CLINICAL VIGNETTE

Hemoperitoneum as First Presentation of Multifocal Hepatocellular Carcinoma

Allana Chau, MD and Reece Doughty, MD

Case Presentation

A 63-year-old female with no significant past medical history initially presented to an outside hospital (OSH) with one day of acute onset abdominal pain and distension. Computed tomography (CT) imaging of the abdomen reported innumerable liver lesions concerning for metastatic disease and ascites. Her pain was managed and she was discharged from the emergency department with instructions for outpatient follow-up.

The following day, she had similar abdominal pain and presented to our institution. The pain was diffuse and associated with several episodes of non-bilious non-bloody vomiting and generalized fatigue. The remainder of review of systems was negative. Of note, she had emigrated from Mexico and not sought medical care in over 20 years. On exam, she was tachycardic to 120, but normotensive, and her abdomen was distended and diffusely tender with palpable hepatomegaly. Initial labs showed Hgb of 8.5 g/dL and mildly elevated liver chemistries. Notably, her Hgb had been 10.4 g/dL the day prior at the OSH. Triple phase CT (TPCT) of the abdomen was again consistent with multiple liver lesions and free fluid with concern for hemoperitoneum and rupture of at least one of the larger liver masses. Uunderlying liver morphology or assessment of primary versus metastatic disease was limited due to severe degree of liver involvement.

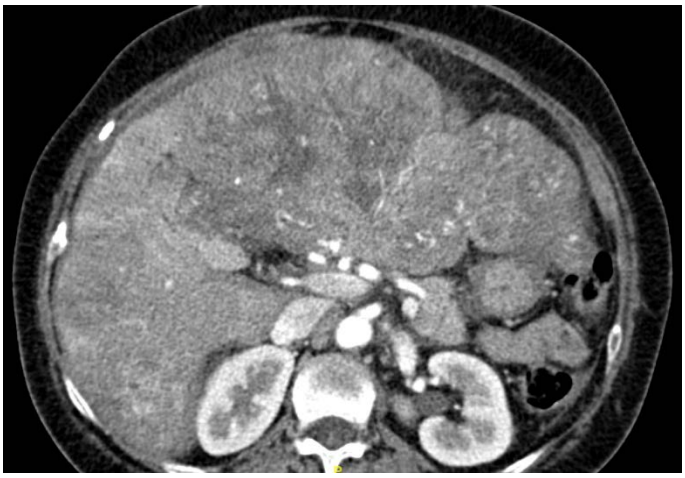
Figure 1.

Repeat Hgb decreased to 6.7 g/dL, and 2 units of packed red blood cells were given with appropriate response. Interventional radiology (IR) performed successful trans-arterial embolization (TAE) of the left hepatic artery with stabilization of Hgb thereafter. Further testing revealed markedly elevated AFP of 1,317,100 ng/mL with negative viral hepatitis serologies. Imaging of liver lesions by magnetic resonance (MR) was non-diagnostic by LI-RADS criteria. Liver biopsy was performed and consistent with moderately differentiated multifocal hepatocellular carcinoma. CT chest revealed metastatic pulmonary disease. She was seen by oncology and started on sorafenib as an outpatient, initially doing well, but in the following weeks declined and transition to hospice was discussed. She developed worsening abdominal pain and was hospitalized after failed central line placement, opted for end-of-life, comfort focused care.

Discussion

Hepatocellular carcinoma (HCC) is the most common hepatic malignancy globally, accounting for approximately 700,000 deaths per year.[1] HCC is one of the most vascular solid tumors, and after liver failure and tumor progression, spontaneous rupture is the third most common cause of death due to HCC worldwide.[1] Hemoperitoneum due to ruptured tumor as the first presentation of HCC is not infrequent in developing countries, but rarely seen in Western countries and carries a mortality as high as 25-75%, making a high index of suspicion extremely important to clinical care.[1] The most common symptoms include severe abdominal pain, distention, anemia, and shock.[1-3] Management of ruptured HCC involves maintaining stable hemodynamics and achieving hemostasis via medical, interventional radiologic, and possible surgical means.

The diagnosis of tumor rupture in patients without a history of cirrhosis or HCC can be difficult. A new finding of ascites (or intra-abdominal fluid) generally warrants diagnostic fluid sampling via paracentesis which we initially considered here given we had the CT report from the OSH from one day prior without mention of hemoperitoneum and suspected metastatic disease. Notably, the OSH CT was a standard abdomen/pelvis study with contrast and not a dedicated liver protocol, otherwise known as a triple phase CT, which is the modality of choice in the evaluation of liver lesions and HCC rupture. Findings suggestive of HCC rupture include bulging contour, discontinuity of liver capsule, subcapsular hematoma, or hemoperitoneum.[1] The radiodensity of fluid on CT can be assessed by Hounsfield units (HU) with fluids of similar density to water such as ascites ranging from 0-15 HU, while

extravascular blood measures 30-45 HU, and clotted blood 45-70 HU.[4]

When the tumor initially ruptured and whether hemoperitoneum was present on the OSH CT is unknown, but discussion with radiology and their concern for hemoperitoneum based on HU measurement allowed us to forego a potentially dangerous procedure and unnecessary delay in appropriate care and intervention in this case. The cornerstone of management is reversal of hemorrhagic shock and preservation of normal parenchyma. TAE is the least invasive approach to hemostasis in the acute phase with a high success rate of 53–100%.[1] Surgical liver resection may also be considered; however, hemodynamic instability and tumor burden may preclude surgery. The mechanism of spontaneous HCC rupture is not completely understood. A review of 89 cases of HCC showed most tumors are located in the left lateral segments (seg II and III) and right posterior-inferior segment (seg VI) of the liver.[5] These areas have a small tissue capacity and are restricted externally by the tough liver capsule. As the tumor grows, increased internal pressure ruptures the parenchyma and capsule.[4] Another study suggests vascular injury leads to the small arteries supplying the tumor to become stiff, brittle, and more prone to breaking.[6] In our patient, the extensive exophytic tumor burden put her at particularly high risk for rupture.

In conclusion, spontaneous rupture leading to the initial diagnosis of HCC is rare in the U.S. and often fatal. A high index of suspicion is essential for early diagnosis, achievement of hemostasis, and mortality reduction. Beyond clinical history and exam, discussion with radiology of imaging findings and abdominal fluid characteristics can help hasten the diagnosis and appropriate treatment by interventional radiology or surgery.

REFERENCES

1. **Sahu SK, Chawla YK, Dhiman RK, Singh V, Duseja A, Taneja S, Kalra N, Gorsi U**. Rupture of Hepatocellular Carcinoma: A Review of Literature. *J Clin Exp Hepatol*. 2019 Mar-Apr;9(2):245-256. doi: 10.1016/j.jceh.2018.04.002. Epub 2018 Apr 26. Review. PubMed PMID: 31024207; PubMed Central PMCID: PMC6476943.
2. **Özen Ö, Tosun A, Akgül Ç**. Spontaneous rupture of multifocal hepatocellular carcinoma: case report. *Int Med Case Rep J*. 2015 Aug 17;8:165-7. doi: 10.2147/IMCRJ.S87746. eCollection 2015. PubMed PMID: 26316825; PubMed Central PMCID: PMC4544813.
3. **Swe T, Naing AT, Baqui A, Khillan R**. Severe Anemia with Hemoperitoneum as a First Presentation for Multinodular Hepatocellular Carcinoma: A Rare Event in Western Countries. *Case Reports Hepatol*. 2016;2016:7082387. doi: 10.1155/2016/7082387. Epub 2016 Nov 23. PubMed PMID: 27999693; PubMed Central PMCID: PMC5141538.
4. **Lubner M, Menias C, Rucker C, Bhalla S, Peterson CM, Wang L, Gratz B**. Blood in the belly: CT findings of hemoperitoneum. *Radiographics*. 2007 Jan-Feb;27(1):109-25. Review. PubMed PMID: 17235002.
5. **Li J, Huang L, Liu CF, Cao J, Yan JJ, Xu F, Wu MC, Yan YQ**. Risk factors and surgical outcomes for spontaneous rupture of BCLC stages A and B hepatocellular carcinoma: a case-control study. *World J Gastroenterol*. 2014 Jul 21;20(27):9121-7. doi: 10.3748/wjg.v20.i27.9121. PubMed PMID: 25083085; PubMed Central PMCID: PMC4112877.
6. **Zhu LX, Geng XP, Fan ST**. Spontaneous rupture of hepatocellular carcinoma and vascular injury. *Arch Surg*. 2001 Jun;136(6):682-7. PubMed PMID: 11387009.