

ACUTE CHOLANGITIS

Spectrum of MR imaging findings

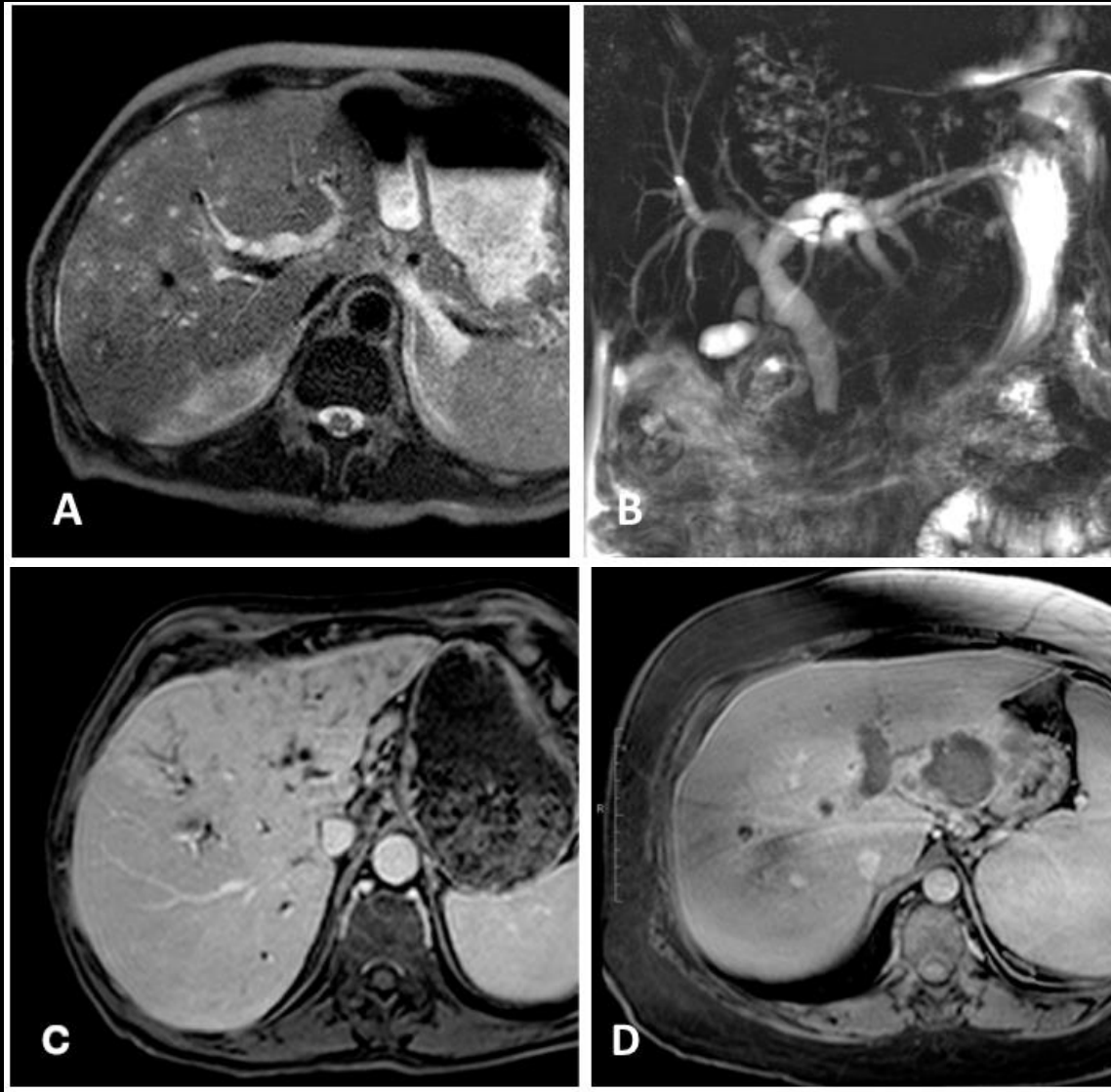
Nunes, PHT¹ M.D.; Jorge Elias¹ Jr M.D., PH.D.; Solis, DAE¹ M.D.; Noguerol, EC¹ M.D.; Santos, JS² M.D., PH.D.; Kemp, R² M.D., PH.D.; Valdair F Muglia¹ M.D., PH.D.

1- Department of Internal Medicine – Imaging Division

2- Department of Surgery – Proctology Division

Ribeirao Preto School of Medicine – University of Sao Paulo Brazil





A: Irregularity of biliary tree with periportal high signal T2 in patient with moderate acute cholangitis. B: multiple cystic formations on the liver left lobe, some of them communicating with the biliary tree, compatible with cholangiolitic microabscess. C: Mild cholangitis showing biliary dilatation with periportal heterogeneous enhancement on post-contrast images. D: cholangitis complicated with left lobe hepatic abscess and pyelophlebitis. Note the portal vein parietal enhancement.

LEARNING OBJECTIVES

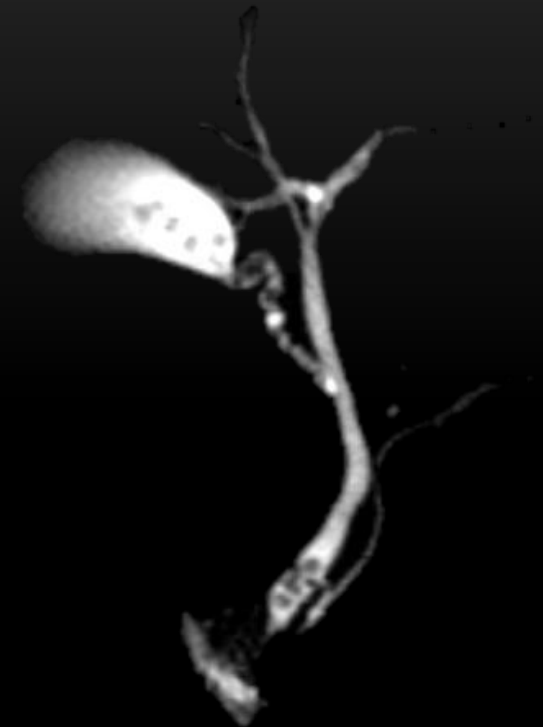
- Illustrate the salient MR imaging findings of acute cholangitis
- Highlight the main underlying conditions
- Provide examples of MR cases with different severity

BACKGROUND

- Acute cholangitis is a common medical emergency, related to acute inflammation and infection of the bile duct.
- It usually results from mechanical obstruction of the biliary tract

BACKGROUND

- It usually results from mechanical obstruction of the biliary tract
 - Gallstones
 - Tumors
 - Stenosis



BACKGROUND

- Clinical manifestations are variable and often non-specific, as are the laboratory markers
- Classical description by Charcot:
 - Fever
 - Jaundice
 - Right upper quadrant pain

BACKGROUND

- Though the Charcot triad have a 90% specificity, it is present only in 18,5% of the cases
- With this in mind, the Tokyo Guidelines were established in 2007 to standardize the diagnosis, severity and treatment

TG18 diagnostic criteria for acute cholangitis

A. Systemic inflammation

	A-1. Fever and/or shaking chills
	A-2. Laboratory data: evidence of inflammatory response

B. Cholestasis

	B-1. Jaundice
	B-2. Laboratory data: abnormal liver function tests

C. Imaging

	C-1. Biliary dilatation
	C-2. Evidence of the etiology on imaging (stricture, stone, stent etc.)

Suspected diagnosis: one item in A + one item in either B or C

Definite diagnosis: one item in A, one item in B and one item in C

Adapted from J Hepatobiliary Pancreat Sci (2018)

BACKGROUND

- Though the presence of mechanical obstruction and dilation of biliary tree already fulfils the imaging criteria for the diagnosis, it is important to recognize the imaging findings related to the inflammatory process itself and the most common causes of the obstruction

BACKGROUND

- The severity assessment on acute cholangitis helps predict prognosis and determine the treatment strategy

TG18 severity assessment for acute cholangitis

Grade III – severe – organ/system dysfunction

Cardiovascular dysfunction: hypotension requiring dopamine or norepinephrine Neurological dysfunction: disturbance of consciousness Respiratory dysfunction: PaO ₂ /FiO ₂ ratio <300 Renal dysfunction: oliguria, serum creatinine >2.0 mg/dl Hepatic dysfunction: PT-INR >1.5 Hematological dysfunction: platelet count <100,000/mm ³
--

Grade II - moderate

Abnormal WBC count (>12,000/mm ³ , <4,000/mm ³) High fever (≥39°C) Age (≥75 years old) Hyperbilirubinemia (total bilirubin ≥5 mg/dl) Hypoalbuminemia (<STD ^a x0.7)
--

Grade I - mild

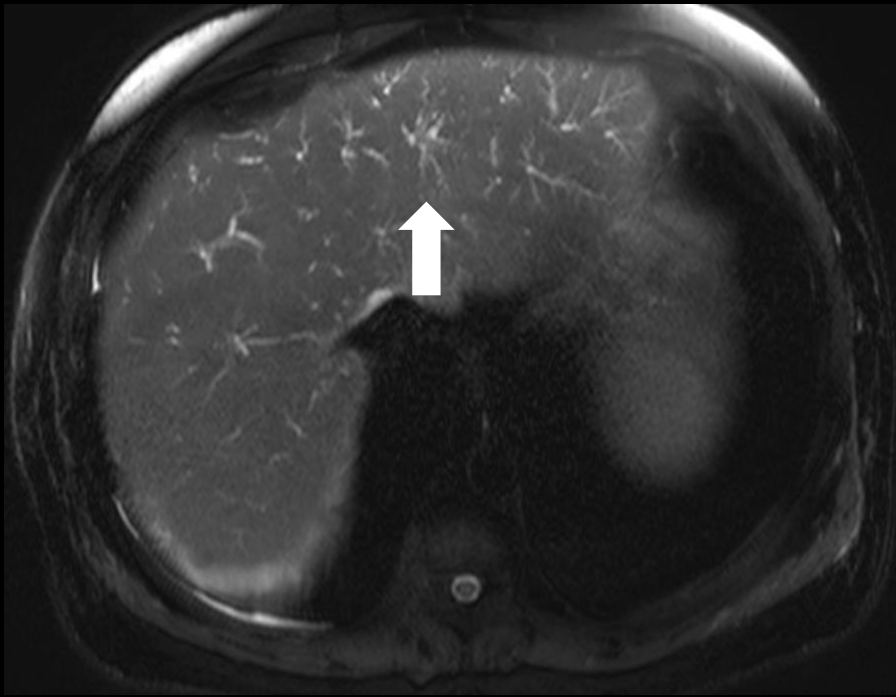
Does not meet criteria for Grade II or III at initial diagnosis

IMAGING FINDINGS

- The imaging findings related to acute cholangitis can be categorized as:
 - Dilatation of the biliary tract
 - Obstruction of the biliary tract: Calculus, tumors, stenosis, others
 - Inflammatory findings: Periportal edema, transient periductal signal, ragged duct.
 - Complications: Abscess, ascites, portal vein thrombosis

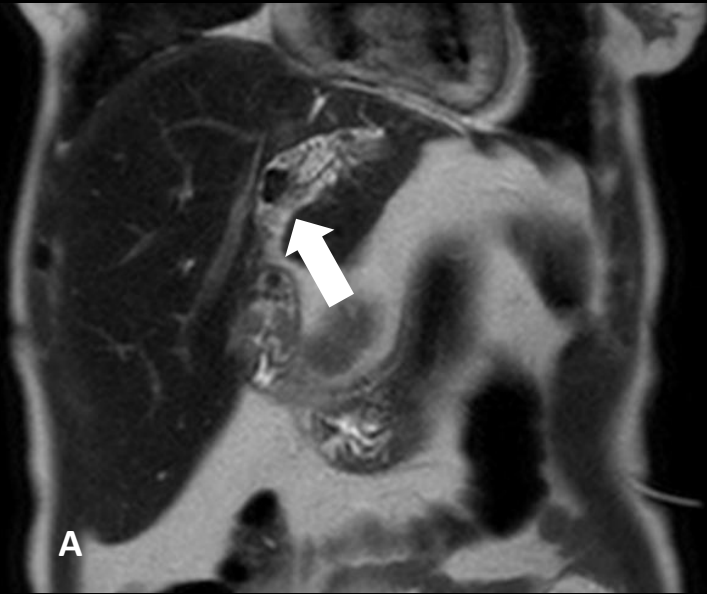
IMAGING FINDINGS

- Dilatation of biliary tract

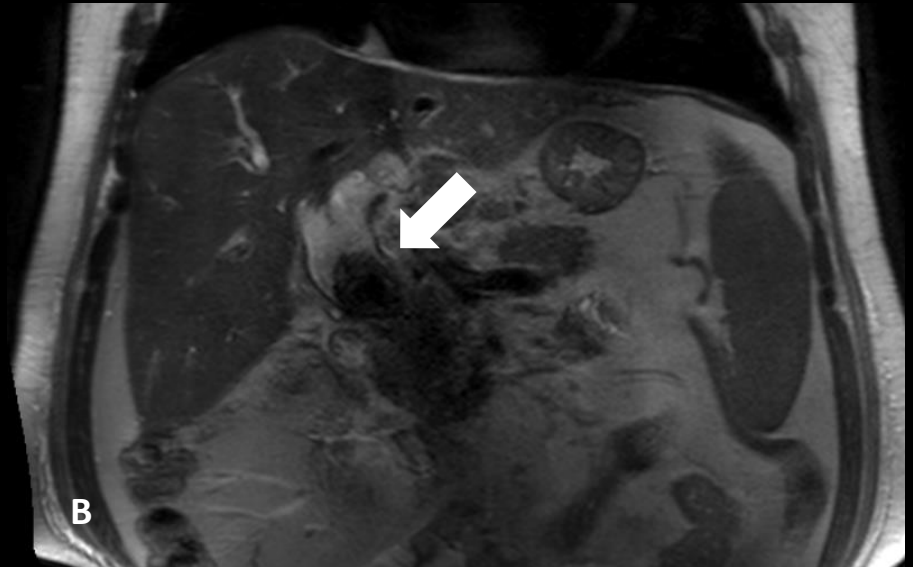


IMAGING FINDINGS

- Obstruction of biliary tract: Calculi



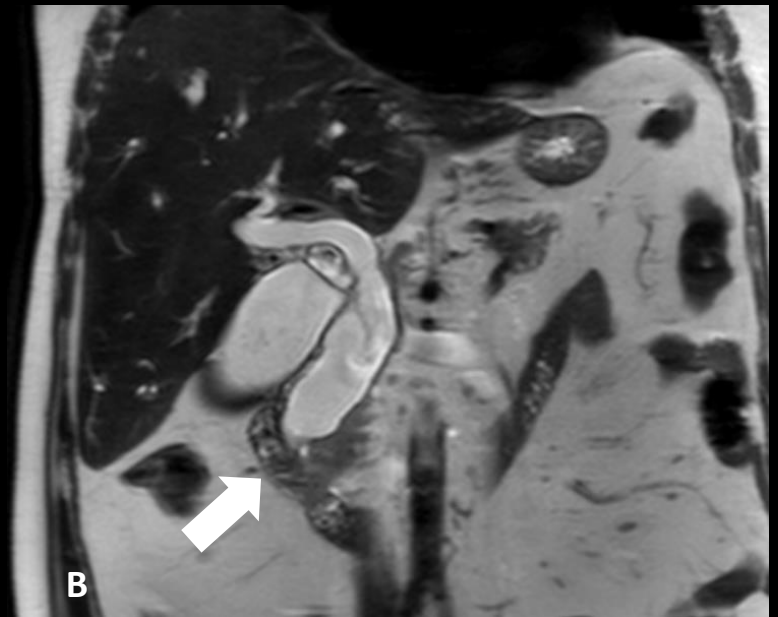
A: elderly patient with intra-hepatic calculi



B: choledochal stone

IMAGING FINDINGS

- Obstruction of biliary tract: Tumor



Tumors complicated with acute cholangitis: intra-hepatic cholangiocarcinoma mass (A) and small periampullary carcinoma (B)

IMAGING FINDINGS

- Obstruction of biliary tract: Stenosis



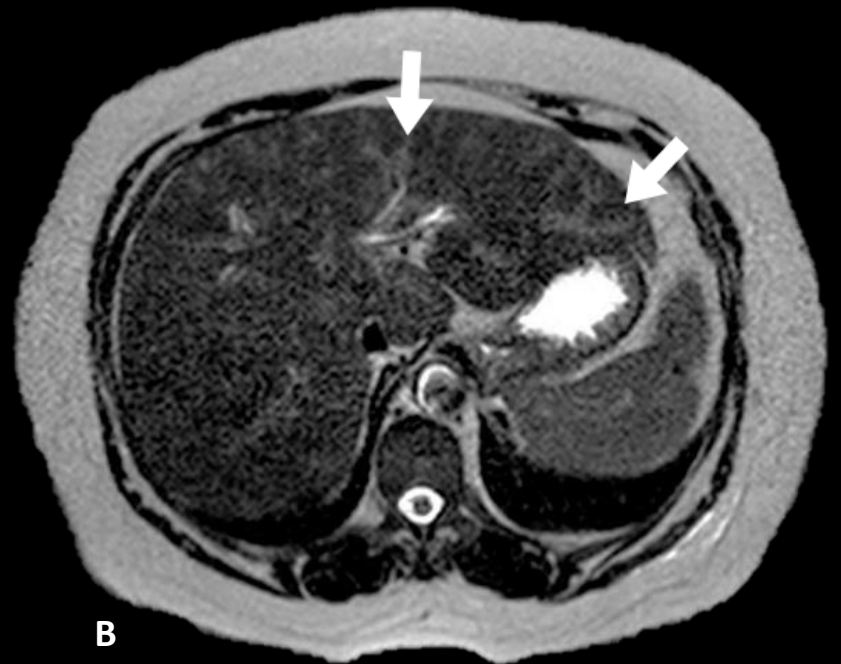
Severe acute cholangitis in middle age patient with choledochal stenosis.

IMAGING FINDINGS

- Inflammatory findings: Periductal edema



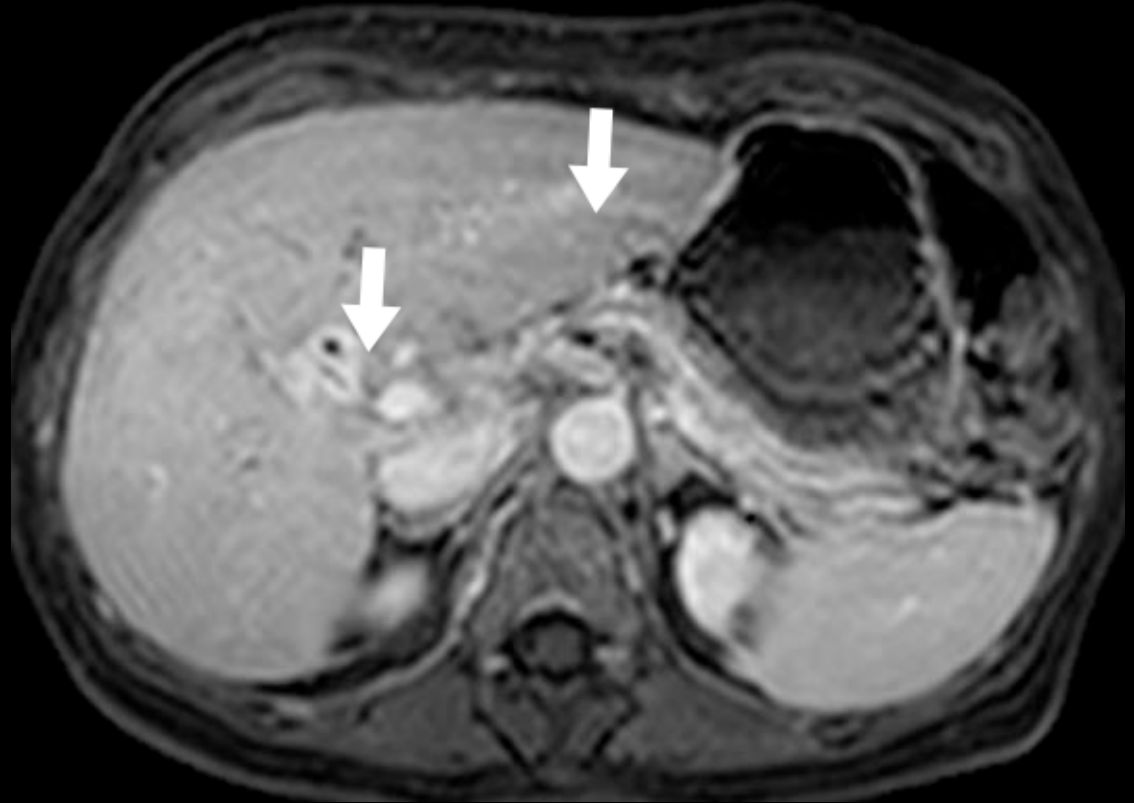
A: Middle age patient with moderate cholangitis in elderly



B: Severe cholangitis in elderly

IMAGING FINDINGS

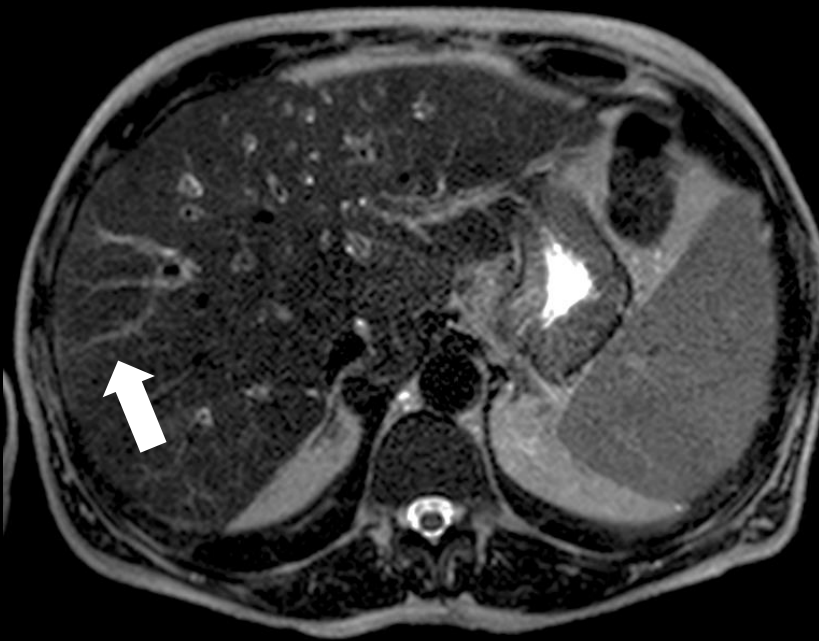
- Inflammatory findings:
transient
periductal signal



Mild cholangitis in middle age patient

IMAGING FINDINGS

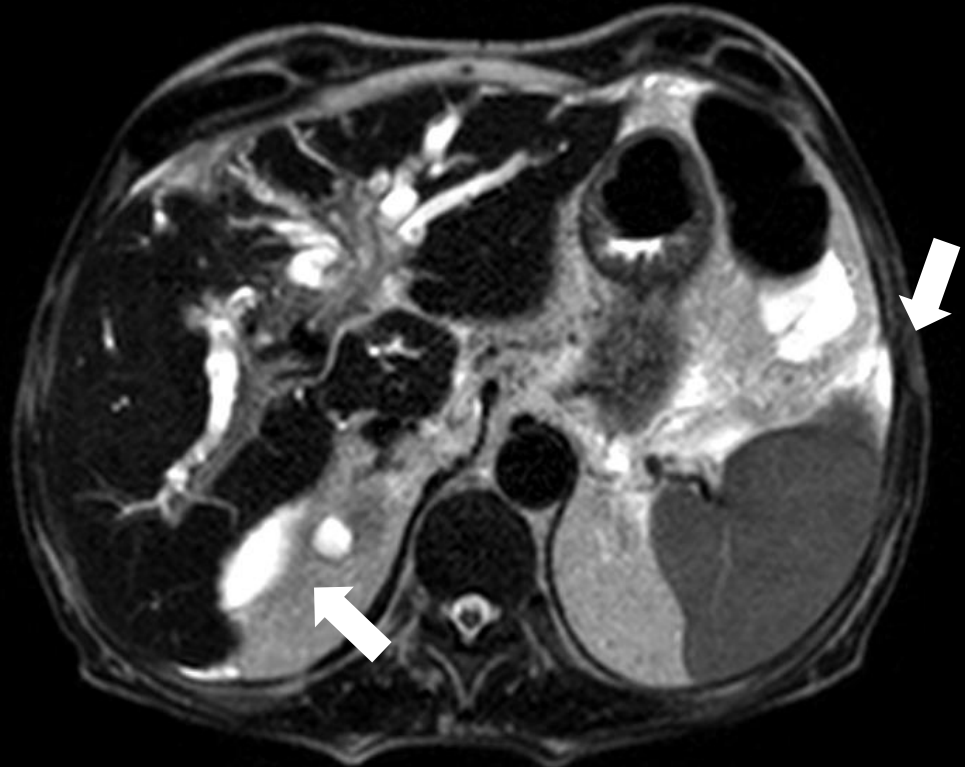
- Inflammatory findings: Ragged duct



Moderate acute cholangitis in two different patients. Note the irregularity and uneven surface of some biliary ductal segments

IMAGING FINDINGS

- Complications: Ascites



Acute cholangitis in elderly patient complicated with ascites. Severity assessed as moderate.

IMAGING FINDINGS

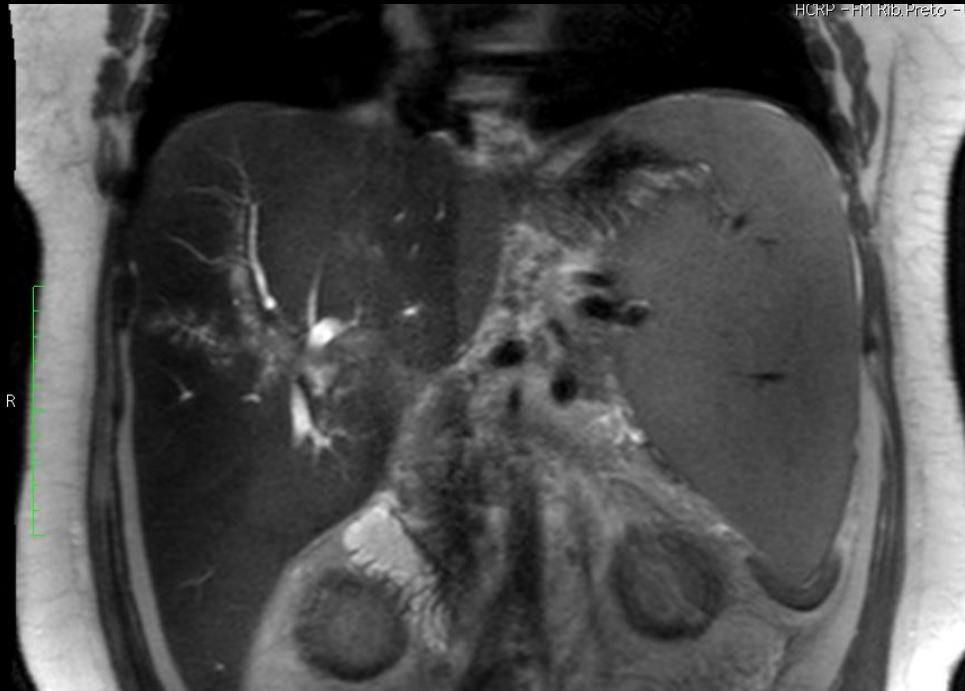
- Complications: Microabscess



Elderly patient with moderate cholangitis. A: multiple T2 high signal foci with obscured margins. B: T1 post contrast shows small collections with enhanced walls.

IMAGING FINDINGS

- Complications: portal vein thrombosis



Middle age patient with moderate cholangitis complicated with pylephlebitis

CONCLUSION

- Acute cholangitis is an important condition with the potential for significant morbidity and mortality. It can sometimes be difficult to diagnose and familiarity with the spectrum of image findings is important

References

- 1) Zhipeng Sun, Yubing Zhu, Bin Zhu, Guangzhong Xu, Nengwei Zhang. Controversy and progress for treatment of acute cholangitis after Tokyo Guidelines (TG13) *BioScience Trends*. 2016; 10(1):22-26.
- 2) Takada T, Strasberg SM, Solomkin JS, *et al*. TG13: Updated Tokyo Guidelines for the management of acute cholangitis and cholecystitis. *J Hepatobiliary Pancreat Surg*. 2013; 20:1-7.
- 3) Wada K, Takada T, Kawarada Y, *et al*: Diagnostic criteria and severity assessment of acute cholangitis: Tokyo guidelines. *J Hepatobiliary Pancreat Surg* 2007;14:52–58.
- 4) Demartines N, Eisner L, Schnabel K, Fried R, Zuber M, Harder F: Evaluation of magnetic resonance cholangiography in the management of bile duct stones. *Arch Surg* 2000;135:148–152.
- 5) Zimmer V, Lammert F: Acute Bacterial Cholangitis. *Viszeralmedizin* 2015;31:166–172
- 6) Miura F, Okamoto K, Takada T, Strasberg SM, Asbun HJ, *et al*. Tokyo Guidelines 2018: initial management of acute biliary infection and flowchart for acute cholangitis. *J Hepatobiliary Pancreat Sci*. 2018 Jan;25(1):31-40
- 7) Altun, Ersan; Velloni, F.; AlObaidy, M.; Elias J Jr; Semelka, Richard C. Gallbladder and biliary system In: *Abdominal/pelvic MRI*. 4th ed. Hoboken, NJ : John Wiley & Sons Ltd, 2015, p. 395
- 8) Santos, JS; Kemp, R; Ardengh, JC; Elias J Jr. Conservative management of cholestasis with and without fever in acute biliary pancreatitis. *World Journal of Gastrointestinal Surgery*, v.4, p.55 61, 2012.