

Pitfalls of MRCP

Linda Pantongrag-Brown, M.D.

MR cholangiopancreatography (MRCP) is widely used in the evaluation of pancreatobiliary disorders. As with all MRI techniques, there are pitfalls that may lead to incorrect interpretation⁽¹⁾. This article is summarized common pitfalls of MRCP, emphasizing at biliary system, that need to be aware in order to avoid the misinterpretation. Pitfalls are divided into 2 categories; false-positive and false-negative pitfalls.

False-positive pitfalls

Common false-positive pitfalls are as following;

1. Air bubble within bile duct may cause filling defect that mimics stone (Figure 1A). This pitfall can usually be recognized by noting that air rises to the nondependent part of the duct and exhibits susceptibility artifact on gradient echo images (Figure 1B)⁽²⁾.
2. Blood clot within bile duct may cause filling defect that mimic stone (Figure 2). Blood clot should

be considered if there is a history of biliary intervention or instrumentation. Also, blood clot shows irregular, geographic morphology, in contrast to the round-shaped morphology of stone. If is considered blood clot, follow-up study should reveal decreased size or disappearance of the filling defect.

3. Surgical clips may cause susceptibility artifact that mimics stenosis of bile ducts⁽³⁾ (Figure 3). Susceptibility artifact worsens as the TE increases with gradient echo images. Therefore, comparing in-phase and opposed-phase images may be helpful when surgical clips are suspected.

4. A crossing right hepatic artery (RHA) may compress the bile duct, creating an impression that mimics stone on thick-slab images or MIP reconstructions⁽⁴⁾ (Figure 4). The nature of this extrinsic compression should be evident on thin section images obtained through the duct.

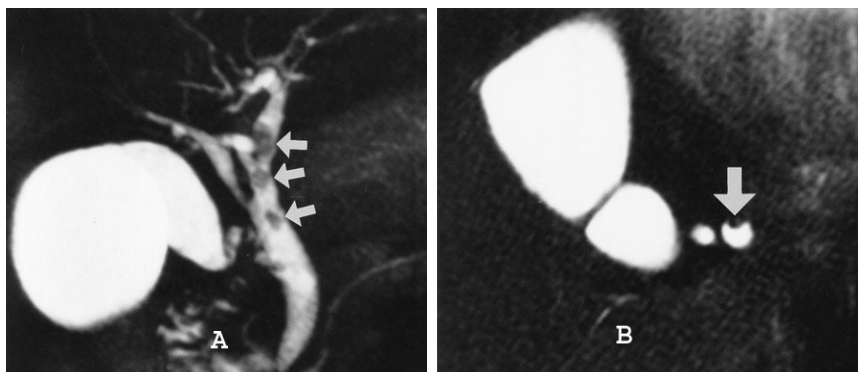


Figure 1 Air bubbles mimics stones.

- A Coronal MRCP shows multiple filling defects within the common hepatic ducts (arrows), suspicious of stones.
- B Axial MRCP reveals a defect rising to the nondependent part (arrow), indicating that a defect is actually a pneumobilia.



Figure 2 Blood clot mimics stones. A filling defect within the CBD (arrow) shows irregular morphology. Given a history of prior endoscopic stone removal, one should raise the possibility of a blood clot.

5. Bile flow artifact may mimic stone (Figure 5). On axial thin section HASTE sequences, it is common to see a small signal void centered in the CBD, secondary to bile flow. MR sequences that are not sensitive to flow artifact, such as true FISP or balanced FFE, should reveal the true nature of this artifact.

False-negative pitfalls

Common false-negative pitfalls or missed lesions are as following;

1. Thick-slab images or MIP reconstructions may obscure stones that are of lower signal intensity than bile (Figure 6). Reviewing source images should be routinely performed to look for stones that may be obscured by MIP or thick-slab images due to partial volume effect⁽⁵⁾.

2. Fluid filled duodenum, stomach or gallblad-

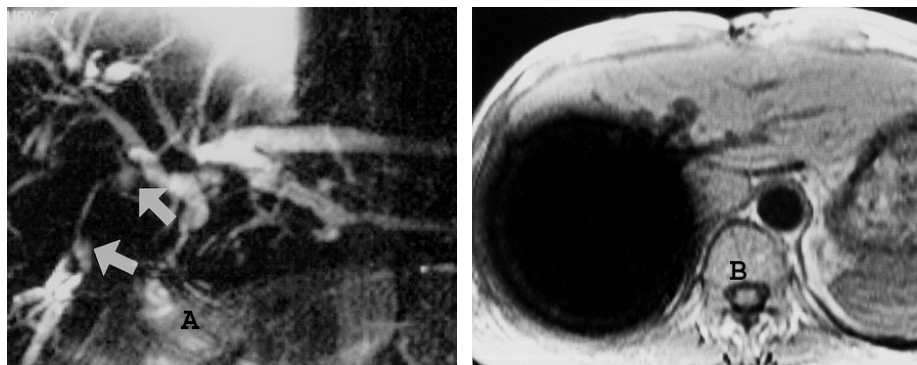


Figure 3 Surgical clips cause pseudostenosis. Coronal MRCP (A) shows long segment pseudostenosis of right posterior hepatic duct (arrows), caused by susceptibility artifact from surgical clips, as shown in axial gradient echo image (B).

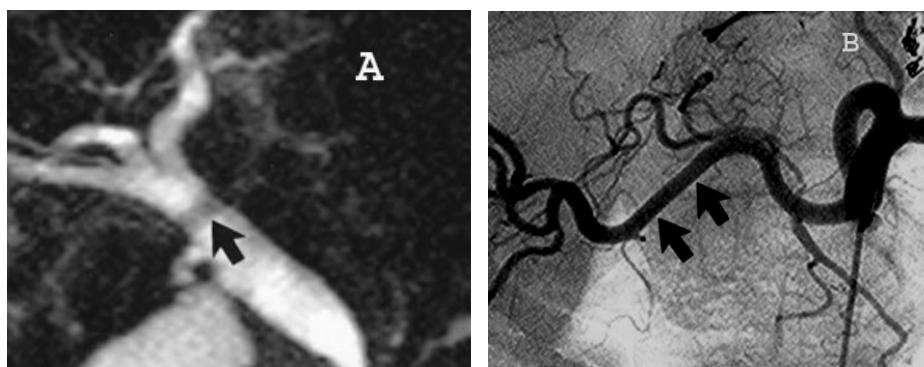


Figure 4 A crossing right hepatic artery causing pseudolesion. Coronal MRCP (A) shows a band of filling defect (arrow) caused by external compression from crossing right hepatic artery (arrows, B).

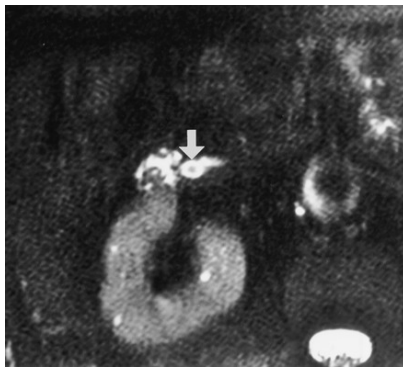


Figure 5 Bile flow artifact mimics CBD stone (arrow) at thin axial image using HASTE sequence. HASTE is sensitive to flow artifact and should be analyzed with caution.

der may obscure lesions. Fluid-filled organs appear bright on MRCP images and, therefore, could obscure lesions that are of lower signal intensity. Acquiring thinner slabs or multiple oblique views may overcome this problem. Negative oral contrast agent may also be helpful. Patient should be advised to be kept NPO for at least 3 hours prior to the study, in order to decrease the amount of fluid within the duodenum.

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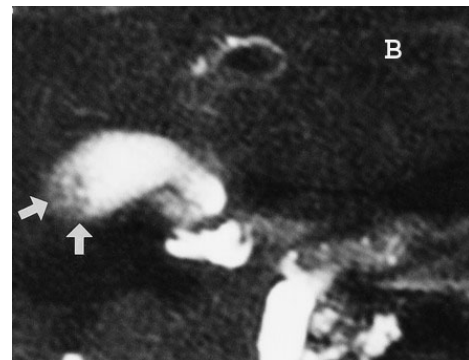


Figure 6 Bright signal intensity of fluid may obscure stones in a MIP reconstruction or thick-slab images because of partial volume effect. Coronal MIP reconstruction (A) does not reveal any gallstone, secondary to partial volume effect. However, at coronal source image (B), multiple gallstones are obvious (arrows).

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