

Chronic Cholecystitis which Mimics Gallbladder Cancer: a Case Report

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Abstract

A 50-year-old male visited our hospital because he was experiencing epigastralgia. On Computed Tomography (CT), a bile duct stone was detected as a high-density material at the level of the lower biliary tract. After admission, biliary drainage by endoscopic procedures, endoscopic sphincterotomy, and stone extraction were performed. Coincidentally, fundal-type adenomyomatosis of the gallbladder was suspected on Magnetic Resonance Imaging (MRI) with Magnetic Resonance Cholangiopancreatography (MRCP). Two months after hospital discharge, the biliary stone was not detected on follow-up MRI with MRCP, but focal thickening of the gall bladder had progressed in comparison to the thickness observed on previous CT and MRI with MRCP. The possibility of gallbladder cancer could not be denied; therefore, an extended cholecystectomy was performed. Histopathological examination revealed chronic cholecystitis without malignancy and no active inflammation. There was no active inflammation in the mucosa, muscularis propria, and subserosa. Quantitative visual assessment using diffusion-weighted imaging in addition to dynamic CT was useful for the diagnosis of chronic cholecystitis.

Introduction

Chronic cholecystitis is typically characterized by diffuse and entire circumferential wall thickening with preserved mucosa and muscular layer. Chronic cholecystitis rarely shows focal but entire circumferential wall thickening. Chronic cholecystitis without preserved mucosa and muscular layer because of severe inflammation or fibrosis can be difficult to distinguish from gallbladder carcinoma. Several studies have reported that morphological assessment for layered pattern and Magnetic Resonance Imaging (MRI) with Diffusion-Weighted Imaging (DWI), including Apparent Diffusion Coefficient (ADC) mapping, could improve the diagnostic performance for differentiating malignant gallbladder disorders from benign ones [1-3]. We describe a case of chronic cholecystitis that showed focal but entire circumferential wall thickening within a relatively short period along with some literature review.

Case report

A 50-year-old male visited our hospital because he was experiencing epigastralgia for a few days. Physical and hematological examinations revealed jaundice and elevation of biliary enzyme levels. On Computed Tomography (CT), high-density material was detected at the level of the lower biliary

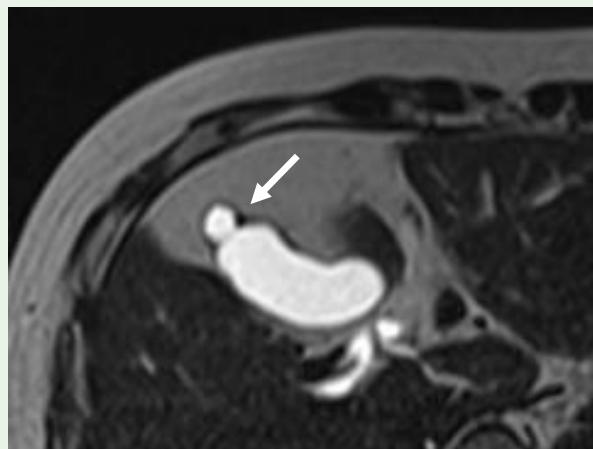


Figure 1: Non-contrast magnetic resonance imaging of the abdomen (findings on admission). Half-Fourier single-shot turbo spin-echo image showing segmental gallbladder wall thickening. A segmental type of adenomyomatosis was suspected.

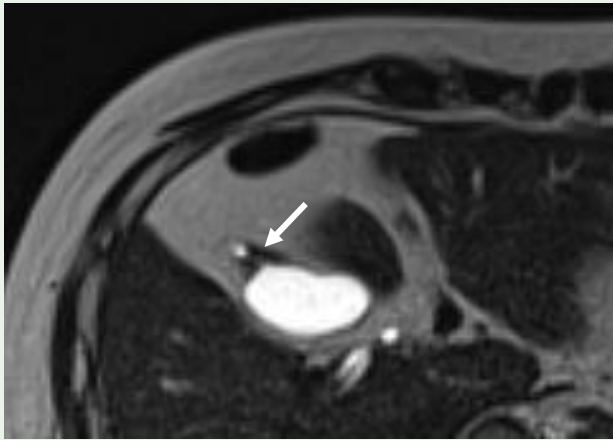


Figure 2: Non-contrast magnetic resonance imaging of the abdomen (14 months later). Focal thickening of the gallbladder wall has progressed compared with the thickness observed on previous MR images. The lesion's surface on the mucosal side is smooth.

tract, which suggested a bile duct stone. After admission, coincidentally, fundal-type adenomyomatosis of the gallbladder was suspected (Figure 1), and a biliary stone was detected on MRI with Magnetic Resonance Cholangiopancreatography (MRCP). Sonographic findings were unclear and insufficient. After biliary drainage by endoscopic procedures, endoscopic sphincterotomy and stone extraction were performed. The postoperative course was uneventful. Two months after hospital discharge, the biliary stone was not detected on follow-up MRI with MRCP, but focal thickening of the gall bladder wall had progressed relative to the thickening observed on previous MR images in which the lesion was detected (Figure 2). The thickened wall of the gallbladder involved the entire circumference, and the lesion's surface on the mucosal side was smooth. The signal intensity of the lesion was isointense in comparison with the signal of a normal gallbladder wall on T2-Weighted Fast Spin Echo Images (T2WI) and Half-Fourier Single-Shot Turbo Spin Echo (HASTE) images. No restricted diffusion was identified (Figure 3). Follow-up sonography showed findings that were unclear and insufficient. Follow-up dynamic CT showed disruption of the mucosal line in both the early and portal phases. The enhancement effect was expanded to the mucosal side in the delayed phase (Figure 4). A dynamic pattern was persistent. These imaging findings continued to progress during the 14-month period. The possibility of gallbladder cancer could not be denied; therefore, extended cholecystectomy was performed.

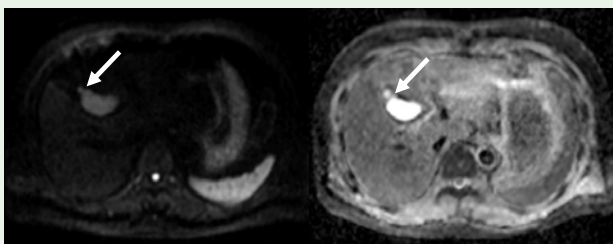


Figure 3: Diffusion-weighted imaging (high b value; b = 1000) showing low signal intensity in association with high apparent diffusion coefficient values, which suggests that the lesion is likely to be benign, such as adenomyomatosis of the gallbladder.

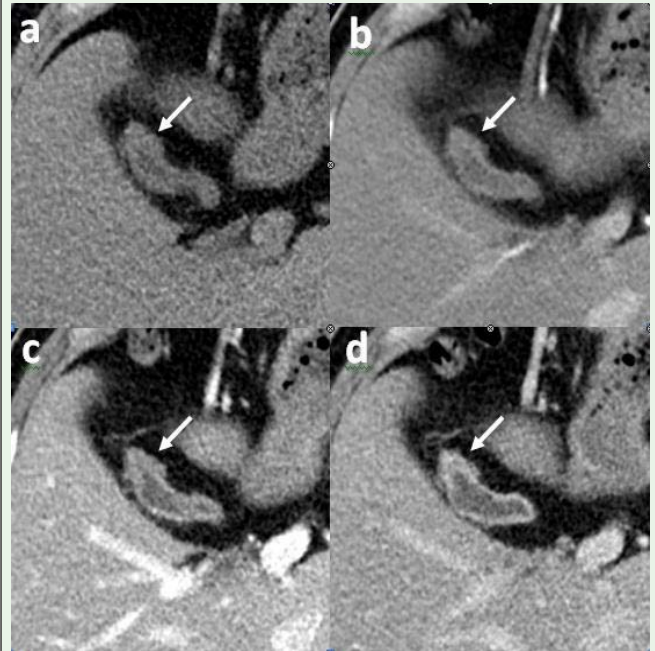


Figure 4: Contrast-enhanced dynamic Computed Tomography (CT). (a) Unenhanced CT showing focal butentire circumferential gallbladder wall thickening. (b) Early phase and (c) portal phase showing disruption of the mucosal line. (d) Enhancement effect of the lesion has expanded to the mucosal side in the delayed phase.

Histopathological examination revealed chronic cholecystitis without malignancy and no active inflammation. The mucosa of the lesion was almost ablated. Increases in the number of elastic and collagen fibers in the muscularis propria and subserosa were proven by Masson's Trichrome (Figure 5). The thickened muscularis propria and increase in Rokitsansky-Aschoff sinuses in the thickened muscularis propria were also detected around the lesion. There was no active inflammation in the mucosa, muscularis propria, and subserosa.

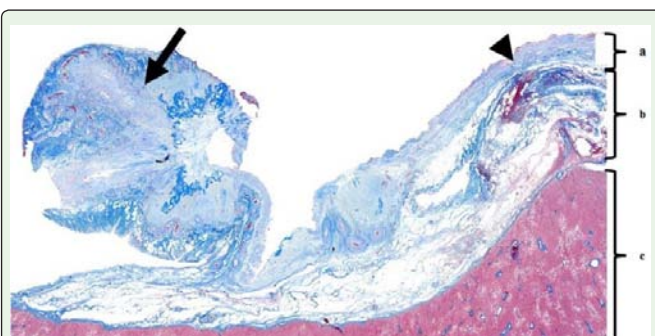


Figure 5: Masson's Trichrome Stain. (a) mucosa and muscularispropria, (b) subserosa and serosa, and (c) hepatic parenchyma. Mucosa of the lesion is almost ablated. Increase in the number of elastic and collagen fibers (arrow) in the muscularispropria and subserosa proven by Masson's Trichrome. The thickened muscularispropria and increase in the Rokitsansky-Aschoff sinuses in the thickened muscularispropria is also detected around the lesion (arrow head).

Discussion

Chronic cholecystitis usually demonstrates diffuse gallbladder wall thickening. The thickened wall histologically consists of fibrosis and inflammatory cell infiltration in the subserosa and hypertrophy of the muscularis propria [4]. However, chronic cholecystitis uncommonly shows localized thickening of the fundal portion of the gallbladder wall [5]. This finding can result from a broad spectrum of pathological conditions, such as adenomyomatosis, chronic cholecystitis, and gallbladder cancer [5-7]. It is necessary to correctly interpret the findings of focal gallbladder wall thickening because misinterpretation can lead to an unnecessary cholecystectomy in patients without intrinsic gallbladder disease.

In this case, pathological findings suggesting adenomyomatosis of the gallbladder were identified around the focal chronic cholecystitis. On pathological examination, the lesion morphology that spread to the entire circumference of the gallbladder was thought to be associated with adenomyomatosis of the gallbladder. For differential diagnosis of the gallbladder lesion, identification of inner layer enhancement and/or the mucosal line of the thickened gallbladder wall may be helpful in differentiating gallbladder cancer from other conditions [8,9]. In this case, a gallbladder cancer was suspected because of the disruption of the mucosal line on dynamic CT. Disruption of the mucosal line of the gallbladder indicates cancer, but severe inflammation because of mucosal ablation can also cause the disruption [10]. We identified abundant fibrous tissues that caused reduction of the vascular bed in the muscularis propria. This finding suggested that the abundant fibrous tissue had affected hypo-vascularity in the early phase of dynamic CT. On the other hand, MRI showed findings suggesting benignity. From the comparison of T2WI and HASTE images and pathological findings, we speculated that the thin hypointense inner layer represented the muscularis propria and the thick hyperintense outer layer represented the subserosal layer. The muscularis propria had many vascular structures; therefore, the enhancement effect of the mucosal line on dynamic CT was thought to be equivalent to the enhancement effect of both the mucosa and muscularis propria. In this case, abundant fibrous tissue caused by inflammation was identified in the muscularis propria. The muscularis propria with abundant fibrous tissue showed a thickened low signal intensity layer as if it was maintaining a hypointense inner layer on T2WI and HASTE images.

It has been reported that a combination of morphological assessment, ADC, and Lesion-To-Spinal Cord Ratio (LSR) in DWI can improve the diagnostic performance for differentiating between malignant and benign gallbladder disorders [11]. The researchers reported the DWI criteria for diagnosing malignancy was defined as a threshold ADC of $<1.2 \times 10^{-3} \text{ mm}^2/\text{s}$ or LSR of >0.48 . In this case, ADC of the lesion was $0.89 \times 10^{-3} \text{ mm}^2/\text{s}$, and LSR of the lesion

was 0.11. LSR of the lesion showed good correlation with the values reported previously. For qualitative diagnosis of gallbladder lesions, assessment of lesion vascularity on dynamic CT as well as quantitative visual assessment using DWI should be considered.

Conclusion

In conclusion, chronic cholecystitis uncommonly shows localized thickening of the fundal portion of the gallbladder wall. Localized gallbladder wall thickening without preserved mucosa and muscular layer may make it difficult to distinguish chronic cholecystitis from gallbladder carcinoma on dynamic CT. The results of our study showed that quantitative visual assessment using DWI in addition to dynamic CT was useful for diagnosis of chronic cholecystitis.

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