Learning objectives

- To present acute acalculous cholecystitis (ACC) as a possible complication in the course of acute viral hepatitis
- To review the clinical symptoms and possible pathogenetic mechanisms in the development of ACC in the context of viral hepatitis
- To remind the imaging modalities used in the diagnosis of ACC
- To discuss the typical and atypical imaging findings and to demonstrate some of them

Background

Viral hepatitis is still quite common entity worldwide. Hepatitis A virus (HAV) infection is the most common cause of acute illness. In viral hepatitis extra hepatic changes are generally rare, the most frequent are arthralgias, dermal vasculitis and cryoglobulinemia. Those typically resolve with the resolution of the disease [1]. In the course of the acute disease the gallbladder can experience both functional and structural changes and almost all of them resolve with the resolution of the disease. The most commonly encountered abnormalities are thickening of the gallbladder wall and sludge formation. In some cases evidence of ACC can also be present. Clinically significant ACC, though, is a relatively rare complication of viral hepatitis. It is usually a self-limiting condition but can eventually progress to gangrenous cholecystitis, perforation of the bladder and even death [4-5].

ACC is the inflammation of the gallbladder in the absence of cholelithiasis. It presents 2-15% of acute cholecystitis [2]. Some form of gallbladder involvement is present in 50 to 98% of all cases with viral hepatitis [3], but the pathophysiology behind it is still unclear. Ischemic injury to the epithelium and the detergent effect of the bile on the epithelial lining are thought to play a major role in the pathogenesis of ACC. Immune genesis with immune complex deposits in the vessels of the gallbladder wall is also speculated on. Local extension of the inflammatory process and direct invasion of the biliary epithelium by the virus are also possible mechanisms, especially in HAV infection [6]. Whereas necrotizing vasculities plays more prominent role in HBV infection [7].

Findings and procedure details

Clinical presentation of ACC is usually in the course of acute hepatitis and presents with abdominal distention and signs of peritoneal irritation, right upper quadrant pain and
positive Murphy’s sign. In some patients however ACC is the initial and only feature of the viral hepatitis.

Uncomplicated cases of viral hepatitis need no imaging. But whenever evidence of complication occurs, the patient is immediately sent to the imaging department. The first method of choice is always ultrasound (US) as it allows excellent visualization of the liver and gallbladder, the changes in the bile ducts and the presence of peritoneal fluid. Rarely additional imaging is need and in those cases CT and MRI (including MRCP) is used.

Changes in the gallbladder during viral hepatitis and ACC are well documented and include the following:

- Decrease in gallbladder volume - quite often in acute hepatitis [8]
- Gallbladder distention , with width more than 40mm, more frequently seen in cases with ACC
- Gallbladder wall thickening- with wall thickness measuring more than 4mm (fig.1 and fig.2)

![Fig. 1: Transverse US image of the gallbladder of a patient with proven HBV infection, showing thickened gallbladder wall](image)

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Fig. 2: CECT of the same patient as in fig. 1 showing thickened and edematous gallbladder wall and strongly enhancing mucosa

References: Department of Diagnostic Imaging, University Hospital

- Sludge formation (not typical for ACC)- imaged on US as intraluminal hyperechoic, mobile material
- Absence of calculi and bile duct dilation
- Multilayered and striated appearance of the gallbladder wall. We’ve also noticed several cases with atypical findings on the ultrasound examination. Those presented with multiple curvilinear hyperechoic filling defects in the gallbladder (fig.3)
Fig. 3: Gallbladder US of a patient with proven HAV infection, demonstrating atypical filling defects

References: Department of Diagnostic Imaging, University Hospital "St. Marina"; Medical University Varna/Bulgaria 2011

When these patients underwent CT, only pronounced gallbladder wall thickening was found (fig.4)

Fig. 4: Plain and CECT of the same patient as in fig 3, showing only grossly thickened gallbladder wall.

References: Department of Diagnostic Imaging, University Hospital "St. Marina"; Medical University Varna/Bulgaria 2011

And the atypical US findings were attributed to the excessive gallbladder wall edema

- Positive sonographic Murphy’s sign - a very common finding in ACC, refering to the pain provoked by the pressure exercised with the probe over the gallbladder
- Pericholecystic fluid is also typical for cases with ACC.
- Periportal tracking can also be present, as a manifestation of edema (fig.5)
Fig. 5: CECT of patient with HBV, demonstrating periportal tracking and some fluid

References: Department of Diagnostic Imaging, University Hospital "St. Marina"; Medical University Varna/Bulgaria 2011

Conclusion

Gallbladder changes accompany more than half of the cases with acute viral hepatitis. And although ACC is very rare in course of the acute disease, it should always be taken into account due to the possible serious complications it may cause -namely gangrenous cholecystitis and perforation.

Personal information
References


