

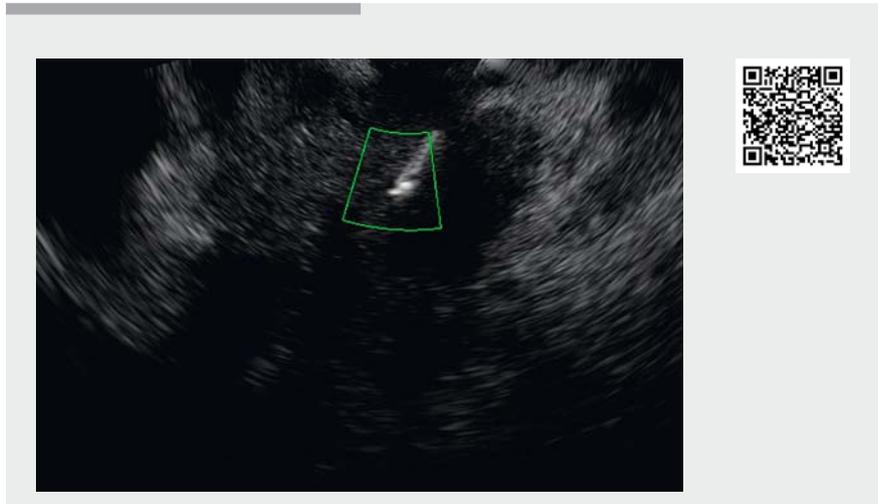
Diagnostic application of sound speed correction for endoscopic ultrasound-guided tissue acquisition of pancreatic mass

Endoscopic ultrasound-guided fine-needle aspiration (EUS-FNA) is a preferred option for acquiring samples from a solid pancreatic lesion [1, 2]. However, inadequate samples will cause a false-negative diagnosis [3]. It is thus imperative to acquire adequate tissue specimens to improve the accuracy of histological examination [4].

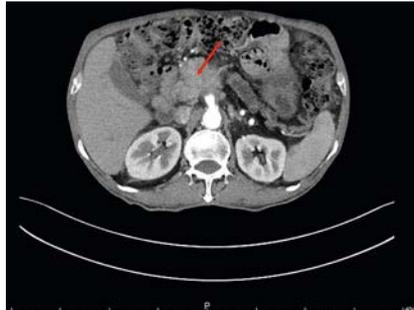
As a new ultrasound technique, sound speed correction can quantitatively measure the tissue hardness [5], and it has been applied to differentiate between healthy and diseased tissues. We therefore used sound speed correction to guide performing EUS-FNA (▶ **Video 1**).

A 77-year-old man who reported vague epigastric pain 3 months ago was transferred to our department. Computed tomography (CT) showed a solid lesion 5.1×3.7 cm in size in the pancreatic neck (▶ **Fig. 1**). The patient decided to undergo EUS-FNA of the pancreatic mass using sound speed correction to determine the character of the pancreatic lesion.

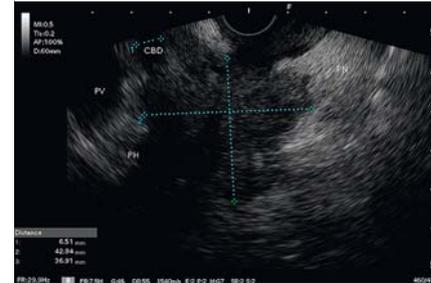
EUS (EG-580UT; Fujifilm Corp., Tokyo, Japan) confirmed a solid lesion 4.3×3.7 cm in size in the pancreatic neck (▶ **Fig. 2**). After completing the contrast-enhanced EUS and tissue elastography, we determined the optimal insertion region for FNA after measuring the hardness with the sound speed correction (▶ **Fig. 3**). Adequate tissue specimens were acquired after one pass with a 22G EUS fine needle (Boston Scientific, Marlborough, Massachusetts, USA) (▶ **Fig. 4**). The pathological examination found many atypical cells, and immunohistochemistry subsequently indicated the lesion was positive for carcinoembryonic antigen, carbohydrate antigen 19-9, mucoprotein 5AC, and Ki-67 (▶ **Fig. 5**). The solid pancreatic lesion was eventually established as pancreatic cancer.



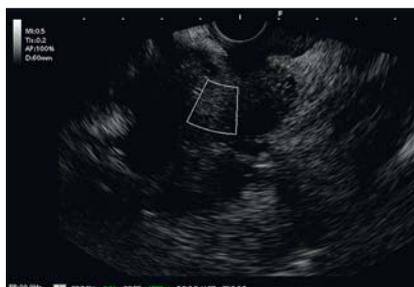
▶ **Video 1** Endoscopic ultrasound-guided fine-needle aspiration (EUS-FNA) of a solid pancreatic lesion using the sound speed correction technique.



▶ **Fig. 1** Computed tomography (CT) showed a space-occupying lesion in the pancreatic neck.



▶ **Fig. 2** Endoscopic ultrasound confirmed a solid lesion 4.3×3.7 cm in size in the pancreatic neck.

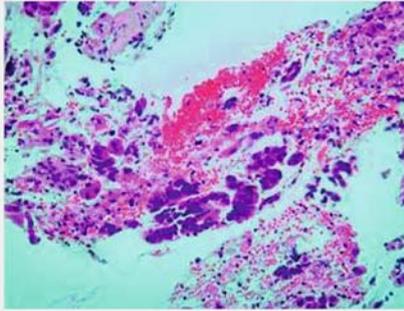


▶ **Fig. 3** The optimal location for fine-needle aspiration was determined with sound speed correction.

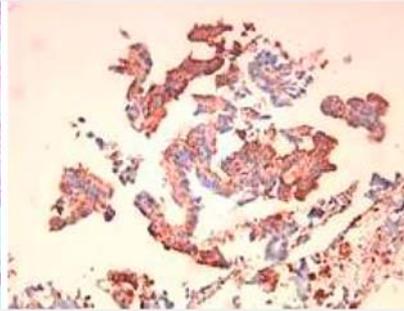


▶ **Fig. 4** Adequate tissue specimens were acquired after completing one pass.

pathological examination



immunohistochemistry



► **Fig. 5** The combination of the pathological examination of a hematoxylin and eosin slide and immunohistochemistry confirmed the diagnosis of pancreatic cancer.

After treatment with EUS-FNA with sound speed correction, the patient returned to the ward without adverse events and complications. The patient declined to receive further treatment after the diagnosis of pancreatic cancer was confirmed, and he was discharged from the hospital after 5 days. Generally, sound speed correction is a valuable option for improving the diagnostic accuracy of EUS-FNA because it can determine the optimal insertion location for fine needle aspiration.

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Competing interests

The authors declare that they have no conflict of interest.

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