A Case of Hepatocellular Carcinoma Rupture Presenting as Hemothorax Following Radiofrequency Ablation

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Abstract

A 73-year-old woman presented with hemorrhagic shock resulting from a hepatocellular carcinoma (HCC) rupture. A hemothorax caused by diaphragmatic injury was identified from radiofrequency ablation performed 3 years prior. Contrast-enhanced computed tomography showed the HCC rupture (a 41 mm diameter tumor was seen in liver segment I, as well as contrast medium that had extravasated around the tumor), a right diaphragmatic hernia, and right pleural effusion. Celiac angiography showed extravasation of contrast medium from a tumor vessel. Transcatheter arterial embolization was performed. However, she died of liver failure 10 days later.

Key words: hepatocellular carcinoma, hemothorax, radiofrequency ablation, embolization

Introduction

The prevalence of hepatocellular carcinoma (HCC) rupture has been reported at 3-15%, and most cases are detected due to hemorrhagic shock and intra-abdominal hemorrhage [1, 2]. There have been some reported cases of post-radiofrequency ablation (RFA) diaphragmatic hernias [3]. In patients with damaged diaphragms, in the case of an HCC rupture, it is possible for the blood released into the abdominal cavity to pass into the thoracic cavity through a diaphragmatic hernial opening. In such cases, it is important to consider possibility of HCC rupture while making the diagnosis if massive pleural effusion and anemia are present. We herein report the case of a patient in whom hemothorax developed, despite the rupture of the HCC being confined within the liver. Patients with diaphragmatic perforation due to RFA may develop hemothorax if HCC rupture occurs.

Case Report

The patient was a 73-year-old woman who was diagnosed with hepatitis C and cirrhosis 20 years ago. She had undergone transcatheter arterial chemoembolization (TACE) and RFA for HCC in liver segment V 11 years ago, and laparoscopic RFA for HCC in liver segment VI, as well as TACE for HCC in liver segment I 3 years ago.

She had abdominal fullness, and 8 hours later, had chest pain. During the 13 hours from symptom onset, she vomited multiple times, and after 15 hours, had impaired consciousness and collapsed. She was immediately taken to an emergency center.

On arrival at the emergency center of our hospital, her blood pressure was 55/36 mm Hg. Hematological findings were as follows: hemoglobin level, 8.0 g/dL; platelet count, 8.6 \times 10^4/μL; serum albumin level, 1.9 g/dL; prothrombin time, 47.6%; aspartate aminotransferase, 51 U/L; alanine aminotransferase, 26 U/L; and serum bilirubin, 3.4 mg/dL. She tested positive for anti-hepatitis C virus antibody and negative for hepatitis B surface antigen. Her Child Pugh Score was 12, Class C.

Chest radiography showed a massive pleural effusion on the right side (Fig. 1); hence, diagnostic puncture of the right pleural cavity was performed, revealing the presence of
bloody pleural effusion. A hemothorax associated with chest trauma was suspected; hence, contrast-enhanced computed tomography (CT) of the chest was performed to determine the source of bleeding. CT revealed massive pleural effusion on the right side, and intra abdominal fat and digestive tract were seen to have prolapsed into the thoracic cavity. A 41 mm diameter tumor was also seen in liver segment I, and contrast medium that had extravasated around the tumor and bloody ascites were also detected (Fig. 2A, Fig. 2B, Fig. 2C). These CT findings led to a diagnosis of HCC rupture, right diaphragmatic hernia, and right pleural effusion.

A right pleural cavity drain was anchored in place, and 2,000 mL of bloody pleural effusion was drained. The bloody pleural effusion was drained at a rate of 250 mL/h to maintain respiratory function. Fluid and blood transfusions were performed, and a vasopressor was administered, but her blood pressure remained unstable. Blood tests performed 2 h after admission showed a hemoglobin level of 3.0 g/dL and a platelet count of 4.5 × 10⁴/μL, lower than those at the time of admission. Bleeding was considered to be continuing; hence, transcatheter arterial embolization (TAE) was performed.

Celiac angiography showed extravasation of contrast medium from a tumor vessel in liver segment I (Fig. 3A, Fig. 3B). Thus, 1 mm gelatin sponge particles (Gelpart®; Nippon Kayaku, Tokyo, Japan) were used to embolize the left hepatic artery. Following embolization, the volume of the fluid drained via the pleural cavity drain decreased, and the hemorrhagic shock resolved. However, she died because of liver failure 10 days later.
A hypervascular hepatic tumor is apparent (black arrow). 3B. Late phase of the celiac angiogram. Tumor stain and extravasation of contrast medium are revealed (white arrow).

Discussion

Almost all cases of HCC rupture that show intrathoracic cavity bleeding are due to the rupture of a remote metastatic lesion, such as a pulmonary, costal, or diaphragmatic metastatic lesion [4]. In such cases, the source of bleeding can be readily surmised, since the lesion of origin faces the thoracic cavity. However, in the present case, despite the fact that the lesion representing the source of the bleeding was located in the abdominal cavity, massive bleeding was present in the thoracic cavity. There is only one report of such an HCC rupture in liver segment I being associated with a hemothorax [5]. In our case, the cause of this may have involved damage to the diaphragm, which serves as the boundary between the thoracic and abdominal cavities. The patient in this case showed both massive bloody pleural effusion and bloody ascites, leading us to surmise that blood had been released into the abdominal cavity and passed into the thoracic cavity through a diaphragmatic hernial opening.

There have been 8 reported cases of post-RFA diaphragmatic hernia, including a case initially described by Koda et al. in 2003 [3]. Six of those 8 cases required surgical reconstruction, whereas the other 2 were either asymptomatic or showed only transient dyspnea that did not need treatment [3, 6-8]. The incidence of damage to the diaphragm caused by RFA for HCC that was not severe enough to result in diaphragmatic hernia was 0.05% [9]. Recent years have seen an increase in the use of percutaneous treatments for HCC, including RFA, cryotherapy, and microwave ablation [10], and this can be surmised to have the potential to result in more cases of asymptomatic diaphragmatic perforation.

Based on chest radiographs of the present patient, we considered intrathoracic bleeding due to chest trauma likely. Contrast-enhanced CT then enabled us to confirm extravasation of contrast medium in contact with a tumor in liver segment I, suggesting that the bleeding was associated with the tumor. However, if those findings had not been obtained, we might have diagnosed hemorrhagic shock due to thoracic injury, since the volume of bloody ascites was small compared with the volume of bloody pleural effusion. That might have delayed the application of appropriate treatment measures. In conclusion, for HCC patients with a history of percutaneous treatments such as RFA, cryotherapy, or microwave ablation, it is important for the clinician to consider the possibility of HCC rupture while making the diagnosis if massive pleural effusion and anemia are present.

Conflict of interest: The authors declare that they have no conflicts of interest to report.

References
