Autoimmune Pancreatitis Diagnosed with Core Biopsy Obtained from a Novel Fork-Tip EUS Needle

Tossapol Kerdsirichairat, MD,Sameer D. Saini, MD, Priscilla R. Chamberlain, MD, and Anoop Prabhu, MD

1Division of Gastroenterology, Department of Medicine, University of Michigan Health Systems, Ann Arbor, MI
2Department of Pathology, University of Michigan Health Systems, Ann Arbor, MI

ABSTRACT
The endoscopic diagnosis of autoimmune pancreatitis from histologic criteria remains challenging as it requires adequate architectural details rather than cytology alone. A 67-year-old man presented with progressive abdominal pain and weight loss. Cross-sectional imaging showed inflammatory changes of the pancreatic body and tail and periaortitis on abdominal computed tomography, but normal serum immunoglobulin G4. A mass-like lesion of the pancreatic body and tail was identified on endoscopic ultrasonography. A histologic diagnosis of autoimmune pancreatitis was accomplished through needle biopsy using a novel fork-tip needle.

INTRODUCTION
The endoscopic diagnosis of autoimmune pancreatitis (AIP) remains challenging, as the main diagnostic criteria is based on pathognomonic histology, requiring architectural changes compatible with AIP. Therefore, most cytologic specimens from fine-needle aspiration (FNA) are insufficient for diagnosis. Prior studies have shown modest performance of the 19-gauge or 22-gauge needle biopsy, with a sensitivity of 43–80% based on International Consensus Diagnostic Criteria.1,2 On the other hand, recent data reported that laparoscopic biopsy or percutaneous biopsy can provide better diagnostic yield (93%) compared to FNA guided by endoscopic ultrasonography (EUS) (72%).3 Laparoscopic and percutaneous approaches remain more morbid, however, compared to the relatively less invasive endoscopic approach.

Previous iterations of needles designed for specimen acquisition for histology include the EchoTip® (Cook Medical, Bloomington, IN), Trucut (QuickCoreTM, Wilson-Cook, Winston-Salem, NC), and EchoTip ProCore® (Cook Medical, Bloomington, IN) needles, for which data have shown limited diagnostic yield.1,4 More recently, the United States Food and Drug Administration approved the use of the SharkCoreTM needle (Medtronic, Boston, MA) as an option for EUS-guided fine-needle biopsy (FNB). A recent multi-center retrospective study showed a high diagnostic yield with minimal passes using this novel fork-tipped needle.5 A second retrospective study showed a comparatively higher diagnostic yield for this needle compared to a standard FNA needle.6 The role of this needle in the diagnosis of AIP has not been investigated.

CASE REPORT
A 67-year-old white man with a history of a hypertension and hyperlipidemia presented with a 2-month history of abdominal pain and an associated 5.4-kg weight loss. Physical exam revealed mild epigastric tenderness. Labs showed albumin 2.9 g/dL and mildly elevated alkaline phosphatase 273 IU/L. Serum lipase and amylase were within normal limits. Computed tomography (CT) of the abdomen showed thickening of the pancreatic body and tail and...
adjacent fat stranding, as well as retroperitoneal fibrosis and periaortitis compressing the middle left renal artery and bilateral urinary collecting systems (Figure 1). The differential diagnosis at that time included AIP, although the immunoglobulin G4 (IgG4) and serum carbohydrate antigen (CA) 19-9 were normal.

The patient was referred for EUS primarily to exclude underlying malignancy and to further evaluate the imaging findings. EUS was notable for a normal bile duct without wall-thickening as well as absence of pancreatic duct dilation or stricture. A hypoechoic focal mass-like lesion (3 x 3 cm) was present at the pancreatic body/tail region (Figure 2). FNB was performed using a SharkCore™ needle (Figure 3). Pathology showed marked lymphoplasmacytic infiltration with fibrosis and without granulocytic infiltration, storiform fibrosis, and abundant IgG4-positive cells per high-power field (HPF) without evidence of malignancy (Figure 4). On the basis of these histopathologic findings, the patient was diagnosed with AIP type 1 per International Consensus Diagnostic Criteria. Given the patient’s tolerance of his symptoms and discussion of the risks and benefits of immunosuppressive therapy, including corticosteroids, he opted to defer therapy for the time being.

DISCUSSION
Autoimmune pancreatitis is a distinct form of pancreatitis with a fibroinflammatory process diagnosed by lymphoplasmacytic infiltrate and fibrosis with an associated dramatic

Figure 1. Thickened pancreatic body and tail (circle) and adjacent fat stranding along with retroperitoneal fibrosis surrounding bilateral kidneys and causing hydronephrosis (arrowheads), and periaortitis (arrows).

Figure 2. A hypoechoic, focal mass-like lesion (3 x 3 cm) was present at the junction of the pancreatic body and tail (circle).

Figure 3. A fork-tip needle was used to perform fine-needle biopsy of the mass.

Figure 4. (A) Pathology at x10 magnification showed storiform fibrosis in the center (asterisk), marked lymphoplasmacytic infiltration (arrowhead), and a small area of pancreatic acini (arrow). (B) Pathology showed sclerotic tissue with abundant IgG4-positive cells.
improvement with corticosteroid treatment. The criteria was initially developed using five cardinal features of AIP including histology, imaging, serology, other organ involvement, and response to steroid therapy (HISORt). The typical histology and immunostaining reveal periductal lymphoplasmacytic sclerosing pancreatitis, storiform fibrosis, and oblitative phlebitis by lymphoplasmacytic infiltration with arteriolar sparing. With immunostaining, the lymphoplasmacytic cells are usually IgG4-positive.

The diagnostic criteria have been revised as the International Consensus Diagnostic Criteria (ICDC) for AIP. The ICDC criteria added three important requirements to fulfill the histologic criteria for AIP. These included emphasis on tissue acquisition from either core biopsy or resection, periductal lymphoplasmacytic infiltrate in the absence of granulocytic infiltration, and a cutoff of positive IgG4-positive cells of >10 cells/HPF. This highlights the importance of pathognomonic architecture rather than cytology, thus emphasizing the importance of core tissue specimens.

Similarly, AIP type 1 and type 2 have also been recently renamed to AIP and idiopathic duct-centric chronic pancreatitis, respectively. Typical imaging of AIP shows a diffuse sausage-like gland with delayed and sometimes rim-like enhancement. The serologic criterion is defined as an elevated serum IgG4 of double the upper limit of normal. Serum IgG4 should be interpreted with caution, however, as the sensitivity is approximately 60–80% with a positive predictive value of only 10%. Based on ICDC criteria, other organ involvement to support the diagnosis of AIP includes the presence of biliary strictures, pathognomonic histologic findings of other organs, or retroperitoneal fibrosis. The final criterion for both ICDC and HISORt is a dramatic radiographic response to steroids within 2 weeks.

**DISCLOSURES**

Author contributions: T. Kerdsirichairat and A. Prabhu acquired the data and wrote and revised the manuscript. SD Saini and PR Chamberlain acquired the data and revised the manuscript. T. Kerdsirichairat is the article guarantor.

Financial disclosure: None to report.

Informed consent was obtained for this case report.

Received July 2, 2016; Accepted September 23, 2016

**REFERENCES**

1. Iwashita T, Yasuda I, Doi S, et al. Use of samples from endoscopic ultrasound-guided 19-gauge fine-needle aspiration in diagnosis of autoimmune pancreatitis. *Clin Gastroenterol Hepatol*. 2012;10:316–22.
2. Kanno A, Ishida K, Hamada S, et al. Diagnosis of autoimmune pancreatitis by EUS-FNA by using a 22-gauge needle based on the International Consensus Diagnostic Criteria. *Gastrointest Endosc*. 2012;76:594–602.
3. Detlefsen S, Mortensen MB, Pless TK, et al. Laparoscopic and percutaneous core needle biopsy plays a central role for the diagnosis of autoimmune pancreatitis in a single-center study from Denmark. *Pancreas*. 2015;44:845–58.
4. Mizuno N, Bhatia V, Hosoda W, et al. Histological diagnosis of autoimmune pancreatitis using EUS-guided trucut biopsy: A comparison study with EUS-FNA. *J Gastroenterol*. 2009;44:742–50.
5. Dimaio CJ, Kolb JM, Benias PC, et al. Initial experience with a novel EUS-guided core biopsy needle (SharkCore): A North American multicenter study. *Gastrointest Endosc*. 2016;84(suppl AB):540–1.
6. Kandel P, Tranesh G, Nassar A, et al. EUS-guided fine needle biopsy sampling using a novel fork-tip needle: A case-control study. *Gastrointest Endosc*. 2016;84:1034–9.
7. Chari ST, Smyrk TC, Levy MJ, et al. Diagnosis of autoimmune pancreatitis: The Mayo Clinic experience. *Clin Gastroenterol Hepatol*. 2006;4:1010–6; quiz 934.
8. Shimosegawa T, Chari ST, Frulloni L, et al. International consensus diagnostic criteria for autoimmune pancreatitis: Guidelines of the International Association of Pancreatology. *Pancreas*. 2011;40:352–8.