Magnetic Resonance Cholangiopancreatography

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<th>Section</th>
<th>Original Policy Date</th>
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Description

Magnetic resonance cholangiopancreatography (MRCP) is a noninvasive method for imaging the biliary and pancreatic ducts using magnetic resonance imaging. These techniques do not require intravenous contrast material and use specialized MRI sequences (i.e., heavily T2-weighted) to make the fluid in the ducts appear bright while the surrounding organs and tissues are suppressed and appear dark. Additional technical factors include fast imaging to reduce motion artifact and sufficient resolution to detect small ductal structures and pathology. When imaging pediatric subjects, a very small field of view and high pixel matrix provide better spatial resolution for small structures. Modifications of the MRCP protocol to include secretin infusion and functional evaluation have also been explored.

MRCP has been proposed as a noninvasive alternative to more invasive imaging procedures such as endoscopic retrograde cholangiopancreatography (ERCP), percutaneous cholangiography, or intravenous cholangiography (IVC). ERCP is an invasive procedure using a long specialized endoscope that can cannulate the biliary tree. This procedure is associated with a risk of complications such as pancreatitis, bleeding, bowel perforation, infection, and rarely death, and it requires anesthesia, which is also associated with potential complications. Percutaneous transhepatic cholangiography (PTC) is also invasive and requires placement of a needle through the liver into an intrahepatic duct. ERCP and PTC obtain diagnostic images by direct ductal injection of radiographic contrast, while IVC uses radiographic contrast that is injected into the bloodstream and later excreted into the bile ducts. ERCP or PTC may also be used to perform therapeutic interventions such as stent placement for obstruction, stone removal, or sphincterotomy. In addition, ERCP may not be technically successful in approximately 3% to 10% of cases, depending on operator skill and/or complex anatomy. Finally, MRCP is able to demonstrate the ducts beyond an obstructing lesion, whereas this may be difficult with ERCP or PTC.
MRCP may be performed on commercially available MR machines using commercially available software and gradient upgrade packages. These products have generally been cleared by FDA 510(k) procedures.

Policy

Magnetic resonance cholangiopancreatography (MRCP) may be considered medically necessary for diagnostic evaluation of the pancreaticobiliary system for the following:

- In patients with suspected biliary and/or pancreatic ductal abnormalities, following incomplete or failed ERCP, or when ERCP cannot be safely performed (for example, a significant allergy to iodinated contrast material which would complicate performance of an ERCP)
- When ERCP is precluded by anatomic considerations, such as a biliary-enteric surgical anastomosis (for example, from previous choledochojejunostomy and partial gastrectomy with Billroth II anastomosis)
- To evaluate patients with biliary tract dilatation, biochemical evidence of biliary obstruction and/or unexplained RUQ pain, including detection of choledocholithiasis, benign stricture, mass lesion (benign or malignant), fistula and other pathologic processes
- Status post cholecystectomy and high clinical suspicion for choledocholithiasis
- Following pancreatic ductal trauma, when ERCP is contraindicated, to assess ductal integrity and pseudocyst formation
- In recurrent acute pancreatitis of unknown etiology, to identify possible causes such as congenitally aberrant ductal anatomy (for example, Choledochal Cyst, Pancreas Divisum and Annular Pancreas)
- Primary Sclerosing Cholangitis

Policy Guidelines

There is no CPT code that specifically describes MRCP. The nonspecific CPT code 74181 (magnetic resonance imaging, abdomen, without contrast material) would likely be used if MRCP was performed in isolation, for example to look for bile duct stones. However, frequently, MRCP may be followed by imaging of adjacent anatomy, for example, if cancer was suspected. In this instance, CPT code 74183 would likely be used (magnetic resonance imaging, abdomen, without contrast material, followed by contrast materials and further sequences).
Rationale

Evaluation of the Bile Ducts

A meta-analysis including 67 primary studies (1) and a systematic review of ERCP conducted by TEC as an Evidence-based Practice Center (EPC) of the Agency for Healthcare Research and Quality (AHRQ) (2) both report that MRCP has high sensitivity and specificity in evaluating common biliary diseases. The meta-analysis reported that MRCP was 97% sensitive (95% confidence interval [CI]: 91–99%) and 98% specific (95% CI: 91–99%) for defining the presence of biliary tract obstruction. Sensitivity and specificity were both 98% for defining the level of obstruction. (1)

However, MRCP performance was slightly lower for detection of stones (i.e., choledocholithiasis) with 92% sensitivity (95% CI: 80–97%) and 97% specificity (95% CI: 90–99%). Similar results were reported by the systematic review, which found that MRCP has sensitivity and specificity greater than 90% for detection of biliary stones. (2)

The diagnostic performance of MRCP is somewhat lower for detection of malignancy with 88% sensitivity (95% CI: 70–96%) and 95% specificity (95% CI: 82–99%). (1) Results included in the systematic review were consistent with these findings. The meta-analysis also explores the relationship between pretest probability of malignancy and post-test probability given the results of MRCP. This analysis “demonstrates that if the pretest suspicion of malignancy is high, a negative MRCP image does not sufficiently exclude that diagnosis.” (1)

Congenital variants in biliary ductal anatomy may be demonstrated on MRCP as well with one series of 171 subjects reporting 86% sensitivity and 100% specificity for detection of variant cystic duct insertion. (3, 4)

Diagnosis of biliary disorders such as sclerosing cholangitis may be difficult on MRCP because of its relatively low spatial resolution and because the morphologic changes of this disorder may be subtle; however, one study reported that MRCP detected the disease with 85%–88% sensitivity and 92%–97% specificity. (3, 5, 6)

Evaluation of the Pancreatic Ducts

The main pancreatic duct is normally less than 3 mm in diameter and becomes narrower near the pancreatic tail. Thus, visualization of the entire pancreatic duct can be technically challenging for MRCP. Visualization of the normal main pancreatic duct on MRCP is reportedly greater than 80%, with even greater sensitivity (97%) in portions located in the pancreatic head and body. (7) The smaller pancreatic tributaries that feed into the main duct are not generally seen on MRCP due to relatively lower spatial resolution compared with ERCP. The sensitivity of MRCP for detecting pancreas divisum is reportedly quite high with estimates of 100%. (7)
The diagnostic performance of MRCP for evaluating patients with chronic pancreatitis showed relatively high specificity (>94%) in defining main duct dilatation and narrowing as well as ductal filling defects. However, MRCP may be less sensitive than ERCP in detecting these abnormalities. (3, 5)

2005 Update

A literature search, performed for the period of 2003 through March 2005 did not identify any published literature that would prompt reconsideration of the policy statement, which remains unchanged.

References:


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<td>HCPCS</td>
<td>S8037</td>
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