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Endoscopic Diagnosis of Ampullary Tumors Using Conventional Endoscopic Ultrasonography and Intraductal Ultrasonography in the Era of Endoscopic Papillectomy: Advantages and Limitations

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See "Endosonographic Preoperative Evaluation for Tumors of the Ampulla of Vater Using Endoscopic Ultrasonography and Intraductal Ultrasonography" by Naoki Okano, Yoshinori Igarashi, Seichi Hara, et al., on page 174-177

The diagnosis of ampullary tumors during screening endoscopy or radiological imaging studies is increasing. Traditional management for ampullary tumors is surgical resection. However, surgical intervention needs radical excision, including excision of the surrounding organs around the ampulla of Vater. With the development of endoscopic techniques, endoscopic resection for ampullary tumors has largely replaced classical surgical resection for the treatment of ampullary tumors, as it is a less invasive intervention.¹ However, owing to the inherited limitation of resection depth by using the endoscopic procedure, only ampullary adenoma or very early stage cancer of the ampulla of Vater are indicated for endoscopic resection.² Radiologic imaging studies, including cross sectional imaging such as computed tomography or magnetic resonance imaging, have poor accuracy for the T-staging of ampullary cancer.^{3,4} Therefore, further investigation with another endoscopic modality in conjunction with duodenoscopic evaluation is needed to identify ampullary lesions suitable for endoscopic resection. In this issue of *Clinical Endoscopy*, Okano et al.⁵ reports the analyzed accuracy of conventional endoscopic ultrasonography (EUS) and transpapillary intraductal ultrasonography (IDUS) for diagnosing ampullary tumors by focusing on finding early-stage tumors as an in-

dication for endoscopic papillectomy (EP) with a snare. EP was used to treat 35 of 48 patients (72.9%) with ampullary tumors. The authors examined the ampullary tumors with EUS and IDUS before endoscopic resection or surgical excision. The overall diagnostic accuracy was the same (85%) for both EUS and IDUS. Diagnostic accuracies for ampullary adenoma or pTis cancer and T1 early-stage cancer were similar with 97% and 73% for EUS, and 94% and 73% for IDUS, respectively. Extension of the tumor into the bile duct and pancreatic duct was diagnosed with accuracies of 90% and 92% by using EUS, respectively, and 88% and 88% by using IDUS, respectively.

Ito et al.⁶ reported the results of a similar study of 40 patients. IDUS was more accurate than EUS for ampullary adenoma and T1 (86% vs. 62%), and the overall accuracy in T-staging (78% vs. 63%). The overall accuracy in the assessment of ductal invasion for IDUS (90% in both the bile duct and the pancreatic duct) was very similar to that of EUS (88% in the bile duct and 90% in the pancreatic duct).

Endosonographic evaluation, especially EUS, is now widely available; however, there is still no consensus regarding the indication of EUS and/or IDUS to make a therapeutic decision in patients with ampullary tumors. Accurate T-staging of ampullary cancer and involvement of the biliopancreatic ductal system are the most important factors that guide appropriate therapy. There is still no consensus on the indication for EP of ampullary tumors. However, ampullary adenoma, high-grade dysplasia, and Tis without ductal involvement are absolute indications for EP. In a retrospective study by Yoon et al.,⁷ 10 clearly resected patients with high-grade dysplasia/Tis and six patients with focal T1 cancer had no sign of recurrence of cancer during a mean follow-up of 27 to 32 months. There-

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fore, T1 cancer and cancer focally limited to the major papilla can be relative indications for EP in cases without lymph node metastasis. In the case of T2 ampullary cancer, radical surgery is needed for cancer invasion to the duodenal muscularis propria. EUS can provide accurate assessment for involvement of the duodenal wall layers. Therefore, theoretically, EUS can be an excellent tool to detect a lesion limited to the major papilla. The reported accuracy of EUS for diagnosing a T1 ampullary cancer is around 90%.⁴ This is particularly relevant as IDUS is the only imaging modality to reveal a layer of the sphincter of Oddi, but it is not visible in every case. It can help discriminate adenomas or Tis lesions from T1 lesions. Of the three published trials that compared EUS with IDUS, two showed that IDUS had higher overall accuracy compared to that with EUS.^{6,8,9} In some cases, the complete assessment of duodenal involvement is difficult with EUS because of unclear visualization of the proper muscle layer of the duodenum. Indeed, Ito et al.⁶ reported that duodenal involvement could not be estimated by using EUS in 15% of patients, compared with the 100% visualization of the duodenal proper muscle layer by using IDUS. Therefore, EUS is preferable for large tumors that invade the pancreatic parenchyma or the duodenum.

Extension of ampullary tumors into the bile duct or pancreatic duct can reduce the complete resection rate achieved with EP. Therefore, preoperative evaluation of tumor involvement of the bile duct or pancreatic duct, or both, is important when assessing candidates for EP. Additionally, EUS and IDUS can show high accuracy for the assessment of intraductal involvement. IDUS is the more accurate tool because the probe can travel through the lumen of the bile duct in a direction perpendicular to the duct. Therefore, IDUS seems to be more accurate than EUS for tumor assessment, including T-staging and intraductal extension. However, the potential over-staging of the lesion, especially as T2, or just over T2, is a limitation of IDUS.^{6,10} The new electronic radial echoendoscope can be used to overcome the limitation of the conventional radial echoendoscope. However, there is still no comparative data about the impact of EUS and IDUS in predicting complete and clear resection after EP.¹¹ The evaluation of tumor infiltration of the sphincter of Oddi is still challenging, even with IDUS.⁶ With EUS/IDUS, diagnosis of foci of an adenocarci-

noma or focal invasion of the duodenal wall layer is difficult.

In conclusion, endosonographic modalities, including EUS and IDUS, can provide highly accurate diagnostic information for the staging of ampullary tumors, and are helpful to identify lesions indicated for endoscopic resection. However, even these tools have limitations and are not perfect diagnostic tools, because of the potential for over- and under-staging and the difficulty in evaluating focal infiltration. Further refinement of endoscopic procedures is needed for the precise assessment of ampullary tumors.

Conflicts of Interest

The author has no financial conflicts of interest.

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