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Case Report

Segmental Resection for Adenocarcinoma Involving the Third Part of the Duodenum: A Rare Case Report

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Abstract

Background: Adenocarcinoma involving the 3r[d] part of the duodenum (D3) is extremely rare. It is frequently missed on upper gastrointestinal (UGI) endoscopy. The standard treatment is either pancreaticoduodenectomy (PD) or segmental duodenal resection.

Case Report: Recently, we encountered a 65-year-old man who presented with weakness, epigastric pain, and occasional vomiting. He was investigated with first line investigations; ultrasound (USG) and UGI endoscopy, which revealed normal findings. The second line of investigations, computed tomography (CT), showed a heterogeneously enhanced irregular circumferential thick walled D3. On the basis of CT findings, UGI endoscopy was done a second time and a biopsy was taken from the suspicious area, but the report came as chronic non-specific duodenitis. A third endoscopy was performed by an experienced endoscopist; a biopsy was taken from the growth; the report came as adenocarcinoma. Duodenal segmental resection was planned. Procedure: the lesser sac was opened; 2[nd], 3[rd] and 4[th] parts of the duodenum were mobilized. Duodenum was resected at the junction of the 2[nd] and 3[rd] parts above and the 3r[d] and 4[th] parts below. During upper part resection, the ampulla was injured; papillotomy and ampulloplasty were done. Reconstruction was performed by duodenojejunostomy, and to protect the duodeno-jejunostomy, a gastro-jejunostomy and a jejuno-jejunostomy were additionally performed. Histopathology revealed a moderately differentiated adenocarcinoma, pathological stage pT3NOMO (IIA). All the resected margins were free. The patient recovered uneventfully and was discharged with advice for chemotherapy.

Conclusion: Diagnosis of D3 cancer is challenging. Segmental duodenal resection is a good surgical option for distal duodenal carcinoma.

Keywords: Distal duodenal cancer, diagnostic difficulty, segmental resection, duodenal adenocarcinoma.

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Introduction

Duodenal adenocarcinoma (DA) is a rare tumor that accounts for only 0.5% of all gastrointestinal tumors [1]. It is mostly located in the 2" part of the duodenum (D2), but extremely rare in the 3r[d] (D3) and [4th] (D4) parts of the duodenum [2-8]. The proximal lesions, i.e., in the 1' (DI) and 2" (D2) parts, are easily detected on imaging and endoscopy, making the diagnosis easier and subsequent management simple. However, distant lesions (D3, D4) are easily

missed by endoscopy. As a result, many patients suffer from persistent symptoms, either from stenosis-related symptoms such as abdominal pain or vomiting, or from bleeding-related symptoms such as melaena and anemia [9]. Sakae et al., a Japanese group, propose that when an endoscopy is performed for any reason, the D3 duodenum should be inspected with a high index of suspicion for the purpose of finding duodenal cancer [9]. Otherwise, repeated endoscopies with biopsy may be required.

The choice of surgery for DI and D2 lesions is PD. Because of the paucity of lesions in D3 and D4, the choice of surgery is debatable. Some advocate PD while others are in favor of segmental duodenal resection. Segmental resection is an appropriate surgical strategy for DA when technically and oncologically feasible and when negative margins can be achieved [10]. In fact, when negative resection margins are achieved, both segmental duodenal resection and PD allow for appropriate lymph node removal and result in equal 5-year overall survival (OS) [1]. Moreover, in comparison to the PD group, the limited resection group had lower overall postoperative morbidity and pancreatic fistula[6].[11].

Here, we report a case of a 65-year-old man who presented with D3 carcinoma and was successfully treated by segmental resection and end-to-end duodeno-jejunal anastomosis.

Case Report

A 65-year-old male smoker presented with recurrent epigastric pain for the last 6 months. It was associated with anorexia, nausea, and occasional vomiting after meals. He was anemic and his BMI was 18.4 kg/m^2. The abdomen was soft and non-tender, with no organomegaly or ascites. As an initial evaluation, UGI endoscopy showed erosive antral gastritis with a positive CLO (Campylobacter-like organism/rapid urease) test. USG of the abdomen showed unremarkable findings. He was treated by triple-therapy for two weeks without any improvement. The intensity of abdominal pain increased, the frequency of vomiting also increased, and he lost 7 kilograms of body weight during his illness. Laboratory workup revealed mild anemia with normal liver and renal functions. CA 19-9 was normal (15.7 U/L), but CEA was raised (21 ng/ml). A CT scan of the abdomen was performed for further evaluation. It revealed a heterogeneously enhanced asymmetrical circumferential thickened wall in the D3 duodenum with a narrow lumen. The narrowed segment was about 44.2 mm long and had a maximum thickness of about 10.5 mm (Figure 1A), with obliterated perilesional fat planes, suspected of duodenal malignancy. A second UGI endoscopy was done, and it revealed an ulcerative lesion with mucosal irregularities in the D3 duodenum. Biopsy was taken from the suspected lesion, but the histopathology report came as chronic nonspecific duodenitis. A third UGI endoscopy (Fig. 1 B) was performed by an experienced endoscopist who took biopsy from the lesion, and the histopathology report revealed a moderately differentiated adenocarcinoma. Considering the age and risks of post-operative complications, segmental resection of the 3r^d and 4th parts of the duodenum was planned. [Procedure]: The abdomen was made open by a bilateral subcostal incision. No ascites, peritoneal or liver metastasis were noted. A firm annular growth was felt in the D3 duodenum with mesenteric puckering. Mesenteric vessels were free of tumor invasion. The D2, D3, and D4 were completely mobilized, and the duodenum was resected at the junction of the D2 and D3 above (Fig. 1C) and the D3 and D4 below. During upper part resection, the ampulla was injured; papillotomy and ampulloplasty were done. Reconstruction was performed by a duodeno-jejunostoiny (Fig. 1D), and to protect the duodeno-jejunostomy, a gastro-jejunostomy and a jej unojejunostomy were additionally performed.

The resected specimen showed a solid irregular growth in the D3 duodenum, about 2 cm x 1.5 cm, with ulceration in surrounding areas. Microscopically, it was a moderately differentiated adenocarcinoma. All the resected margins were free. A total of 4 lymph nodes were dissected, and none showed signs of metastasis. The pathological diagnosis according to the American Joint Committee on Cancer (AJCC) 8th edition was "Duodenal adenocarcinoma of the 3r^d part ($T_3N_OM_O$), grade II, stage 1IA". The patient recovered well from anesthesia, and the postoperative course was uneventful. He was discharged on the 12th post-operative day with advice for adjuvant chemotherapy.

Discussion

Duodenum adenocarcinoma (DA) is the most common of all small bowel adenocarcinomas, followed by the jejunum and ileum[2,6,9]. But it is a rare tumor that accounts for only 0.5% of all gastrointestinal tumors [1]. It most commonly arises from D2 and its incidence in D3 and D4 is extremely rare [2].

Diagnosis of DA in D1 and D2 is easy by endoscopic examination, but it is very challenging if the carcinoma is located in D3 or D4. Afridi et al. [12] suggested that in most cases of DA, barium meal follow-through and UGI endoscopies, as well as biopsies, are effective diagnostic techniques to confirm the diagnosis. However, Kalogerinis et al. [2] suggest that the distal duodenal lesions (D3 and D4) are often missed on barium x-ray examination. The lesions may also elude endoscopy, necessitating multiple endoscopies to confirm the diagnosis[12]. Sakae et al. [9] reported their multicenter observational analysis from 11 Japanese institutions in 2017 involving 205 patients with small bowel adenocarcinoma. They found about 54% of DA patients were symptomatic at diagnosis, either from stenosis-related symptoms such as abdominal pain or vomiting, or from bleeding-related symptoms such as melena and anemia. They proposed that whenever an UGI endoscopy is performed, regardless of the reason, the D3 duodenum must be inspected in order to detect duodenal cancer. In the present case, our patient was symptomatic as well, and we performed UGI endoscopy three times to reach a diagnosis. Therefore, a high degree of suspicion is required and an experienced endoscopist may properly diagnose DA in D3 or D4.

Resection of the primary tumor is the only curative treatment option for DA[1,2,9,13]. Historically, either pancreaticoduodenectomy (PD) or segmental duodenal resection have been considered. Although PD is the preferred operation for all proximal lesions, there are different opinions regarding surgery of distal DA. Segmental duodenal resection is a preferable alternative for patients with distal duodenal tumors who do not have advanced disease. In terms of lymph node clearance, the difference between the two methods is insignificant. According to Solaini et al. [5], there were no differences in the number of nodes removed depending on the type of resection (median 15 for segmental resection vs. 16 for PD). This type of surgical treatment has a negligible impact on OS, according to this study. As a result, segmental duodenal resection was suggested for distal duodenal lesions. Tocchi et al. [14] reported that in 25 patients with istal DA, curative resection was accomplished. Segmental resection was performed on 16 patients, while PD was performed on 9 others. Kaklamanos et al. [15] described 12 patients with distal DA. A segmental resection was performed on 8 individuals, while a PD was performed on 4 others. A study of 68 individuals with resectable DA was published by Bakaeen et al. [16]. A segmental resection was performed on 15 patients, and their 5-year OS rate was similar to that of PD. Garcia-Molina et al. [13] demonstrated precise surgical procedures for distal duodenal lesions, indicating that the CattellBraasch approach is required in such circumstances. Their patient with DA at D3 developed multiple hepatic metastases two months after surgery and died a year later. The author concluded that a more extensive surgical technique would not be able to prevent the early development of hepatic metastases because these metastases most likely existed at a subclinical stage before the surgery. They concluded that segmental duodenectomy is a safe and effective surgical method for treating tumors in the distal duodenum without the complications of PD, which was also very appropriate for our patient.

DA has a 5-year OS rate of 25-75% after resection, which is much higher than other periampullary malignancies [1,6]. In their multi-variate analysis, Nitta et al. [17] reported that lymph node metastases and pancreatic invasion were independent prognostic indicators in DA. The survival outcomes for DA patients with pancreatic invasion were related to a significant prevalence of hematogenous recurrence. Sakamoto et al. [7] published their single-center data on 65 patients with DA, which showed the 3- and 5-year OS rates after curative resection were 75% and 65%, respectively. Jensen et al. [18] recently reported their single-center data on 96 patients with DA, which showed that after curative surgery, the 3- and 5-year OS rates were 66.3% and 58.2%, respectively.

Cloyd et al. [10] analyzed 1611 patients with DA, where 746 (46.3%) underwent simple resection, mainly in the form of segmental resection, and 865 (53.7%) underwent radical resection, mainly in the form of PD. They concluded that radical surgery in the form of PD does not appear to confer improved survival compared with simple segmental resection for DA in univariate, multivariate, and stage-by-stage analyses. DA in some situations (such as when the tumor is located in D2 of the duodenum) requires PD and cannot be technically removed with a lesser resection. In these situations, segmental resection should not be attempted at the expense of proper oncologic surgery. However, their results support the idea that a segmental resection is an appropriate surgical strategy for DA when technically and oncologically feasible and when negative margins can be achieved [10].

Meijer et al. [1] performed a thorough review of the literature and meta-analysis of 26 observational studies involving 6438 patients. After curative resection, the pooled 5-year OS rate was 46%, compared to 1% in palliative-treated patients. It demonstrated a significant survival benefit for patients with DA following curative surgical resection when compared to palliative-treated (bypass only) patients. When negative resection margins are achieved, both segmental duodenal resection and PD allow for appropriate lymph node removal and result in equal OS. Lymph node involvement is a negative prognostic factor for survival, with a considerably lower 5-year OS rate than for node-negative disease (21% for nodal metastases vs. 65% for node-negative disease). Lymphatic drainage from the distal regions of the duodenum ends primarily in the small bowel mesentery. These lymphatic basins are not eliminated after PD, indicating that extended lymph node resection has no further influence on OS. Although PD is recommended for all DA tumors, the results of Meijer et al. also emphasized that segmental resection is the resection of choice for distal DA whenever radical resection margins can be accomplished [1].

Burasakarn et al.[6] conducted another meta-analysis that included 15 studies with a total of 3166 patients, 995 of whom (31.4%) were treated with limited resection and 1498 with PD. In comparison to the PD group, the limited resection group had lower overall postoperative morbidity and pancreatic fistula, no statistically significant difference in overall mortality, and equivalent long-term OS. They concluded that PD remains the standard treatment for primary DA to guarantee complete regional lymphadenectomy. Additionally, limited resection may be indicated in certain patients who have superficial lesions at sites where it can be safely conducted (e.g., distal duodenum) [6].

Chemotherapy is generally employed as a palliative strategy, but it has not been well explored due to the low prevalence of adenocarcinoma in the duodenum [1,7].

Conclusion

Diagnosis of D3 cancer is a challenging one. A high degree of suspicion and a routine look at the D3 area are needed during endoscopy. Segmental duodenal resection is a good surgical option for distal duodenal carcinoma. However, to see the long-term outcome, we need to follow the patient for more time, and more patients are required.

Consent

Written informed consent was obtained from the patient party.

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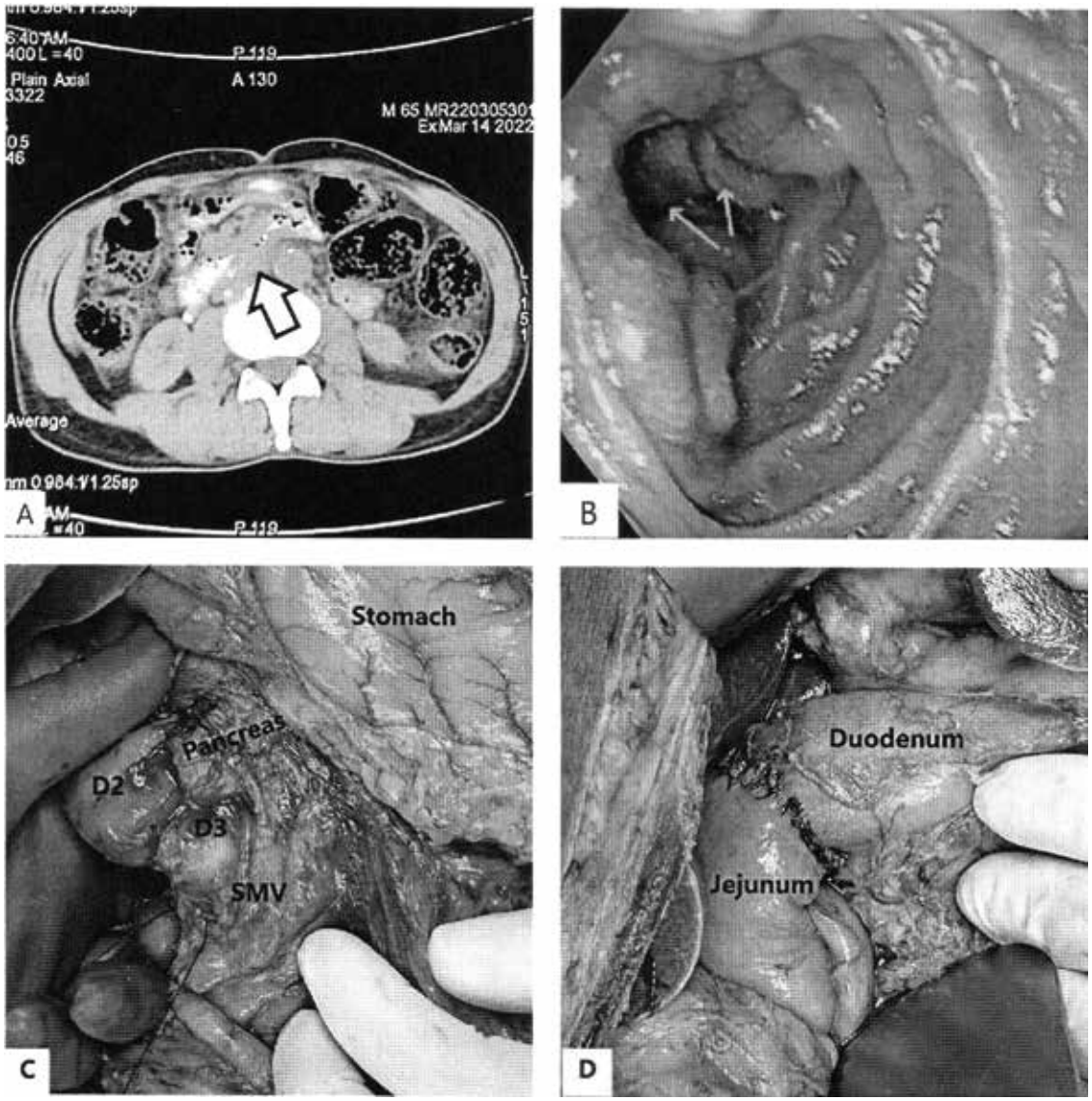

Figure 1: A. axial CT scan demonstrating luminal narrowing (arrow), contrast passes with difficulty across D3, B. endoscopic view of the lesion in D3 (green arrows)., C. operative view of the lesion in D3, SMV was free, and D. after en-bloc removal of the specimen, the completed end-to-end duodeno-jejunostomy

(D3 = third part of the duodenum, SMV = superior mesenteric vein)

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