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EC GASTROENTEROLOGY AND DIGESTIVE SYSTEM

Research Article

The Role of Endoscopic Ultrasound (EUS) in the Diagnostics and Selection of Patient Management for Benign Tumors of the Major Duodenal Papilla

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Received: May 18, 2020; **Published:** June 22, 2020

Abstract

Adenomas of the major duodenal papilla are rare pathology that in some cases can cause the development of ampullary cancer. Considering the specific papilla location, it is very difficult to detect the formations at an early stage. However, clinical signs, such as pain, and obstructive jaundice, may indicate the spread of the neoplastic process. Endoscopic ultrasound is the only method that allows not only to detect the formation, but also to evaluate the tumor spread in the bile and pancreatic ducts. The doctor selects the approach and method of surgical treatment of the patient depending on the results of the EUS.

Keywords: *EUS; ERCP; Papillary Adenoma; Papillectomy; Benign Tumors of the Papilla*

Abbreviations

EUS: Endoscopic Ultrasound; ERCP: Endoscopic Retrograde Cholangiopancreatography; APC: Argon Plasma Coagulation

Introduction

Adenomas of the papilla make up about 1% of all new formations of the gastrointestinal tract and are potentially malignant and can cause ampullary cancer in some cases [1,2]. Ampullary carcinoma is the second most common cause of death from cancer after colorectal cancer [3]. It is difficult to diagnose the disease of the major duodenal papilla at an early stage because of its specific location. Considering the small size of the formation, it is difficult to visualize it with an gastroscope during screening gastroscopy. The accuracy of the diagnosis directly depends on the experience of the endoscopist and the sedation conditions. You have to have the indications to perform duodenoscopy, such as common bile and/or pancreatic duct dilatation, according to transabdominal ultrasound that is often performed, when the patient already have obstructive jaundice and pain. Regarding the clinical signs, they are an unfavorable predictor of tumor spread. In the last decade, the main treatment method of this disease was surgical. Nowadays, some authors say that endoscopic removal of the ampullary adenoma is an effective and safe procedure that is an alternative to the surgical treatment [4]. Unlike EUS, traditional radiological methods, such as magnetic resonance cholangiopancreatography and multispiral computer tomography, cannot detect accurately the local prevalence of the tumor that is the key to effective endoscopic resection.

Materials and Methods

The study included 10 patients with tumors of major duodenal papilla. At the preoperational stage, all patients were examined with endoscopic ultrasound (EUS) (Olympus Evis EXERA II UE-ME1; GF-UCT 140-AL5) in order to assess the prevalence of the process, to detect the invasion to the muscle layer of the duodenum wall, to assess how far the process went into the CBD lumen and the major pancreatic duct, and to assess the lymph node enlargement. The examined patients included five men, and five women. The average age was 63,2. All patients had concomitant diseases. Two patients had such concomitant pathologies that it was not possible to do extended surgical procedures. According to the results of EUS, all the patients underwent surgical treatment: two of them had pancreatoduodenal resection done, 8 patients underwent endoscopic treatment.

Results

An intraampullary tumor was detected in 2 patients. An endoscopic examination did not show the tumor tissue in these patients. In these cases, EUS was the main diagnostic method. In 8 patients, the tumor was localized mainly in the lumen of the duodenum and was well visualized with duodenoscopy (duodenoscope Olympus TJF-Q 180 VR). The extraampullary component of the tumor was 10 - 25 mm. EUS was informative in all 10 patients and had an impact on the selection of surgical tactics. Preoperative morphological screening was performed in 9 patients. In 8 patients, a papillary adenoma was detected, and in one case a papillary neuroendocrine tumor was detected.

The most difficult thing was to obtain the material in case of intraampullary adenoma.

In one case, a mucosal dissection was performed above the lesion with a subsequent tumor biopsy (Figure 1).

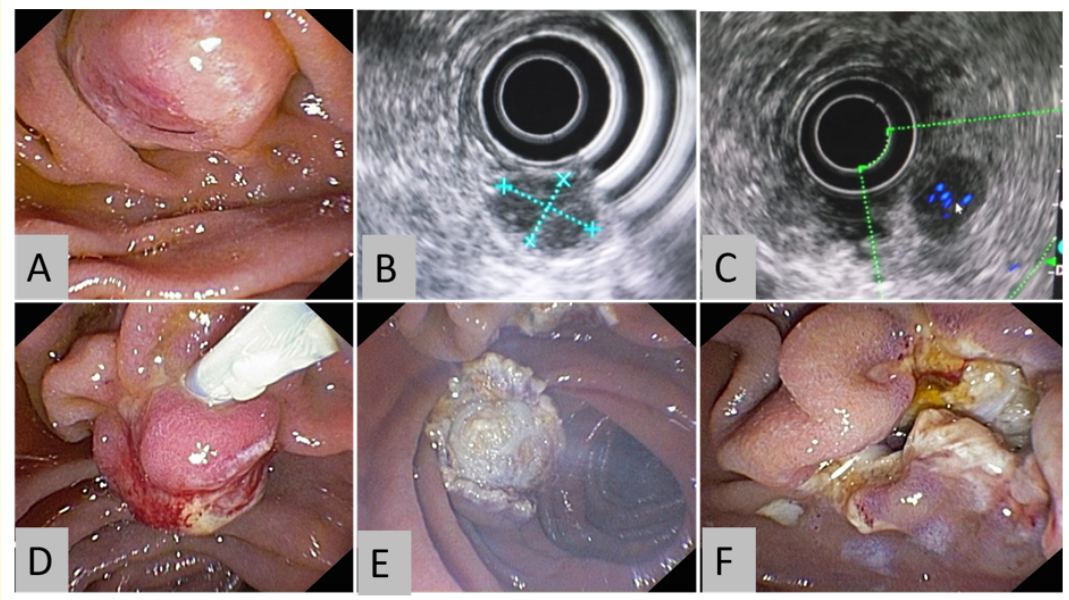

Figure 1. *Intraampullary tumor (neuroendocrine tumor). Preoperative diagnosis: A- Endoscopic image; B- EUS. The formation of a rounded shape with a clear, even contour with a heterogeneous structure: hyperechoic inclusions and anechoic component; C- EUS. In the CDI mode you can visualize a blood flow in the center of the formation; D, E, F- Stages of endoscopic papillectomy.*

One patient did not have a preoperative biopsy done, the material was obtained during the endoscopic intervention (ERCP), aimed at treating obstructive jaundice. The final morphological study showed that 2 patients had adenocarcinoma, 4 patients had adenoma with a low-grade dysplasia, 1 patient had neuroendocrine tumor, and 3 patients had a high-grade adenoma. There was no correlation between the size of the tumor and the presence of invasive adenocarcinoma.

The EUS was mainly done to determine if it is possible to remove the tumor endoscopically. The tumor invasion to the muscle layer of the duodenal wall was detected in one case (T2). The patient underwent surgical treatment. The postoperative material showed adenocarcinoma of the major duodenal papilla (Figure 2).

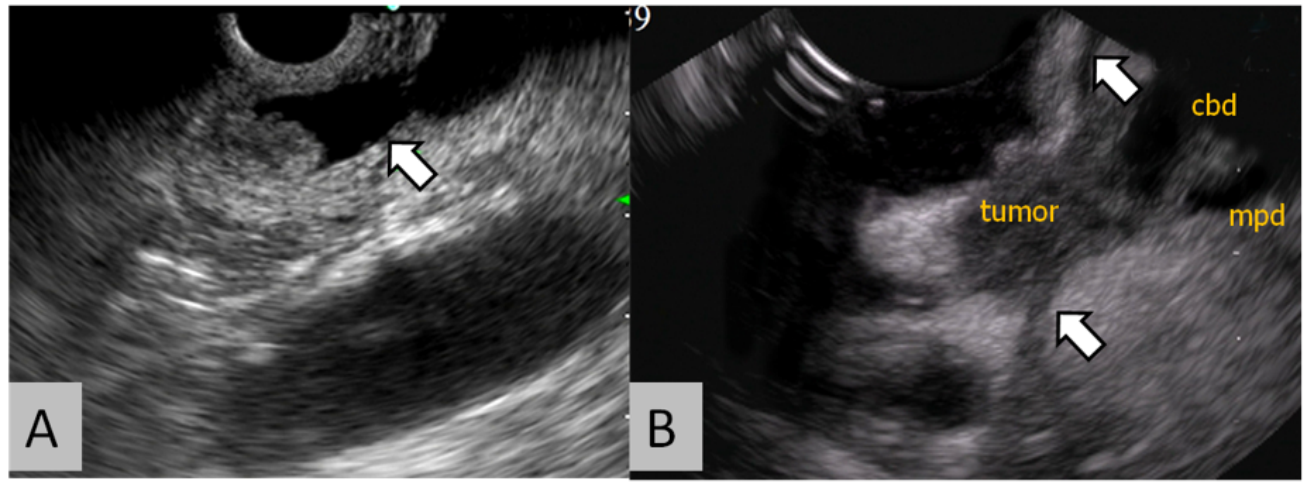

Figure 2: *A- The tumor does not spread to the muscle layer of the duodenal wall (indicated by arrow); B- The tumor is spread to the muscle layer of the duodenal wall (indicated by arrow).*

Five patients had tumor in the terminal portion of the common bile duct. Moreover, in one case, the EUS showed that the intraluminal part of the tumor did not separate from the ductal wall and was lateral-spreading (T2). The patient underwent surgical treatment. Four patients had tumor in the terminal portion of the common bile duct that had a size of 7 - 15 mm. The EUS showed that the intraluminal part of the tumor was separated from the wall at the level of the intrapancreatic portion of the common bile duct and was floating (T1). This group of patients underwent endoscopic treatment. We did not have any cases of the enlargement of the regional lymph nodes (N0).

Endoscopic removal was performed in several stages using the peacemeal resection method (single-use oval electrosurgical snares 15 mm, Olympus). First, the papilla was removed that had a part of the tumor coming into the lumen of the duodenum. Then the cannulation of the common bile duct and the major pancreatic duct was performed (single-use sphincterotome CleverCut 2V, Olympus). In case of the intraductal part of the tumor (according to the EUS and ERCP), the remaining part of the tumor was dislocated into the lumen of the duodenum with the help of a balloon extractor (stone extraction balloons 15 mm, Olympus). After that, it was excised with the help of an endo loop or forceps for a hot biopsy (reusable hot biopsy forceps, Olympus) (Figure 3).

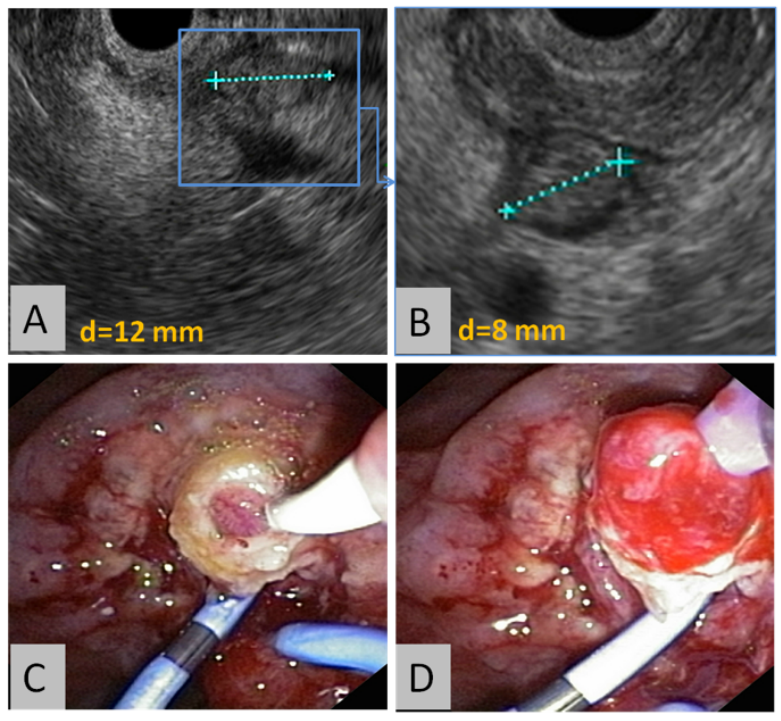

Figure 3: *A and B- EUS picture of the tumor spread to the terminal portion of the common bile duct, the tumor is floating; C- The moment of tumor dislocation in the duodenum with the help of a balloon extractor; D- Capture of the dislocated part of the tumor using an endo loop.*

Argon plasma coagulation (APC) was used for the ductal entrances, followed by stenting of the common bile duct and major pancreatic duct. The non-ampullar part of the formation (if any) was removed with a standard loop resection and submucosal injection, if it was necessary. The post-resection defect was treated with APC to provoke the hemostasis. Two patients had complications after the removal of the tumor in the endoscopic group: massive bleeding, which required laparotomy, and an abdominal abscess complicated by sepsis and the mortality.

Thus, endoscopic removal was performed in 8 patients.

The complete removal of the tumor was macroscopically achieved in 7 cases out of 8 cases. In one case, the patient had an intraampicullary tumor and a large peripapillary diverticulum. The doctor refused to do the surgical treatment because of a severe comorbid condition. The classical loop papillectomy is not indicated either because of the presence of a peripapillary diverticulum. The patient underwent endoscopic papillosphincterotomy with a partial fractional resection of the tumor fragments (R2 resection) available for visualization, and argon plasma destruction of the entrance. The patient underwent 4 sessions of endoscopic treatment with an interval of 3 months with a positive effect (absence of a visible tumor and filling defect according to ERCP). The follow-up was 3 - 8 months. Doctors visually examined the resection area, and a biopsy was done.

There was one case of relapse after the endoscopic removal of a large adenoma (3.5 cm). Six months later the tumor spread to the surrounding mucosa and terminal portion of the common bile duct. As a result, the patient underwent one more endoscopic mucosal resection (Figure 4).

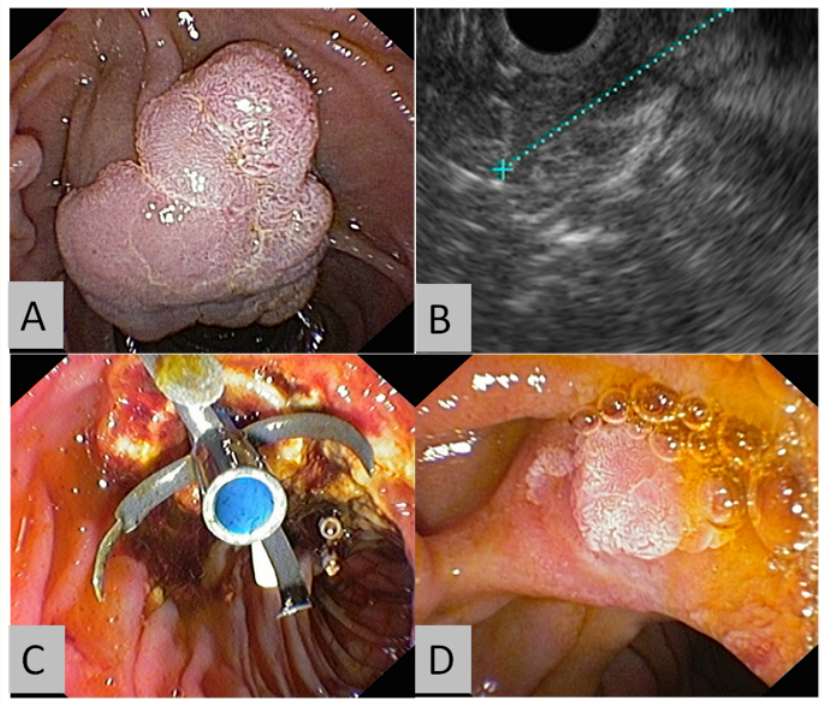

Figure 4: *A- A large adenoma of the major duodenal papilla; B- EUS image, the formation is lateral-spreading, is located inside the submucosal layer; C- Post-resection defect, CBD and MPD have plastic stents installed, clipping of two visible vessels in the distal resection margin is done; D- Control after 6 months: relapse of adenomas in the resection area.*

Discussion

Duodenum tumors are rare pathologies and make up 0.3% - 1.5% [5], in the average about 1% of all tumors of the gastrointestinal tract [6]. However, the frequency of malignant development of the ampullary tumor is 25 - 35% [7,8]. There are no clinical signs of the disease for a long time, or they can be nonspecific. Jaundice and pain come already at quite a severe stage. It is very difficult to visualize the major duodenal papilla, when you perform screening gastroscopy. This directly depends on the sedation conditions, the experience of the endoscopist and the anatomical peculiarities. Duodenoscopy is performed to have the target examination of the major duodenal papilla in case of obstructive jaundice syndrome, dilation of the common bile duct and/or pancreatic ducts shown by the ultrasound. Adenomas are divided into ampullary and non-ampullary according to the endoscopic results. When you detect adenomas of the major duodenal papilla and have the morphological evidence of it, it is indicated to remove it. Nowadays most authors support the endoscopic treatment of both ampullary and non-ampullary, in case that they have no evidence of adenocarcinoma of the major duodenal papilla and in case that the tumor did not spread in the deep layer of the duodenum wall. However, a preoperative morphological study may give a false negative result in 1/3 of cases. So, the list of indications for the removal of these formations is actually longer [7]. After analyzing publications on this subject, the authors make a conclusion that endoscopic papillectomy is a safe and effective method, which is currently a selection method for local adenomas of the major duodenal papilla. The authors also show a low level of complications. Different authors speak about the relapse rate of 19% in the average. It can be up to 63%, if the size of the tumor is more than 3 cm [9-11]. Our data correlate with literature data. The endoscopic treatment can be done successfully and effectively if the tumor is not spread in the muscle wall of the duodenum and it is possible to remove the tumor completely.

EUS allows us very accurately to detect the tumor invasion in the muscle layer of the duodenal wall and select candidates for surgical treatment. To understand the possibility of the endoscopic removal of the intraductal part of the tumor, besides its sizes, EUS allows us to determine the length of the real tumor contact with a ductal wall, as we can remove endoscopically a floating part of the tumor after we disclocate it to the lumen of the duodenum.

EUS is also the only method to detect and evaluate an intraampullary tumor of the major duodenal papilla.

The method is operator-dependent and should be performed by a doctor with a big experience in EUS of the pancreatobiliary area and interventions performed on the ducts and resection of the gastrointestinal mucosa. In our study diagnostic EUS and formation removal were done by the same operator.

Conclusion

EUS is a necessary diagnostic method in the preoperative detection not only of the depth of neoplasia (in case when cancer is suspected), but also in the evaluation of the tumor spread in bile and pancreatic ducts. The surgical approach and the method of tumor removal directly depend on the EUS results. However, the researcher has to have a big experience to perform this study and to interpret the results, so such patients should be treated in big multidisciplinary centers that specialize on this problem.

Conflict of Interest

There is no conflict of interest.

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Volume 7 Issue 7 July 2020