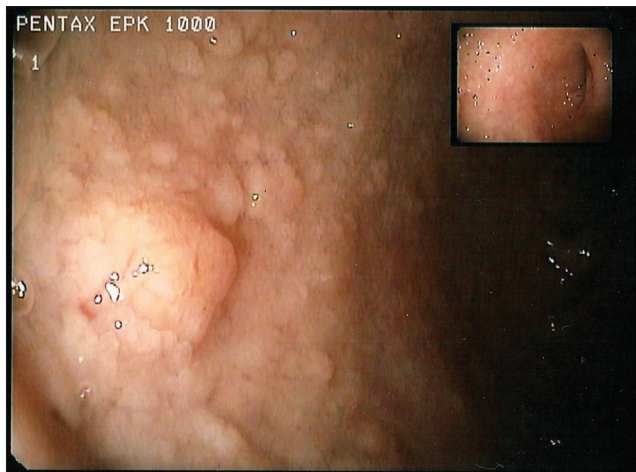
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**Figure 1:** Micronodular mucosa with central reddish elevated formation with a size of 6 mm, which represents a neuroendocrine tumor grade I

Neuroendocrine neoplasms are less common, but usually are found in advanced stages. Treatment options include endoscopic submucosal dissection, surgery, and more recently, laparoscopic and endoscopic cooperative surgery (LECS).

## Case Report

We present a rare case of a 60-year-old male patient with end-stage renal failure who underwent a screening pretransplantation endoscopic control.

He suffered from arterial hypertension and diabetes mellitus and had no abdominal symptoms or weight loss.

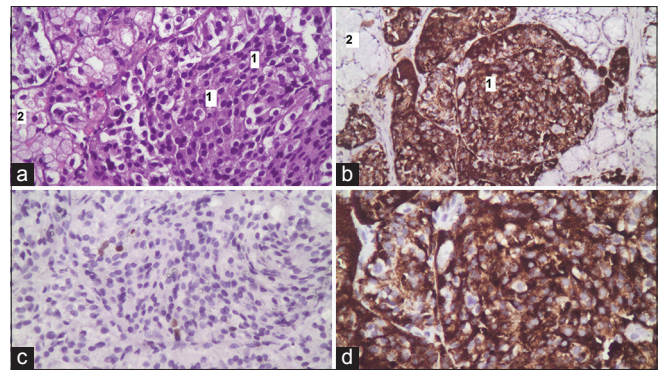
Laboratory evaluation showed hematocrit: 30.8%, hemoglobin: 10.4g/dl, mean cell volume: 83.1fl, mean corpuscular hemoglobin: 29 pg, mean corpuscular hemoglobin concentration: 32.5 g/dl, white blood cells: 6.1 K/ $\mu$ L (neutrophils: 74.7%, lymphocytes: 17.6%, monocytes: 5.4%, and eosinophils: 0.5%), and platelets count: 212 K/ $\mu$ L.

Biochemical parameters revealed urea: 185 mg/dl, creatinine: 5.7 mg/dl, uric acid: 8.6 mg/dl, glucose: 118 mg/dl, aspartate aminotransferase: 33 IU/L, alanine transaminase: 26 IU/L, alkaline phosphatase: 101 IU/L,  $\gamma$ -GT: 77 IU/L, total bilirubin: 0.9 mg/dl, lactate dehydrogenase: 229 IU/L, amylase: 40 IU/L, and creatine phosphokinase: 23 IU/L.

Colonoscopy reveals no pathological findings.

However, upper gastrointestinal endoscopy reveals an abnormal mucosa in the anterior upper part of the duodenal bulb, described as a micronodular mucosa and a central nodule of 6 mm with erythematous mucosa. We obtained multiple biopsies from these findings.

Histology of the micronodular mucosa reveals a heterotopic gastric mucosa and a small hyperplastic polyp. Biopsies



**Figure 2:** (a) H and E stain. 1 = neuroendocrine tumors cells, 2 = heterotopic gastric mucosa. (b and d) chromogranin stain. 1 = neuroendocrine tumor cells, 2 = heterotopic gastric mucosa. (c) Ki-67 index

from the small nodule reveals a carcinoid tumor [Figure 1]. Immunohistochemistry of the tumor reveals positive chromogranin levels, low mitotic index (1/10 HPF), and Ki-67 index <1% [Figure 2]. This was a neuroendocrine tumor (NET GI). Gastrin levels were normal and chromogranin levels were abnormal (314 ng/ml, ULN <120 ng/ml). The patient underwent a spiral tomography of the thorax and the abdomen, which reveals no other pathological findings.

## Discussion

Although our patient has a small ( $\leq 1$  cm) NET at the anterior upper part of the duodenum who could be resected endoscopically, we decided differently. Histology revealed an extended infiltration of the mucosa by the tumor which could not be assessed in detail by gastroscopy. Moreover, endoscopic ultrasound could not access depth invasion because of the location of the tumor who limited endoscope manoeuvrability.

The tumor seems to be small on endoscopy, but occupies histologically a bigger area and no depth estimation could be assessed. LECS is an alternative method where gastroscopy confirms and determines incision lines accurately by an endoscopic mucosal and submucosal incision technique, while the seromuscular layer is incised laparoscopically and the incision line is closed using a laparoscopic stapling device,<sup>[3]</sup> but requires high-end medical departments and the experience is very small, mainly in Japan.

Surgical excision seems to be the best treatment for large tumors or smaller lesions with histological extensions and the lack of depth estimation by endoscopic ultrasound.

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## Conflicts of interest

There are no conflicts of interest.

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