**Name of journal:** **World Journal of Gastroenterology**

**ESPS Manuscript NO: 11248**

**Columns: CASE REPORT**

**Adenocarcinoma of third and fourth portions of duodenum: The capsule endoscopy value**

Paquissi FC *et al.* Duodenal adenocarcinoma diagnosed by capsule endoscopy

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**Received:** May 11, 2014 **Revised:** July 8, 2014

**Accepted:** August 13, 2014

**Published online:**

# **Abstract**

Primary adenocarcinoma of the small intestine occurs in over 50% of cases in the duodenum. However, its location in the third and fourth duodenal portions occurs rarely and a diagnostic challenge. The aim of this work is to report an adenocarcinoma of third and fourth duodenal portions, emphasizing its diagnostic difficulty and the value of video capsule endoscopy. Male, 40 years old, no medical history, with abdominal discomfort and progressive fatigue, four months ago; and one episode of melena in moderate amount. The physical examination was normal, except for mucosal pallor. Blood tests were consistent with microcytic, hypochromic iron deficiency anemia with 7.8 g/dL hemoglobin. The upper and lower endoscopy were normal. Additional work-up with video capsule endoscopy showed polypoid lesion involving third and fourth portions of the duodenum. Biopsy showed a moderately differentiated adenocarcinoma. Abdominal computed tomography showed a wall thickening from third duodenal portion until proximal jejunum, without distant metastasis. The patient underwent segmental resection (distal duodenum and proximal jejunum) with duodenojejunostomy. The surgical specimen histology confirmed the biopsy diagnosis, with transmural infiltration, without nodal involvement. Conclusion: Adenocarcinoma of the third and fourth portions of the duodenum are difficult to diagnose; and capsule endoscopy is of great value.

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**Key words:** Duodenum; Duodenal cancer; adenocarcinoma; Endoscopy; video capsule endoscopy

**Core tip**: Third and/or fourth duodenal portion adenocarcinoma is a rare disease, associated with vague clinical picture and a diagnostic challenge. Capsule endoscopy has shown a higher accuracy compared to conventional endoscopic methods. This case report the occurrence of adenocarcinoma on the third and fourth duodenal portions; and the value of capsule endoscopy to minimize the diagnostic difficulty.

Paquissi FC, Lima AHFBP, Lopes MFNV, Diaz FV. Adenocarcinoma of third and fourth portions of duodenum: the capsule endoscopy value. *World J Gastroenterol* 2014; In press

# **INTRODUCTION**

The small intestine is approximately 75% of the length and 90% of the mucosal surface of the gastrointestinal tract; but represents only 2% to 5% of all primary malignant gastrointestinal tumors, about 13 to 18 times less common than colon cancer, despite its exposure to a variety of endogenous and exogenous harmful substances[1,2]. Histologically, there are four subtypes of malignant tumors of the small intestine: adenocarcinomas (around 40%); neuroendocrine tumors (35% to 40%); lymphomas (15%) and sarcomas (11% to 13%)[3,4]. When distributed by segments adenocarcinomas are more common in the duodenum and proximal jejunum; neuroendocrine tumors and lymphomas in the distal portions; while sarcomas have diffuse distribution[3,5].

Duodenal adenocarcinoma represents approximately 0.5% of all malignant gastrointestinal tumors and the most studied of them are those located in the first and second (most periampullary) portions[6,7]. The location of this tumor in the third and/or fourth duodenal portion is rare, presents with non-specific symptoms and of difficult diagnosis using conventional endoscopic methods[8]. In this paper is presented an adenocarcinoma of the third and fourth portions of the duodenum, with review of the literature, emphasizing the difficulties and the value of video capsule endoscopy for diagnosis.

# **CASE REPORT**

Male, 40 years old, no medical history, presenting epigastric and mesogastric discomfort and progressive fatigue, with four months of evolution; and reports an episode of melena in moderate quantity. Physical examination was normal except for mucosal pallor. The laboratory findings were consistent with microcytic, hypochromic iron deficiency anemia with 3.49 x 106/mm3 RBC, 7.8 g/dL hemoglobin, 27.5% hematocrit, 79 fL MCV, 22.5 pg MCH, 28.4 g/dL MCHC, 22.6% RDW, 915000/mm3 platelets, and 13 ng/mL serum ferritin. Urine analysis, serum liver function test (LFT), hemolysis markers, and serum electrolytes were unremarkable. Upper gastrointestinal endoscopy (until the 2nd duodenal portion) and colonoscopy were normal. Further investigation, using video capsule endoscopy, in the outpatient setting, showed polypoid lesions involving the third and fourth portions of the duodenum (Figure 1). The biopsy showed a moderately differentiated adenocarcinoma. Abdominal CT showed a wall thickening involving third and fourth portions of the duodenum and proximal jejunum, with no clear cleavage lines with adjacents structures without evidence of nodal and distant metastasis (Figure 2). The patient underwent a segmental resection of the duodenum (third and fourth portions) and proximal jejunum, with duodenojejunostomy. The pathological examination of the surgical specimen confirmed a moderately differentiated adenocarcinoma infiltrating the wall of the organ without lymph node metastasis (Figure 3). The patient underwent a follow-up by oncology.

# **DISCUSSION**

This case represents a rare location of primary duodenal adenocarcinoma[8]; and in a younger patient compared to the average peak incidence of duodenal adenocarcinoma shown in literature (seventh decade of life), with a slight predominance for males[9]. The patient was younger, and in personal and/or family medical history there was no known condition associated with early occurrence; such as inflammatory bowel disease[10]; familial adenomatous polyposis; or hereditary nonpolyposis colorectal cancer, in which cancer presents earlier (median 39 years)[11].

The clinical picture of adenocarcinoma in third and fourth portions occurs with rather non-specific symptoms. Unlike periampullary tumors, whose main clinical picture is jaundice and other clinical aspect from the obstruction of the hepatobiliary-pancreatic system[7], in third and fourth portions tumors non-specific symptoms such as vague abdominal pain, weight loss, anemia symptoms, but no frank bleeding, and more rarely, bowel obstruction dominate the clinical picture[12,13]. In this case, the duration of the symptoms before diagnosis was 4 mo, that is within the average literature range (from 1.4 to 8 mo)[7]; and one study showed worse 2-year survival rate associated with 4 months or longer duration[14].

In routine work-up, both upper and lower endoscopy were normal. This situation is a substratum to miss tumors in the third and/or fourth portions, and is often worsened by the low index of clinical suspicion, which usually delay the diagnosis, resulting in advanced disease at diagnosis and decreasing the rate of potentially curatives resections[7,15]. After nondiagnostic conventional endoscopic tests, in the setting of iron deficiency anemia, it was worth to have a high index of suspicion for tumors beyond the second portion and, to keep on the work-up using a method of greater accuracy for these tumors, the endoscopic capsule[8,16].

Capsule endoscopy is a non-invasive procedure that uses a wireless endoscopic device that allows obtaining images of the gastrointestinal tract. In this case, a valuable tool that allowed complete small bowel exploration in ambulatory setting. The main indications for its use are the evaluation of obscure gastrointestinal bleeding, and Crohn's disease[17,18]. Its sensitivity and specificity for diagnosing a small bowel tumor is 88.9% to 95% and 75% to 95% respectively, in setting of obscure gastrointestinal bleeding[16,19]. Tumors are found in about 3% to 9% of patients submitted to it for evaluation of obscure gastrointestinal bleeding, and 50% to 60% were malignant[18]. Video Capsule endoscopy has also been used for the evaluation of patients with certain disorders that increase the risk of tumors of the small intestine such as familial adenomatous polyposis[18].

Treatment of primary duodenal adenocarcinoma depends on the location and staging. In this case, it was performed a segmental resection of the duodenum (3rd and 4th portions) and the proximal jejunum (20 cm from duodenojejunal flexure), with primary duodenojejunostomy. This approach was preferred to more extensive resection, because provides equivalent survival rates to extensive resections (since it is possible to achieve negative margins), with the benefit of lower morbidity than that associated with pancreaticoduodenectomy[20]; and even better survival, as was shown in one study[21]. Currently, extensive pancreaticoduodenectomy applies more to tumors of the proximal duodenum (1st and 2nd portions)[22].

The Pathological examination of the surgical specimen confirmed a moderately differentiated adenocarcinoma, which is the most common histological grade[3,23], that infiltrates the three layers of the wall, without invasion of adjacent organs or metastasis to the lymph nodes, and surgical margins were negative for tumor cells. Therefore, it was a stadium II tumor (T3 N0 M0), that is the most frequent stage for adenocarcinoma in this site[12,24]. Despite negative margins and no lymph node involvement, the combination of 3 variables present in this case: tumor extension, histological grade and transmural invasion, are associated with poor prognosis[6].

With regard to the adjuvant treatment, there is no established protocol for small bowel adenocarcinomas, due to the lack of randomized trials[25]; and few available data from retrospective studies have shown no statistically significant overall survival benefit[26]. As with treatment, there is no established follow-up protocol for patients with resected adenocarcinoma of the small intestine. In this case, the patient continued follow-up by oncologist.

Malignant tumors of the small intestine, although rare, should be part of the differential diagnosis in the investigation of obscure gastrointestinal bleeding; and the high index of suspicion and appropriate use of endoscopic capsule are of great value.

**comments**

***Case characteristics***

A 40-year-old male presenting with abdominal discomfort and progressive fatigue due to severe anemia by continuous bleeding from third and fourth portions duodenal cancer.

***Clinical diagnosis***

Small intestine examination with video capsule endoscopy revealed multilobular, ulcerated with low-flow bleeding lesion in the third and fourth duodenal portions.

***Differential diagnosis***

Upper gastrointestinal endoscopy (until the 2nd duodenal portion) and colonoscopy were performed to rule out stomach and colon bleeding respectively.

***Laboratory diagnosis***

Blood test demonstrated RBC 3.49 x 106/mm3; hemoglobin 7.8 g/dL; MCH 79 fL and serum ferritin 13 ng/mL. Metabolic panel and liver function test were within normal limits.

***Imaging diagnosis***

Abdominal computed tomography demonstrated a wall thickening involving third and fourth duodenl portions and proximal jejunum, without evidence of nodal and distant metastasis.

***Pathological diagnosis***

The histopathological examination of the surgical specimen demonstrated a three layers infiltrating adenocarcinoma, without lymph nodes invasion, with free surgical margins.

***Treatment***

Segmental resection of duodenum (3rd and 4th portions) and proximal jejunum (20 cm from duodenojejunal flexure) was performed, with primary duodenojejunostomy.

***Experiences and lessons***

Malignant tumors of third and fourth duodenal portions are a diagnostic challenge using conventional endoscopic tests; a high index of suspicion and appropriate use of endoscopic capsule is of great value for early diagnosis.

***Peer review***

The authors reported primary adenocarcinoma of the 3rd/4th portions of the duodenum in 40-year-old man. Blood test revealed microcytic, hypochromic iron deficiency anemia. Upper gastrointestinal endoscopy and colonoscopy were normal, but the polypoid lesions with low-flow bleeding were observed by video capsule endoscopy.

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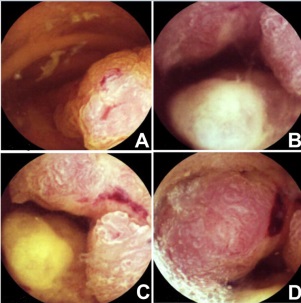
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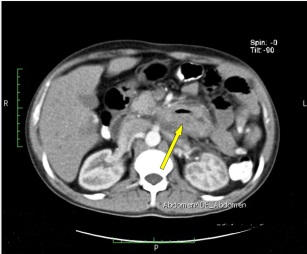
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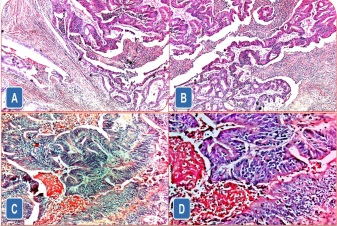
**P-Reviewer:** Charoenphandhu N **S-Editor:** Ma YJ **L-Editor:** **E-Editor:**



**Figure 1** **Capsule endoscopy findings in the 3rd and 4th portions of the duodenum.** A: Polypoid and multilobular lesion; B, C: partially obstructing the lumen; C, D: ulcerated with low-flow bleeding.



**Figure 2 Abdominal computed tomography scan demonstrating a thickening of the wall involving the third and fourth portions of duodenum, narrowing its lumen (arrows), without no clear lines of cleavage with adjacent structures; with no evidence of nodal and distant metastasis.**



**Figure 3 Histological findings of surgical specimen demonstrating moderately differentiated adenocarcinoma, infiltrating the wall thickness (A) (HE, x 5), with areas of cribriform appearance due to fusion of glands and areas of necrosis (B) (HE, x 10); A higher magnification, demonstrating dysplastic aspect of epithelium, loss of polarity and cell dysplasia (C) (HE, x 100) and (D) (HE, x 200). HE: Hematoxylin and eosin.**