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ABSTRACT
Two consecutive female patients presented with progressive jaundice, epigastric pain and weight loss. Cross-sectional imaging with computer tomography and magnetic resonance imaging did not show any mass lesions whereas magnetic resonance cholangiopancreatography showed common bile duct strictures. Both patients were then referred for endosonographic evaluation. Endoscopic ultrasound showed occult pancreatic head masses in both cases and endoscopic ultrasound guided fine needle aspiration confirmed the diagnosis of pancreatic cancer. Both patients then successfully underwent endoscopic palliation with endoscopic ultrasound guided celiac plexus neurolysis and insertion of self expandable metallic biliary stents. This case is reported to describe the diagnostic and therapeutic impact of endoscopic ultrasound in the management of occult pancreatic head cancer.

Endoscopic ultrasound is useful in the management of pancreatic cancer. It can detect occult pancreatic lesions, provide tissue diagnosis and facilitate pain palliation.

Key words: stricture, endosonography, jaundice, neurolysis, pancreatic cancer.

INTRODUCTION
In a patient presenting with the triad of cholestatic jaundice, abdominal pain and unexplained weight loss, the possibility of a pancreaticobiliary malignancy is a very important diagnostic consideration. Cross-sectional imaging techniques such as computer tomography (CT) and magnetic resonance imaging (MRI) with magnetic resonance cholangiopancreatography (MRCP) are the standard first line investigations. Recent years has seen the introduction of endoscopic ultrasound (EUS) into clinical practice in Southeast Asia. EUS has the potential to detect small lesions not visualized by cross-sectional imaging and can be used to obtain tissue diagnosis through EUS-guided fine needle aspiration (EUSFNA). EUS also has therapeutic applications such as EUS-guided celiac plexus neurolysis (EUSCPN) and EUS-guided biliary drainage.1 In this case report, we described two consecutive patients with obstructive jaundice due to occult pancreatic head cancers that were diagnosed by EUSFNA and discussed the diagnostic and therapeutic impact of EUS in pancreatic cancer management.

CASE ILLUSTRATION
Case 1
An 80-year old female presented with epigastric pain and weight loss over a 6-month period, and jaundice of 1-month duration. Physical examination revealed sclera icterus and epigastric tenderness. No abdominal mass or lymph nodes were palpable. The serum total bilirubin was 7.52 mg/dL (range: < 1.0), aspartate transaminase (AST) 218 U/L (range: < 32), alanine transaminase (ALT) 288 U/L (range: < 31), alkaline phosphatise (ALP) 703 U/L (range: 35 – 104) and CA19-9 2023 U/mL (range: < 37). MRI and MRCP were done. A mid common bile
duct (CBD) stricture was present and the proximal CBD was dilated to 12mm (Figure 1); however, no pancreatic masses were seen. Codeine phosphate was prescribed for pain control and endoscopic retrograde cholangiography (ERC) was performed (Figure 2) and a 10Fr 7.5 cm plastic biliary stent was inserted to drain the obstructed biliary system. She was referred for further evaluation and management by EUS. After removal of the CBD stent in order to avoid ultrasonic artefacts, EUS was performed using a linear echoendoscope (GF-UC140P-AL5, Olympus, Tokyo, Japan). EUS showed a hypoechoic pancreatic head lesion that measured 1.31 x 1.78 cm. EUSFNA (Figure 3) was performed under colour Doppler ultrasound guidance using a 22 gauge needle (Cook Endoscopy, Winston-Salem, NC, USA) and on-site cytopathological assessment confirmed the presence of malignant cells.

This was stage 1A disease (T1N0M0) and potentially resectable. However, she opted for endoscopic palliation rather than surgery on account of advanced age. Immediately after EUSFNA, EUS-guided CPN was performed by injecting a mixture comprising 4 ml of 0.5% bupivacaine and 16ml of absolute alcohol into the celiac plexus, followed by ERC and insertion of a 10 mm x 80 mm uncovered self expandable metallic biliary stent (SEMS) (Wallstent™ Endoprosthesis, Boston Scientific, Natick, MA, USA). (Figure 4, 5) There were no complications, and she was discharged the same day. A week later, the total bilirubin had decreased to 3.5 mg/dL, and pain had resolved.
Case 2

A 68-year-old female presented with worsening jaundice over 1 month, associated with abdominal pain and weight loss. She has underlying hypertension and hyperlipidemia, and during this period, was found to have newly diagnosed diabetes mellitus. Physical examination revealed deep jaundice and a palpable gallbladder. The total bilirubin level was 21.11 mg/dl, ALP 431 U/L, AST 183 U/L, ALT 59 U/L and CA19-9 >5000 U/ml. CT and MRI did not show any mass lesions, but MRCP showed a distal CBD stricture. The clinical course was also complicated by cholangitis. Fentanyl patch was required for pain relief. She was referred for EUS evaluation. EUS was performed using a linear echoendoscope and this showed a 2.88 x 2.72 cm heterogeneous pancreatic head mass with involvement of portal vein. EUSFNA confirmed the diagnosis of pancreatic head cancer. As this was stage 3 disease, she opted for endoscopic palliation. She underwent both EUS-guided CPN (Figure 6) and ERC with insertion of biliary SEMS (Wallstent™ Endoprosthesis, Boston Scientific, Natick, MA, USA) successfully in one setting with no complications. The jaundice improved and the pain was relieved.

DISCUSSION

The technical aspects of EUS may be briefly described as follows. An echoendoscope has an ultrasound transducer at its tip. This transducer converts electrical energy to mechanical energy, creating an ultrasonic wave that is transmitted to a target organ and then reflected back to the transducer and converted to an electrical signal that is used to generate a real time image of the organ. There are two basic types of echoendoscopes. A radial echoendoscope creates a cross-sectional image similar to CT. A linear echoendoscope scans longitudinally rather than circumferentially, and thus allows the path of an inserted needle tip to be traced real-time, facilitating the process of EUSFNA and other EUS-guided interventions. Both types of echoendoscopes may be used to evaluate the pancreas with a similar diagnostic yield, but the latter, although technically more difficult to learn, will allow EUSFNA to be performed at the same setting without a need to change echoendoscopes.

EUS is well suited to detect and assess the T stage for pancreatic cancer. The close proximity of the ultrasonic transducer to the pancreas from the duodenum and stomach allows very detailed examination of the pancreas. Published data have shown that EUS is superior to CT for detecting pancreatic lesions. For lesions less than 3 cm, EUS has a sensitivity of 99% compared to 55% for CT. In the detection of pancreatic lesions up to 1.5 cm, EUS was superior to helical CT, with detection rates of 100% versus 87%. EUS has also been shown to be more sensitive than MRI, with reported sensitivity of 93% vs. 67% for lesions smaller than 3 cm. Hence, it was not unexpected that in the 2 cases described, both CT and MRI had failed to detect the small pancreatic cancers. EUS is very useful for staging and assessing surgical resectability. EUS was compared with angiography and found to be significantly more sensitive (86% vs. 21%) in detecting vascular involvement. The additive effects of CT and EUS in predicting unresectability in pancreatic cancer has been assessed and it was found that tumour resectability was most accurately assessed in patients evaluated with both CT and EUS. A cost minimization analysis favoured a sequential strategy in which EUS was used as a confirmatory technique when helical CT suggested tumour resectability. Hence, as illustrated in our cases, cross-sectional imaging such as CT and MRI should still be performed first when pancreatic cancer is suspected, since these tests can also assess the presence of distant metastases. EUS should be performed if no lesions are obvious on CT or MRI, when there is a need to confirm surgical resectability and when tissue diagnosis is required. Tissue diagnosis is important to guide treatment strategies. Poor surgical candidates would require histological diagnosis prior to palliative chemotherapy. Even in patients who are surgical candidates, EUSNA is useful in distinguishing a primary pancreatic tumour from other etiologies such as lymphoma, metastasis and even benign disorders such as tuberculosis. EUSFNA of the pancreas is safe, with the main complication being pancreatitis, which can occur in 1% of cases; these usually occur in the context of EUSFNA of normal pancreas, rather than pancreatic.
tumour. To avoid bleeding, the platelet count and coagulation profile should be normal.

Apart from its diagnostic utility, EUS also has an important role in treatment. EUS-guided CPN can be used to provide effective pain palliation in pancreatic cancer patients, as described in the two cases. An early study demonstrated sustained improvement in pain score in 79–88% of patients treated with EUS-guided CPN. A subsequent study showed pain reduction in 78% of patients, and that patients who received adjuvant therapy along with CPN experienced further pain reduction. Recent years has also witnessed the introduction of the technique of EUS-guided CBD drainage as salvage therapy for failed ERC, as an alternative to percutaneous transhepatic biliary drainage. No doubt more data are required to establish definitively the therapeutic role of EUS-guided biliary drainage; however initial data are promising and this is an especially attractive option in patients with terminal pancreatic head cancer who do not want an external drainage device to impair their quality of life. There is also ongoing research concerning EUS-guided tumour ablation, but it remains experimental at this point in time.

CONCLUSION

EUS is a very useful tool in the management of pancreatic cancer. In a single setting, EUS can detect occult pancreatic lesions missed by cross-sectional imaging, provide tissue diagnosis and provide pain palliation.

REFERENCES