

Complete Resection of Ampullary Paragangliomas Confined to the Submucosa on Endoscopic Ultrasound May Be Best Achieved by Radical Surgical Resection

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Key Words

Paraganglioma · Ampulla of Vater · Endoscopic ultrasound · Pancreaticoduodenectomy

Abstract

Paragangliomas of the gastrointestinal tract generally are benign tumors usually found in the second portion of the duodenum. We present a case of paraganglioma of the ampulla of Vater confined to the submucosa on endoscopic ultrasound examination. This was initially treated by endoscopic resection, followed by pancreaticoduodenectomy after local resection margins were positive. Histopathology showed a well-differentiated ampullary paraganglioma confined to the submucosa, but with involvement of one regional lymph node. Only 25 prior cases of paraganglioma at the ampulla of Vater have been reported, and nine of these have demonstrated local or distant metastases. Because of their malignant potential, ampullary paragangliomas should be treated with radical resection if the goal is to achieve complete resection, even if preoperative imaging shows local confinement.

Introduction

Paragangliomas are rare neoplasms of the gastrointestinal tract, with the majority occurring in association with the second portion of the duodenum. In general, these tumors are considered benign, despite reports of cases with simultaneous regional lymph

node metastases or evidence of distant metastases after surgery [1–9]. We report a case of paraganglioma at the ampulla of Vater that was found to be malignant at the time of surgical resection despite preoperative imaging that showed the lesion to be confined to the submucosa.

Case Report

A 62-year-old woman presented to an outside institution with evidence of an upper gastrointestinal bleed. Upper endoscopy showed a duodenal ulcer as well as a 2 cm firm swelling at the ampulla of Vater. Mucosal biopsies at that time were normal. Endoscopic ultrasound (EUS) examination of the ampulla revealed a 2 cm hypoechoic mass arising in the submucosa. This mass did not involve the muscularis propria or the pancreas (fig. 1). Magnetic resonance imaging and magnetic resonance cholangiopancreatography did not reveal local lymphadenopathy or evidence of metastases. On the basis of the submucosal involvement, local endoscopic resection was performed after submucosal injection with saline. Histopathologic analysis revealed a well-differentiated ampullary paraganglioma with a positive deep resection margin.

In an attempt to achieve complete resection of the paraganglioma, the patient underwent open surgical local ampullary resection. However, frozen section of the deep margin was positive for tumor and a pylorus-preserving pancreaticoduodenectomy (Whipple procedure) was performed. Histopathology of the pancreaticoduodenectomy specimen showed a well-differentiated, not otherwise specified malignant paraganglioma composed of predominately epithelioid cells confined to the mucosa and submucosa of the pancreas and duodenum (fig. 2). All surgical margins were negative. However, one out of nine periduodenal lymph nodes was positive for metastatic paraganglioma (fig. 3). The patient's postoperative course was uneventful, and she has done well through one year of follow-up.

Discussion

Paraganglia are clusters of chromaffin, or neuroendocrine, cells. Originating in the neural crest during embryogenesis, these cells migrate in close association with ganglion cells from the autonomic nervous system. The histogenesis of paragangliomas is not known. It has been proposed that they arise as a hamartoma derived from maldevelopment of the pancreas, remnants of the migration of the ventral pancreatic primordium [1], which would account for the high incidence of paragangliomas in the second portion of the duodenum. Other proposed origins for paragangliomas include sympathetic gangliocytic cells, glandular intestinal cells, or gangliocytic cells of Meissner's plexus. Histologically, duodenal and ampullary paragangliomas are composed of a combination of three cell types: epithelioid, ganglion-like, and spindle (sustentacular) cells arranged in a 'zellballen' pattern [1, 8]. While the proportion of each of these cell types varies, one type usually predominates.

Paragangliomas located at the ampulla of Vater generally are considered benign [10]. However, nine previously reported cases of ampullary paragangliomas had malignant characteristics. Six of these patients had lymph node invasion discovered at the time of surgery [1–4, 6, 9], and three patients were found to have distant metastatic disease between 3 months and 11 years after the initial resection [5, 7, 8]. In our case, evidence of regional lymph node metastasis was not detected until it was decided to proceed with radical resection.

Currently, there is no consensus as to the treatment of ampullary paragangliomas. Some have advocated local endoscopic or surgical resection, especially when EUS imaging shows the lesion to be confined to the submucosa [10]. Out of 25 ampullary paragangliomas previously reported in the literature [10, 11], nine had evidence of lymph node and/or distant metastases [1–9]. There have been no reports of disease recurrence in

patients initially treated by pancreaticoduodenectomy, even when simultaneous lymph node invasion was present [1, 3, 5, 6]. These findings support the statement by Bucher et al. that radical resection of an ampullary paraganglioma may result in a better outcome for the patient, particularly if complete resection is desired [9].

Conclusion

Despite preoperative imaging with EUS that shows confinement of the ampullary paraganglioma to the submucosa, the high percentage of local and distant metastases for these tumors favors radical surgical resection (i.e. pancreaticoduodenectomy) over local resection, either endoscopic or surgical.

Fig. 1. EUS of the ampullary mass. The interface between submucosa and muscularis propria appears intact, indicating confinement to the submucosa (arrows).

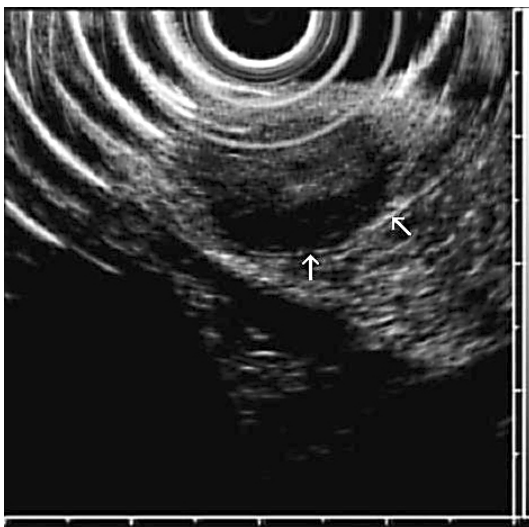


Fig. 2. High-power magnification of the ampullary paraganglioma shows that it is composed of pleomorphic cells arranged in mainly small nests in a ‘zellballen’ pattern with intervening cords of stromal cells (H&E, original magnification 100×).

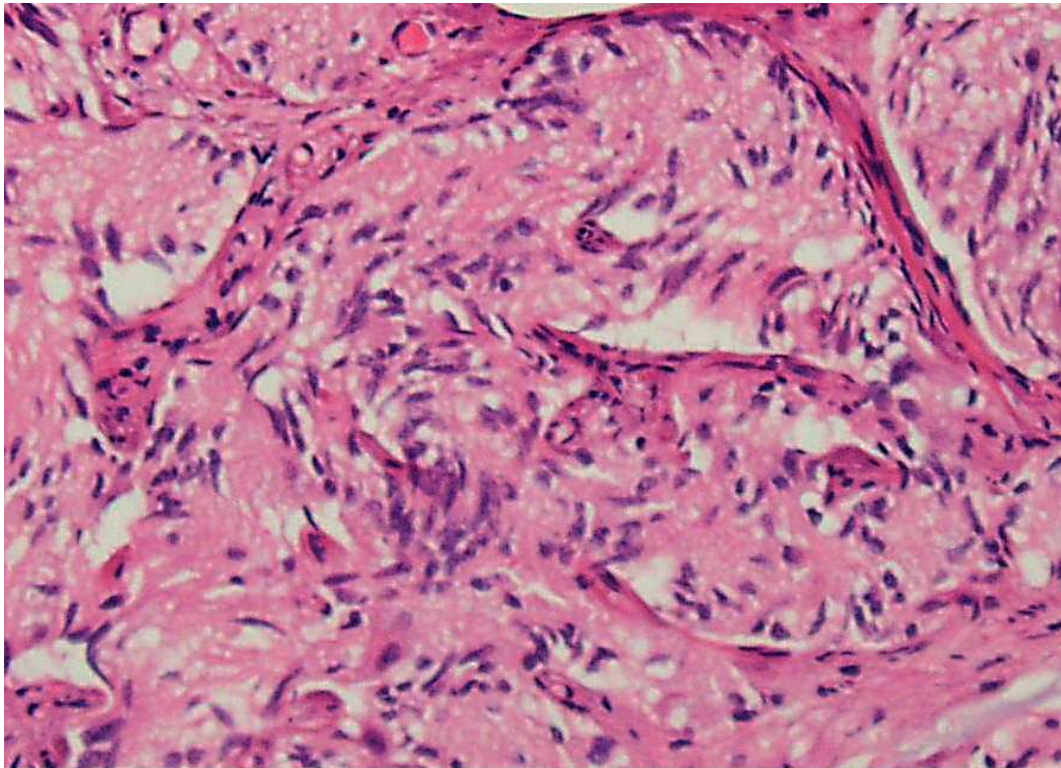
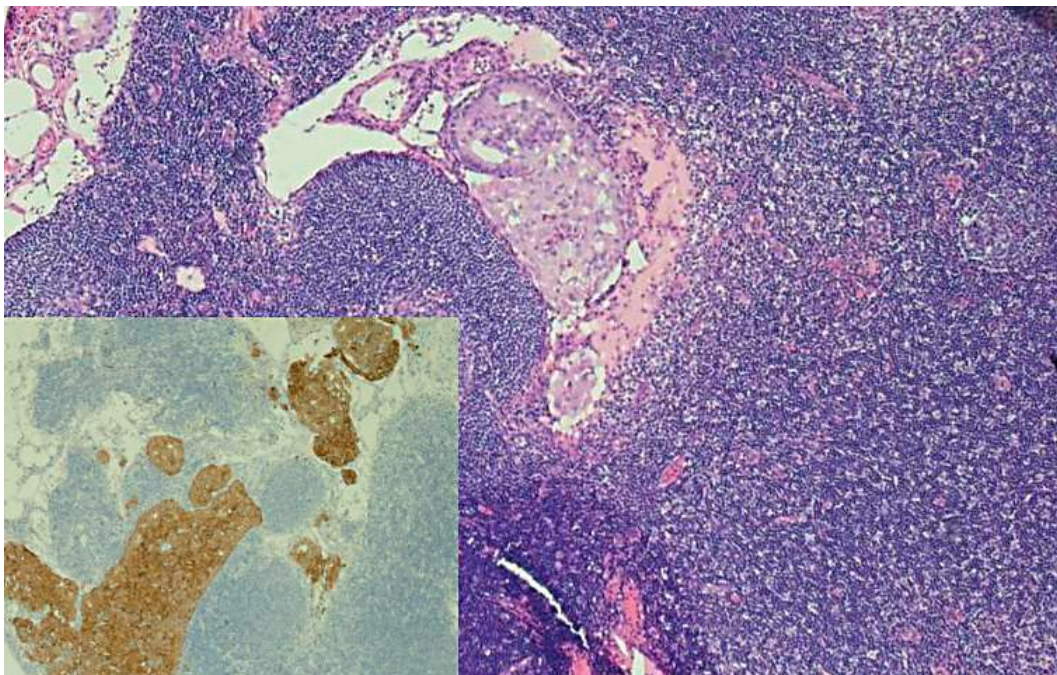


Fig. 3. Low-power magnification of the periduodenal lymph node containing metastatic paraganglioma (H&E, original magnification 40×). Immunostaining for synaptophysin confirms the presence of metastatic disease (inset).



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