Prospective Evaluation of the Accuracy of the Intraductal Secretin Stimulation Test in the Diagnosis of Chronic Pancreatitis

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Background & Aims: **The standard secretin stimulation test (SST) is the accepted gold standard for pancreatic function testing. The intraductal secretin stimulation test (IDST) performed at the time of endoscopic retrograde cholangiopancreatography (ERCP) has been proposed as a more feasible way to evaluate pancreatic function. The accuracy of the IDST for the diagnosis of chronic pancreatitis (CP) has not been well defined.** ***Methods:*** **We prospectively evaluated patients with suspected CP. The IDST, SST, and ERCP were performed in each of the 19 study patients. The SST and ERCP were used as independent diagnostic standards against which the results of the IDST were compared directly to determine the sensitivity, specificity, and accuracy of the IDST.** ***Results:*** **When the SST was used as a diagnostic standard for CP, the sensitivity of the IDST was 80% (95% confidence interval [CI], 44%–97%), the specificity was 22% (95% CI, 2%–60%), and the overall accuracy was 52% (95% CI, 28%–75%). The positive predictive value was 53% and the negative predictive value was 50%. When the pancreatogram was used as the diagnostic standard, the sensitivity of the IDST was 100% (95% CI, 69%–100%), the specificity was 55% (95% CI, 21%–86%), and the overall accuracy was 79% (95% CI, 54%–93%). Receiver operator curves showed that there was no optimal cut-off value for peak bicarbonate concentration that led to acceptable sensitivity and specificity.** ***Conclusions:*** **The IDST is not accurate for the diagnosis of CP.**

The diagnosis of chronic pancreatitis (CP) is based on the detection of abnormal structure or function of the diseased pancreas. The most accurate way to evaluate pancreatic function is the administration of a hormone stimulation test such as the secretin stimulation test. The reliability of the secretin stimulation test in detecting CP has been evaluated against histology in over 100 patients by Hayakawa et al.[1] In this study, the peak bicarbonate concentration of pancreatic secretion was the most accurate parameter for the diagnosis of CP.

Although the secretin stimulation test has been accepted to be the most sensitive and specific test to diagnose pancreatic exocrine insufficiency, it currently is not used widely.[2,3] The procedure is labor and time intensive and demands trained personnel and a designated laboratory. The passage of a large-size (26F) oroduodenal tube is required. The tube has to remain in place for more than 1 hour because the standard secretin stimulation test (SST) requires collection of pancreatic secretions for 60 minutes after injection with secretin.[4] During the insertion of the tube and during sample collection, sedation is not used because it may interfere with the test results.[3,5] The lack of sedation makes the performance of the SST uncomfortable for patients. The degree of discomfort is usually not great but occasionally a patient may not tolerate the test.

One proposed way to improve the feasibility of the SST is a shorter collection time. Some investigators have suggested a 10- to 15-minute collection of pancreatic secretions instead of the standard 60 minutes.[6,7] A shorter collection time certainly would make the secretin test easier to perform for both patients and personnel. Equally important, shorter collection times may allow an alternative method of collecting pancreatic secretions to the cumbersome standard oroduodenal tube. Indeed, intraductal placement of a catheter at the time of endoscopic retrograde cholangiopancreatography (ERCP), standard endoscopy, or transnasal passage of a small-caliber endoscope all have been used to collect pancreatic secretions after secretin stimulation.[6–9] From those methods the intraductal secretin test (IDST) performed at the time of ERCP had gained the most popularity in everyday practice and as a research tool.

Abbreviations used in this paper: CI, confidence interval; CP, chronic pancreatitis; ERCP, endoscopic retrograde cholangiopancreatography; IDST, intraductal secretin stimulation test; ROC, receiver operator curves; SST, standard secretin stimulation test.

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In some studies the IDST alone is used as a gold standard to diagnose CP.[6,10]

We recently found in a large patient population (633 patients) that the diagnostic accuracy of the first 15-minute duodenal collection obtained during a standard 60-minute secretin stimulation test for the diagnosis of CP to be only 57%.[11] These results, along with data from other investigators, suggest that the short 15-minute collection time used in the IDST may be inadequate to evaluate pancreatic function and diagnose CP.[8,11] We prospectively evaluated the accuracy of the IDST and SST for the diagnosis of CP.

Patients and Methods

Patients

The research protocol was approved by the institutional review board at the University of Florida. Patients in whom ERCP and SST had been ordered by the treating physician for the evaluation of suspected CP based on clinical presentation, as well as laboratory and radiologic tests, were considered for the study. If the patient did not meet any exclusion criteria (Table 1) he or she was asked to participate in the research protocol. Patients who signed the informed consent form were enrolled and the results are reported in this series. Twenty-three patients were enrolled between March of 1996 and July of 2002. For 2 years (July 1998–June 2000) no patients were enrolled because porcine secretin was not available and synthetic human secretin was not yet approved by the Food and Drug Administration. Patient demographics and the results of the SST, IDST, and ERCP were entered into a computer database prospectively.

Standard Secretin Stimulation Test Sample Collection Protocol

The SST was performed by placement of a Dreiling tube orally to the second portion of the duodenum. Fluoroscopy was used to guide the tube into position. The Dreiling tube has ports for simultaneous aspiration of gastric and duodenal contents. To decrease dilution of pancreatic secretions, 15 minutes of continuous aspiration of the stomach and duodenal contents was performed before intravenous secretin administration. Immediately after intravenous secretin bolus, duodenal juice was collected by continuous aspiration in 15-minute aliquots for a total of 60 minutes. Four samples (15, 30, 45, and 60 minutes) were collected and analyzed further.

Endoscopic Retrograde Cholangiopancreatography and Intraductal Secreting Stimulation Test Sample Collection Protocol

With the patient under conscious sedation using meperidine and midazolam, endoscopy was performed with side-viewing video duodenoscope (JF 130, TJF-130, or TJF-160; Olympus America, Inc., Melville, NY). The pancreatic duct was cannulated in a standard fashion by using a triple lumen catheter (Tandem; Microvasive Endoscopy, Boston Scientific Corp., Natick, MA). Glucagon was not used in any patient to avoid any interference with pancreatic exocrine function. The IDST was performed at the time of ERCP. Once deep cannulation of the main pancreatic duct was achieved an intravenous bolus of secretin was given. Pancreatic juice was collected via the wire port of the cannulating catheter in 5-minute aliquots for 15 minutes using a suction syringe. Three samples were collected (5, 10, and 15 minutes) and analyzed further. A pancreatogram then was obtained by using full-strength contrast.

Sample Processing Protocol and Endoscopic Retrograde Cholangiopancreatography Film Interpretation

During the collection process of pancreatic secretions by ether SST or IDST the samples were kept on ice. At the completion of the collection process the samples were analyzed immediately for bicarbonate concentration by back titration in our laboratory, which is located in our endoscopy suite. The pancreatic juice samples were kept on ice and promptly analyzed to avoid deterioration of the sample leading to falsely low bicarbonate concentrations. The highest concentration of bicarbonate among the 4 aliquots for the SST or among the 3 aliquots for the IDST was reported as the peak bicarbonate concentration, respectively. For the SST, a peak bicarbonate concentration of less than 80 mEq/L is diagnostic of chronic pancreatitis in our laboratory.[4]

All pancreatograms were read by 2 experienced pancreaticobiliary endoscopists (P.D. and C.F.) and graded from 0 to 4 according to the Cambridge classification of CP.[12] Any discrepancies were resolved after the films were reviewed by a third experienced endoscopist (A.F.). Pancreatogram changes graded as Cambridge class 0 and 1 were considered normal and classes 2, 3, and 4 were considered diagnostic of CP.

Results

Twenty-three patients were enrolled. Of those 23 patients, 19 patients (9 men, 10 women; mean age, 57 y; range, 21–82 y) successfully completed both the SST and IDST and the results are reported. For the remaining 4 patients, complete data were not available. One patient could not tolerate the passage of the Dreiling tube at the

Table 1. Exclusion Criteria

Age <18 y
History of pancreatic surgery
History of pancreatic cancer
Inability to cannulate pancreatic duct
Concurrent use of anticholinergic medications
Concurrent use of octreotide