

DIAGNOSTIC ACCURACY OF ACUTE CHOLECYSTITIS USING MRCP AND CLINICAL RELEVANCE.

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Target Audience: Clinical abdominal and emergency radiologists are the primary targets that would benefit from the data presented in this abstract.

Purpose: Ultrasound remains the primary imaging modality for suspected acute cholecystitis; however, there has consistently been a broad range of reported diagnostic sensitivity and specificity throughout the literature (1). HIDA scans have proved to have the highest sensitivity and specificity in regards to diagnosis of acute cholecystitis; however, there are multiple logistical and clinical limitations in regards to acquiring this examination. There is limited literature regarding the diagnostic accuracy of MRCP in the setting of acute cholecystitis (1). The published data suggests that the accuracy is similar to ultrasound but with less variation (1). In addition to evaluating the gallbladder, MR imaging provides the ability to evaluate for alternative pathology and does not expose the patient to ionizing radiation (1). We aimed to determine our institutional diagnostic accuracy of diagnosis of acute cholecystitis using MRCP and to determine the sensitivity and specificity of the imaging findings.

Methods and Materials: A retrospective review was performed identifying patients with a discharge diagnosis of acute cholecystitis or those having received an MRCP from 1/1/2005 - 12/31/2011. Patients without MR imaging during the acute visit were excluded. 282 patients with 296 MRIs have been included. Clinical information, discharge diagnoses, and surgical procedures were recorded. MRCP images were reviewed, independently and blindly, by two abdominal imaging fellowship trained radiologists. The studies were evaluated for the following predetermined imaging findings of acute cholecystitis: overdistention (greater to or equal to 5 cm in AP dimension and 10 cm in longitudinal dimension), wall thickening greater than 3mm, abnormal T2 hyperintensity corresponding to mural inflammation, mural stratification on T2W imaging, pericholecystic and perihepatic fluid, gallstones, hyperenhancement of the gallbladder mucosa (if contrast given), or transient enhancement in the pericholecystic liver parenchyma (if contrast given) (2,3). In addition, the radiologists were asked to conclude whether or not there was acute cholecystitis. Pathology reports and/or discharge diagnosis were used as the reference standards. Sensitivity and specificity, as well as positive and negative predictive values (PPV, NPV, respectively) were calculated for each imaging finding, as well as for the overall diagnosis.

Results: The sensitivity, specificity, PPV, and NPV for the overall diagnosis of acute cholecystitis: was 26%, 97%, 91%, and 52%, respectively. The individual imaging findings that were evaluated had the following sensitivity, specificity, PPV, and NPV: overdistention 31%, 81%, 66%, 49%; wall thickening 37%, 71%, 62%, 48%; mural inflammation 19%, 89%, 68%, 47%; mural stratification 12%, 96%, 79%, 47%; pericholecystic fluid/stranding 34%, 77%, 64%, 49%; gallstones 91%, 43%, 66%, 80%; gallbladder mucosal hyperenhancement 4%, 97%, 63%, 45%; and hyperenhancement of pericholecystic liver parenchyma 22%, 96%, 88%, 70%.

Discussion: MRCP is very specific for the diagnosis of acute cholecystitis. A number of imaging findings had excellent specificity, including mural stratification, gallbladder mucosal hyperenhancement, and hyperenhancement of pericholecystic liver parenchyma. The insensitivity of MRCP for diagnosis of acute cholecystitis, as demonstrated by our results, suggests use of this modality as a problem solving tool when results are limited or equivocal on US examination and that additional imaging may be needed.

Conclusions: Due to the insensitivity of diagnosis of acute cholecystitis using MRCP, alternate imaging approaches are suggested particularly those involving functional imaging. Traditionally, functional imaging for the assessment of cholecystitis has employed HIDA scans; however, there are multiple limitations to this examination. An alternative option includes the use of hepatobiliary contrast agents to perform functional imaging using MR, an area which deserves ongoing inquiry (4).

References:

1. Kiewiet J., Leeuwenburgh M., Bossuyt P., et al. A Systematic Review and Meta-Analysis of Diagnostic Performance of Imaging in Acute Cholecystitis. *Radiology*. 2012; 264(3):708-720.
2. Tonolini M., Ravelli A., Villa C., et al. Urgent MRI with MR cholangiopancreatography (MRCP) of acute cholecystitis and related complications: diagnostic role and spectrum of imaging findings. *Emergency Radiology*. 2012;19:341-348.
3. Watanabe Y., Nagayama M., Okumura A., et al. MR Imaging of Acute Biliary Disorders. *Radiographics*. 2007; 27:477-495.
4. Akpınar E., Turkbey B., Karcaaltincaba M., et al. Initial Experience on Utility of Gadobenate Dimeglumine (Gd-BOPTA) Enhanced T1-Weighted MR Cholangiography in Diagnosis of Acute Cholecystitis. *Journal of Magnetic Resonance Imaging*. 2009; 30:578-585.