

## MR Cholangiographic Findings of Drug-Induced Hepatic Injury

Masayuki Kanematsu, M.D.<sup>1</sup>, Hiroaki Hoshi, M.D.<sup>1</sup>, Yoshimune Shiratori, M.D.<sup>2</sup>, Takafumi Naiki, M.D.<sup>2</sup>, Hiroshi Kondo, M.D.<sup>1</sup>, Ichiro Yasuda, M.D.<sup>2</sup>, Masayuki Matsuo, M.D.<sup>1</sup>, Hisataka Moriwaki, M.D.<sup>2</sup>

<sup>1</sup>Department of Radiology, Gifu University School of Medicine

<sup>2</sup>1st Department of Internal Medicine, Gifu University School of Medicine

### Abstract

We experienced a 74-year-old female patient with drug-induced hepatic injury whose magnetic resonance (MR) cholangiographic imaging findings were unusual. The MR cholangiographic images showed thick, homogeneous, moderately high signal-intensity layer that was consistent with the thickened gallbladder wall. Sonographic examination subsequently performed disclosed the thickening of the gallbladder wall that was considered to be due to extension of hepatic inflammation. We demonstrate and assess the MR imaging findings of this interesting case in the report.

### Keywords

Drug-induced hepatic injury; magnetic resonance; cholangiography; gallbladder; ultrasonography

### Introduction

Currently, magnetic resonance (MR) cholangiography is widely used as noninvasive imaging technique in the diagnosis of pancreaticobiliary diseases [1, 2]. It is useful in diagnosing biliary calculi, strictures and dilatations, and neoplasms. However, to our knowledge, no previous reports have described the potential diagnostic utility of MR cholangiography for acute hepatic inflammatory process extending to the gallbladder. We demonstrate and assess a case with drug-induced hepatic injury whose MR cholangiographic images were diagnostically useful in the report.

### Case Report

A 74-year-old woman complaining of progressive jaundice was referred to Gifu University Hospital. The serum total bilirubin level was 4.6 mg/dl on the fourth day since she started undergoing intravenous administration of ceftazidim (2g/day) for suspected acute bronchitis. Although the administration of ceftazidim was aborted on the

seventh day, the serum total bilirubin level continuously rose up to 17.1 mg/dl when she was hospitalized in our hospital on the eleventh day. Other liver function tests were moderately elevated. There was a moderate eosinophilia. She had no evidence of viral hepatitis, alcoholic hepatitis, autoimmune hepatitis, or primary biliary cirrhosis from her clinical history and laboratory data. She was suspected of having drug-induced hepatitis caused by ceftazidim administration on the basis of the relationship between the drug administration and clinical course. She was conservatively medicated, and her serum total bilirubin level came back to normal four months later.

To rule out the possibility of having calculi or malignancy in the biliary tract, the patient underwent MR cholangiography. MR imaging was performed with a superconducting imager at 1.5 T (Signa Horizon, GE Medical Systems, Milwaukee, Wis). MR cholangiography was obtained by using shingle-shot fast spin-echo

sequence with 128 echo train (4000/1001 [TR/effective TE], one signal acquired, net acquisition time of 2 seconds). A single thick-slice (70 mm) coronal projection image with 256 x 128 matrix and 20 x 20-cm field of view was obtained for MR cholangiography.

The MR cholangiography image showed thick, homogeneous, and moderately high signal-intensity layer that was consistent with edematous, thickened gallbladder wall (**Fig. 1A**). No biliary dilatation or calculus was seen. Sonographic examination subsequently performed disclosed the wall thickening of the gallbladder (**Fig. 1B**). She underwent follow-up MR cholangiography when her hyperbilirubinemia resolved, and the test showed no evident abnormal findings.

### Discussion

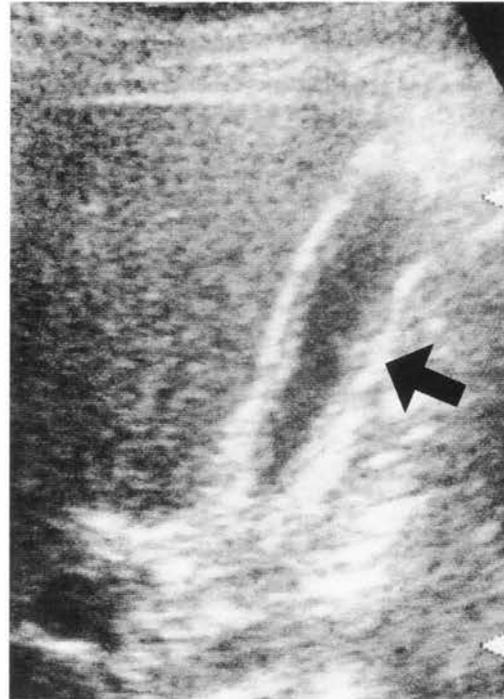
It is well known that inflammatory process in the liver can transmit to the gallbladder, and may cause a thickening of the gallbladder wall [3].

This phenomenon is occasionally observed on sonography and CT [3, 4]. It is believed that hepatic inflammation extends via the vascular communications between the liver and gallbladder, sometimes referred to as aberrant cholecystic venous drainage [5]. Because MR cholangiography is a technique recently introduced for biliary tract imaging, no previous report has described the imaging findings of the biliary system affected by acute hepatic injury. Drug-induced hepatic injury may occur suddenly to patients who are medicated without any episodes of previous liver disease, and may present with progressive jaundice caused by acute hepatocellular damage or cholestasis, occasionally resulting in acute liver failure. Early diagnosis of this disease is a key to successful sequelae. Radiologists should remember that MR cholangiography can demonstrate a wall thickening caused by acute hepatic injury of any etiology when interpreting MR cholangiography in patients with suspected liver disease.



**Fig. 1.** A 74-year-old woman with drug-induced hepatic injury caused by an intravenous administration of ceftazidim.

**A,** MR cholangiography image obtained by using a single-shot fast spin-echo sequence (4000/1001 [TR/effective TE]) shows thick, homogeneous, moderately high signal-intensity layer (arrow) that is consistent with the thickened gallbladder wall.



**B,** Sonographic image subsequently obtained shows the thickened gallbladder wall (arrow).

**References**

1. Takehara Y, Ichijo K, Tooyama N, Kodaira N, Yamamoto H, Tatami M, Saito M, Watahiki H, Takahashi M. Breath-hold MR cholangiopancreatography with a long-echo-train fast spin-echo sequence and a surface coil in chronic pancreatitis. *Radiology* 1994;192:73-78.
2. Laubenberg J, Buchert M, Schneider B, Blum U, Hennig J, Langer M. Breath-hold projection magnetic resonance-cholangio-pancreaticography (MRCP): a new method for the examination of the bile and pancreatic ducts. *Magn Reson Med* 1995;33:18-23.
3. Giorgio A, Francia G, Amoroso P, et al. Morphologic and motility changes of the gallbladder in response to acute liver injury: a prospective real-time sonographic study in 255 patients with acute viral hepatitis. *J Ultrasound Med* 1989; 8:499-506.
4. Itoh H, Sakai T, Ohshiro K, et al. A septum-like structure of the gallbladder in acute viral hepatitis: CT demonstration. *Radiat Med* 1990; 8:236-237.
5. Marchal G, Tshibwabwa-Tunba E, Verveken E, et al. "Skip areas" in hepatic steatosis: a sonographic-angiographic study. *Gastrointest Radiol* 1986; 11: 151-157.

ダウンロードされた論文は私的利用のみが許諾されています。公衆への再配布については下記をご覧ください。

### 複写をご希望の方へ

断層映像研究会は、本誌掲載著作物の複写に関する権利を一般社団法人学術著作権協会に委託しております。

本誌に掲載された著作物の複写をご希望の方は、(社)学術著作権協会より許諾を受けて下さい。但し、企業等法人による社内利用目的の複写については、当該企業等法人が社団法人日本複写権センター（(社)学術著作権協会が社内利用目的の複写に関する権利を再委託している団体）と包括複写許諾契約を締結している場合にあっては、その必要はございません（社外頒布目的の複写については、許諾が必要です）。

権利委託先 一般社団法人学術著作権協会

〒107-0052 東京都港区赤坂 9-6-41 乃木坂ビル 3F FAX：03-3475-5619 E-mail：info@jaacc.jp

複写以外の許諾（著作物の引用、転載、翻訳等）に関しては、(社)学術著作権協会に委託致しておりません。

直接、断層映像研究会へお問い合わせください

### Reprographic Reproduction outside Japan

One of the following procedures is required to copy this work.

1. If you apply for license for copying in a country or region in which JAACC has concluded a bilateral agreement with an RRO (Reproduction Rights Organisation), please apply for the license to the RRO.

Please visit the following URL for the countries and regions in which JAACC has concluded bilateral agreements.

<http://www.jaacc.org/>

2. If you apply for license for copying in a country or region in which JAACC has no bilateral agreement, please apply for the license to JAACC.

For the license for citation, reprint, and/or translation, etc., please contact the right holder directly.

JAACC (Japan Academic Association for Copyright Clearance) is an official member RRO of the IFRRO (International Federation of Reproduction Rights Organisations).

Japan Academic Association for Copyright Clearance (JAACC)

Address 9-6-41 Akasaka, Minato-ku, Tokyo 107-0052 Japan

E-mail info@jaacc.jp Fax: +81-33475-5619