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## Case Report

# Hepatic subcapsular hematoma without elevated hepatic enzyme levels: A case report<sup>☆</sup>

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### ABSTRACT

In cases of abdominal trauma, elevated liver enzyme levels can indicate hepatic injury. To date, there are no documented reports of hepatic trauma without liver enzyme abnormalities. Herein, we present a case of hepatic subcapsular hematoma following a motor vehicle accident without abnormal findings in blood and biochemical tests over the course of time. The patient was a woman in her 20s who had collided with a passenger car while driving a light motor vehicle. She walked by herself to see a nearby after-hour doctor as an outpatient. Radiography was performed, and the patient was discharged on the same day. She was reexamined the next day and referred to our medical center due to possible hepatic injury. Her respiratory and circulatory dynamics were stable; however, she experienced mild tenderness in her right upper abdomen upon arrival. Echo-free space was observed in Morrison's and Douglas' pouches on abdominal ultrasound, and abdominal computed tomography showed a hepatic subcapsular hematoma (grade II according to the American Association for the Surgery of Trauma liver injury scale). However, blood and biochemical tests did not reveal any abnormalities. The hematoma reduced with conservative treatment after admission, and the patient was discharged on the 18th hospital day. This case indicates that hepatic injury cannot be ruled out based on serodiagnosis alone; thus, diagnostic imaging is required in cases of blunt abdominal trauma.

### Introduction

In Japan, most hepatic injuries are caused by blunt injury, and elevated liver enzyme levels can indicate hepatic damage. To date, there are no documented reports of hepatic trauma without liver enzyme abnormalities. Herein, we report a rare case of hepatic subcapsular hematoma without elevated liver enzyme levels.

### Case presentation

The patient was a woman in her 20s who presented with mild abdominal pain following a motor vehicle accident. She had collided with a passenger car while driving a light motor vehicle. At the time of the accident, she was wearing a seatbelt and the airbag deployed. After the accident, she walked by herself to see a nearby after-hour doctor as an outpatient. Only plain radiography was

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performed, and the patient was discharged on the same day. She was reexamined the next day and referred to our medical center due to possible hepatic injury. Her past medical history included endometriosis, for which she had undergone laparoscopic surgery at the age of 23.

On examination, her consciousness was alert, and her vital parameters were as follows: blood pressure 110/67 mmHg, heart rate 96 bpm, respiratory rate, 15 breaths/min., body temperature 37.1 °C. The abdomen was soft and nontender to palpation. Abdominal ultrasound showed echo-free spaces in Morrison's and Douglas' pouches. Blood and biochemical test results were as follows: white blood cells 6650/ $\mu$ L, red blood cells  $3.54 \times 10^4$ / $\mu$ L, hemoglobin 9.7 g/dL, platelets  $239 \times 10^3$ / $\mu$ L, aspartate transaminase (AST) 27 U/L, alanine transaminase (ALT) 22 U/L, lactate dehydrogenase (LDH) 155 U/L,  $\gamma$ -glutamyl transpeptidase ( $\gamma$ -GTP) 9 U/L, total bilirubin 0.9 mg/dL, and C-reactive protein (CRP) 0.669 mg/dL. Abdominal computed tomography (CT) revealed a crescent-shaped low-density area on the liver surface extending from the anterior to the posterior area. No active bleeding was observed on contrast-enhanced CT (Fig. 1).

The patient was admitted to rest and conservative treatment was provided. Since her liver enzyme levels were not elevated and the hematoma gradually decreased during the hospitalization course (Fig. 2), she was discharged on the 18th hospital day. On the follow-up abdominal CT obtained after 1 year, the hematoma persisted, but was reduced (Fig. 3). The changes in transaminase levels over the treatment course are presented in Table 1.

## Discussion

According to previous studies, the liver is the most commonly damaged organ in blunt abdominal trauma [1]. Transaminase levels, particularly ALT levels, are known to be elevated in the event of hepatic damage [2]; thus, elevated liver enzyme levels can indicate hepatic injury in cases of blunt abdominal trauma. Transaminases are present in the liver, brain, and myocardium. Elevated AST and ALT levels can be found when hepatocytes are damaged, for example, due to inflammation, infection, and trauma [3], and there are reports that they can be useful to assess the severity of trauma [2]. Prior studies have reported cutoff values for AST and ALT to diagnose blunt hepatic injury, and although the data were obtained from children, their sensitivity and specificity for levels of AST and/or ALT greater than 130 U/L were 92.9–100 % and 92.3–100 %, respectively [4,5]. However, no reports have described hepatic injury with normal AST and ALT levels throughout the disease course.

Histologically, the liver capsule is composed of a thin membrane-like structure made up of elastic collagen fibers through which blood vessels run [6]. As it does not contain hepatocytes, it can be considered that hepatocyte damage would not be present when the blood vessels of the liver capsule rupture. However, rupture of the blood vessels of the liver capsule is rarely an isolated injury because the capsule is very thin, and damage to the liver parenchyma is also expected. In our case, the AST and ALT levels were not elevated despite the presence of a large hepatic subcapsular hematoma (grade 2 according to the organ injury scale [7]), which is considered to



Fig. 1. Abdominal computed tomography image obtained on day 1. Axial image showing a large subcapsular hematoma in the right liver lobe.



Fig. 2. Abdominal computed tomography image obtained on day 15. Axial image showing reduced size of the subcapsular hematoma.



Fig. 3. Abdominal computed tomography image obtained after 1 year. Axial image showing persisting hematoma, which had reduced significantly.

**Table 1**  
Change in transaminase levels over the treatment course.

	Day 0	Day 1	Day 3	Day 9	Day 12	After 1 year
AST (U/L)	27	22	12	15	12	14
ALT (U/L)	22	20	11	10	7	11

AST, aspartate transaminase; ALT, alanine transaminase.

be due to isolated rupture of the liver capsule blood vessels, without damage to the capsule or liver parenchyma, or if any, the damage would have been mild. As the hematoma was very large, the patient could have developed hemoperitoneum if the damage to the capsule was severe.

In conclusion, the present case demonstrates that, although AST and ALT levels can be indicators of hepatic injury, it cannot be ruled out based on serodiagnosis alone. Hence, diagnostic imaging is required in cases of blunt abdominal trauma.

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### Declaration of competing interest

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