

## Secretin-Stimulated MRCP

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### **Could you provide some background on the development of secretin-stimulated magnetic resonance cholangiopancreatography?**

When it was first introduced in 1991, magnetic resonance cholangiopancreatography (MRCP) was able to illustrate the dilated common bile duct in a way that was similar to what clinicians were accustomed to with ERCP. In the original publication on MRCP, it took approximately 6 minutes to obtain this image using MRCP. Over the next several years, the time required to obtain an image was shortened to 2–20 seconds. Also, the MRCP technique was further developed to be able to provide images of not only the normal common bile duct but also the pancreatic duct, which is significantly smaller, approximately 3 mm in diameter. Seeing small changes, such as minor strictures, however, was still problematic.

In 1995, a Japanese group described the technology of secretin-stimulated MRCP, and then in 1997, a Belgian group presented the first major paper making good use of this technology. Matos et al. from Belgium hypothesized that using secretin with MRCP would enhance the imaging of the pancreatic duct. The investigators performed a normal MRCP, then administered secretin and acquired an MRCP image every 30 seconds. Several findings were described. First, the imaging of the pancreatic duct was improved because the administration of secretin stimulated production of pancreatic fluid. These images provided better definition of the pancreatic duct. In addition, the investigators were able to know more definitively whether or not a stricture or stenosis was present, and if either were present, whether it was significant.

Later, it was hypothesized that quantifying the volume of the fluid secreted from the pancreas could provide a functional analysis of the exocrine pancreas in its response to secretin. In chronic pancreatitis, both, the endocrine function e.g. insulin production, and the exocrine function, e.g. bicarbonate secretion decrease. Over the last 5 years, studies have found that quantification of the fluid accumulation in the duodenum and proximal small bowel correlates very well with the degree of chronic pancreatitis.

In summary, secretin-stimulated MRCP provides better definition of the pancreatic duct, a better idea of whether stenoses are present and whether or not they are significant, and also an idea of the exocrine pancreatic function.

### **How is secretin-stimulated MRCP most commonly used?**

Secretin-stimulated MRCP is frequently used to examine the pancreatic ductal anatomy in order to detect whether a pancreas divisum is present (Figure 1). Evaluating a patient for pancreas divisum requires determining where the pancreatic duct enters into the duodenum. Often times, this location is very difficult to see, and secretin provides a significant advantage by better defining the prepapillary part of the pancreatic duct.

### **How does secretin-stimulated MRCP aid in diagnosis of pancreatic diseases?**

The diagnosis of chronic pancreatitis is difficult, particularly for early chronic pancreatitis; late-stage chronic pancreatitis is typically easy to diagnose with cross-sectional imaging. The gold standard for diagnosing early-stage chronic pancreatitis has been ERCP. However, this technique is quite invasive. Often times, when a patient complains of abdominal pain, a clinician might be reluctant to diagnose using ERCP, but wants to rule out chronic pancreatitis. In this situation, when the underlying cause of such pain is unknown but when the problem is likely to not be severe, secretin-stimulated MRCP is a good test to use.

### **Can secretin-stimulated MRCP be used for diagnosis and for evaluating treatment response?**

Yes. As an example, a patient with stenosis in the pancreatic duct may undergo an ERCP, with subsequent balloon dilatation and temporary stenting of the stenotic area. Secretin-stimulated MRCP can be performed as a follow up study which may serve as a provocation test that enables the radiologist to see whether the stenosis is still relevant or not.

### **What other uses of secretin-stimulated MRCP are being explored?**

Currently, researchers are using this imaging modality to examine the sphincter of Oddi and the papilla complex. However, these uses are still in investigational stages and are not yet supported by the literature.

### **Are there any disadvantages to using secretin-stimulated MRCP?**

A normal MRCP is a totally noninvasive procedure. Adding the secretin component changes this to an invasive approach because intravenous access is acquired. In clinical trials, secretin was observed to be associated with some side effects, such as abdominal pain and nausea; however, these were minor and can be easily monitored in patients undergoing MRCP. The main concern is that the incorporation of secretin changes a noninvasive procedure to an invasive one, and any use of a drug must be justified.

### **Can secretin stimulation be incorporated easily into MRCP as it is already performed?**

Yes. All new magnetic resonance scanners have the capability of adding secretin stimulation. This technique can be used anywhere; its use does not need to be reserved for major academic centers.

To conduct a secretin-stimulated MRCP, a patient enters the MR scanner for the baseline MR imaging. Secretin is then administered intravenously, and the patient is scanned for an additional 10 minutes. Again, this technique can be added to a standard MRCP without a high degree of learning.

Obtaining information such as that regarding whether a pancreas divisum is present with a minimally invasive test is very beneficial. Secretin-stimulated MRCP enables many questions to be answered in a way that is minimally invasive, that does not require sedation, and that takes a relatively short amount of time.

### **Suggested Reading**

Czako L, Takacs T, Morvay Z, Csernay L, Lonovics J. Diagnostic role of secretin-enhanced MRCP in patients with unsuccessful ERCP. *World J Gastroenterol.* 2004;10:3034-3038.

Punwani S, Gillams AR, Lees WR. Non-invasive quantification of pancreatic exocrine function using secretin-stimulated MRCP. *Eur Radiol.* 2003;13:273-276.

Mariani A, Curioni S, Zanello A, et al. Secretin MRCP and endoscopic pancreatic manometry in the evaluation of sphincter of Oddi function: a comparative pilot study in patients with idiopathic recurrent pancreatitis. *Gastrointest Endosc.* 2003;58:847-852.

Cappeliez O, Delhaye M, Deviere J, et al. Chronic pancreatitis: evaluation of pancreatic exocrine function with MR pancreatography after secretin stimulation. *Radiology* 2000;215:358-64.

Matos C, Metens T, Deviere J, et al. Pancreatic duct: morphologic and functional evaluation with dynamic MR pancreatography after secretin stimulation. *Radiology.* 1997;203:435-441.



MRCP image post secretin stimulation shows a pancreas divisum with the Santorini duct entering the duodenum (red arrow) superior to the distal common bile duct. Note also the filling of the duodenum with pancreatic secretions.