PANCREATIC FUNCTION TESTS

Phillip P. Toskes, MD

Radiographic tests (CT, MRI, MRCP) generally are positive when 50% or more of the pancreas is damaged. They are quite useful in those with big duct disease.
Some investigators suggest that direct intubation function tests may be abnormal when 30% of the gland is damaged.
Relationship Between Pancreatic Exocrine Function and Histological Changes in Chronic Pancreatitis.
*T. Hayakawa et al.* Am J Gastroenterol, 1992;87:1170-74

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Histology</td>
<td>25/25 (100%)</td>
<td>83/83 (100%)</td>
</tr>
<tr>
<td>Secretin</td>
<td>24/25 (96%)</td>
<td>74/88 (89%)</td>
</tr>
<tr>
<td>ERCP</td>
<td>60% as accurate as secretin</td>
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Secretin Test at University of Florida
• Oroduodenal tube with gastric and duodenal ports placed fluoroscopically with only topical anesthesia (benzocaine spray and viscous lidocaine). When proper positioning has been accomplished both ports are placed to low constant suction. Constant vigilance is necessary to prevent clogging of the tubes. Basal gastric and duodenal pH and volume are measured for 15 min. Synthetic porcine or human secretin is infused at a dose of 0.2 mcg/kg over 1 hour. Volume, bicarbonate, and pH are assessed at 15 min intervals x4 by back titration.

Normal Secretin Test Values at UF:

Peak Bicarb (mEg/L) 80-130
Volume (mL/kg) 1.5-5.7
Total Bicarb output (mEg/hr) 10 – 37

* This is the most accurate test for small duct disease

S-MRCP

This test measures volume of pancreatic flow rather than bicarbonate concentration. MR images are obtained for 30 min which may be insufficient time for secretin stimulation. It can be predicted that the S-MRCP may detect big duct (severe) disease but be lacking for small duct disease.
Premise

- Volume on the SST should be similar to volume on S-MRCP

Hypothesis

- We can indirectly compare SST with S-MRCP by comparing volume on the SST to the gold standard peak bicarbonate on the SST.

Conclusions

- Volume does predict CP but poorly and very insensitive
- Bicarb output is a better predictor of PB than volume or vol/kg but is still insensitive
- You will miss a lot of CP patients especially those with no CT or structural changes using volume alone – and likely S-MRCP
- More studies are needed to look at sensitivity of S-MRCP for minimal change CP
  - Look at S-MRCP in early CP
  - Compare S-MRCP to SST
  - Compare diffusion weighted MRI to SST and S-MRCP
**Endoscopic Secretin Test (eSST)**
This is a modified version of the original secretin test with the main differences being the use of sedation in the eSST and the use of an endoscope to collect duodenal secretions. The SST and the eSST have only been directly compared in one small crossover study of healthy controls without any CP patients. Both the SST and the eSST received sedation. Again our previous work evaluating sedation on the SST and animal studies demonstrate a definite influence on the SST results. Our results with the SST indicates that a full 60 min stimulation is needed to obtain optimal sensitivity and specificity.

### Sensitivity and Specificity for CP

<table>
<thead>
<tr>
<th>TEST</th>
<th>Sensitivity</th>
<th>Sensitivity (Combined)</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Early</td>
<td>Late</td>
<td></td>
</tr>
<tr>
<td>SST</td>
<td>79%</td>
<td>97%</td>
<td>90%</td>
</tr>
<tr>
<td>ERCP</td>
<td>66%</td>
<td>93%</td>
<td>-----</td>
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<tr>
<td>S-MRCP</td>
<td>-----</td>
<td>92%</td>
<td>69%, 72%</td>
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<tr>
<td>MRCP</td>
<td>25%</td>
<td>75%</td>
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13C Breath Test

• New grant regarding 13C breath test (PBT) designed to detect early damage to the pancreas.
• Tracer dose of sodium 13C bicarbonate utilized to detect amount of bicarbonate released following pancreatic stimulation.
• A normal pancreas will release unlabeled bicarbonate, decreasing the ratio of 13C/12C exhaled carbon dioxide in contrast to a “sick pancreas”