

EUS-guided Injection Therapy for Pancreatic Solid Tumors

Dong-Wan Seo

Professor, Director of Digestive Endoscopy Center, Asan Medical Center, University of Ulsan

College of Medicine, Seoul, Korea

Introduction

Endoscopic ultrasound (EUS) is a powerful tool for the delineation of pancreas and detection of small lesions in this area. Nowadays EUS is used actively in the pancreatic disease not only for the diagnosis but also for the therapeutic purposes. With modification of EUS-guided fine needle aspiration (EUS-FNA), EUS-guided injection became possible and can be used for the management of various pancreatic lesions including pancreatic cystic tumor (PCT), benign pancreatic solid tumor and pancreatic cancer.

Pancreatic cystic tumor

Pancreatic cystic tumors are increasingly detected these days because of improved imaging modalities. Mucinous cystic tumor, serous cystic tumor, intraductal papillary mucinous neoplasm (IPMN) are most common types of PCTs. If the size is large and the tumor show typical features, differential diagnosis is not difficult. However, we are detecting smaller and smaller lesions these days because of improved imaging modalities. For small lesions, the differential diagnosis is problematic and many cystic tumors fall into indeterminate cyst even after extensive work-up. Unlike surgical resection, EUS-guided injection therapy can be applied to indeterminate cystic tumor. Ethanol injection was first tried by Gan SI et al. but complete resolution was observed in about one-third of included patients (Gastrointest Endosc 2005). Our group conducted a series of studies to evaluate the technical feasibility, safety and therapeutic efficacy of EUS-guided ablation. At first, we conducted a pilot study and selected 14 patients with PCT received EUS-guided ethanol lavage and paclitaxel injection (EUS-EP) and observed for 6 months. Complete resolution (CR) of PCT was observed in 11 patents and partial resolution (PR) in 2 patients. Next step study was focused on septated PCT and we observed 60% of CR and 20% of PR. Encouraged by above results, we conducted a long-term follow-up study after EUS-EP of PCT. Fifty-one patients were enrolled for EUS-EP by the following inclusion criteria; 1) uni- or oligolocular cyst, 2) indeterminate tumors for which EUS-FNA was required, and 3) PCTs showing size growth during the observation period. Under EUS-guidance, cyst fluid aspiration, ethanol lavage and injection of paclitaxel were performed. Twenty PCTs were oligolocular. Mean CEA level was 463 ng/mL (1-8190). The median follow-up was 20.6 months. Mean volume of PCT decreased from 14.09 mL to 3.31 mL. CR was observed in 28 patients, PR in 6 patients, and a cyst persisted in 12 patients. Splenic vein thrombosis as procedure-related complication occurred in 1 patient. EUS-EP appears to be a safe and effective method for treating PCT.

Benign solid pancreatic tumors

Solid pseudopapillary neoplasm and neuroendocrine tumor including insulinoma are typical example of benign solid pancreatic tumor. These lesion can be ablated by EUS-guided intervention. The technical feasibility and efficacy of ethanol injection have been reported although the number of studies are limited. Based on anecdotal data, ethanol injection effectively controlled functioning insulinoma and neuroendocrine tumors without causing serious complications. The method of injection and amount of ethanol are not standardized and long-term follow-up studies are required. Recently EUS-guided RFA technique is introduced and this can also be applied to manage benign solid pancreatic tumors in the future.

Pancreatic ductal adenocarcinoma

Pancreatic ductal adenocarcinoma shows dismal prognosis and about 80% of the cases are unresectable at the time of diagnosis. For unresectable cases, the effect of chemotherapy is quite limited. Majority of patients still show large mass causing compression and infiltration into nearby structures. The first EUS-guided injection of antitumor agent was reported by Chang K et al (Cancer 2000). Pilot study of cytoimplant injection showed promising results but subsequent trial failed to show similar results. After this report, there have been many trials using ONYX015, TNFerade, dendritic cells, dendritic cell plus gemcitabine, and adenovirus H101. All these trials showed limited initial success with minor complications and subsequent trials did not show similar results. EUS-guided radioactive iodine seed implantation can be tried for the local control of unresectable pancreatic cancer and the short-term studies showed very good result. If the patient complains severe pain, EUS-guided celiac plexus neurolysis using 100% ethanol and bupivacane can decrease the intensity of pain. Our group is conducting a study using EUS-guided RFA for the palliation of unresectable advanced pancreatic cancer. EUS-guided direct ablation of pancreatic cancer seems to be possible without causing serious complication. However, this study is still ongoing and it is too early to draw any conclusion.

Conclusions

EUS-guided injection therapy can be used for the management of pancreatic cystic tumor, benign pancreatic solid tumor and pancreatic cancer. Although the technical feasibility and initial safety of this modality have been reported by several studies, there are still unsolved issues requiring more studies. This technique started to be used recently and it is expected to be used more widely in the future for the management of small pancreatic lesions.