Back to basics: what is needed for optimal use of ultrasound in the evaluation of pancreatobiliary diseases?

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In addition to malignant tumors such as pancreatic adenocarcinoma, cholangiocarcinoma, gallbladder cancer, and duodenal papilla cancer, pancreatobiliary diseases include a wide range of benign conditions such as acute pancreatitis, chronic pancreatitis, autoimmune pancreatitis, cholecystitis, and cholangitis. Ultrasound (US) is an essential diagnostic imaging modality for the diagnosis and treatment of patients with pancreatobiliary diseases.

Advances in US devices have been remarkable. It is now possible to evaluate blood flow using harmonic imaging and contrast-enhanced US, as well as to assess tissue stiffness using elastography. More recently, shear wave elastography has become available, and is becoming widely accepted as an US modality.

A shortcoming of transabdominal US for the diagnosis of pancreatobiliary diseases is that gastrointestinal gas hinders the visualization of organs such as the biliary tract and pancreas which are located behind the stomach, duodenum, large intestine, and other organs. Endoscopic US (EUS) allows us to obtain detailed information that cannot be obtained with conventional US by means of direct visualization of the biliary tract and pancreas from inside the gastrointestinal tract using ultrasonic waves. In addition, the evolution from mechanical to electronic scanning methods has allowed us to make detailed diagnoses with the addition of Doppler-based blood flow studies. It is now possible to perform examinations using contrast-enhanced US and elastography. Convex EUS makes possible not only visualization but can also guide EUS-fine needle aspiration (FNA), which allows obtaining sufficient tissue to allow the

histologic diagnosis of pancreatobiliary diseases, especially pancreatic diseases, from the gastrointestinal tract. In addition to histologic diagnosis, EUS-FNA has an increasing number of therapeutic applications such as drainage of pancreatic cysts and obstructive jaundice, as well as injection of dendritic cells and ethanol nerve block.

US for pancreatobiliary diseases has evolved from transabdominal to transgastrointestinal approaches, Doppler, contrast-enhanced US, and weighted imaging such as elastography, and from diagnosis to treatments such as puncture-based histologic diagnosis, bile duct and pancreatic cyst drainage, and treatments employing injection of drugs. In light of these remarkable advances, how should US for pancreatobiliary diseases evolve going forward?

US examination is performed first when a pancreatobiliary disease is suspected as it is noninvasive and easy to perform. US is also used in routine medical evaluations and screening programs at many institutions, and thus plays an important role in the incidental detection of pancreatobiliary diseases. According to past screening-related reports, however, the detection rates for pancreatic cancer and biliary cancer are extremely low. Hence, the usefulness of US for detecting these diseases is not yet established. Special pancreatic US performed at the Osaka International Cancer Institute has improved visualization of the pancreas by having the patient drink tea with milk. This has contributed to a higher detection rate of pancreatic cancer. Onomichi City in Hiroshima Prefecture has advocated an Onomichi model for the early detection of pancreatic cancer using a regional care network and US, which has contributed to improved early detection of pancreatic cancer. There is a pressing need for the creation of US-based screening models suitable for each region similar to the network in Onomichi City. To that end, not only ultrasonographers but also physicians who are proficient at US need to be trained in greater numbers, but opportunities for young physicians to perform US examinations have decreased sharply with reforms of the clinical training system and specialist system imposed in recent

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years. Perhaps the biggest roadblock is the fact that there are now fewer physicians with the passion we saw in the 1990s to diagnose pancreatobiliary diseases using US, EUS, and intraductal US.

In addition to ongoing advances in US equipment, what is needed for the future progress of US for the evaluation of

pancreatobiliary diseases might be to go back to basics, to regain passion for diagnosis and treatment using US.

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