Imaging manifestations of a dreaded obstetric complication in the immediate postpartum period

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HELLP (hemolysis, elevated liver enzymes, low platelet) syndrome is a dreaded complication that may develop during pregnancy or in the immediate postpartum period. Rarely this syndrome manifests itself with imaging findings. We report a case of HELLP syndrome in which the diagnosis was reaffirmed via imaging findings.

HELLP syndrome is a descriptive acronym for a pregnancy-induced condition in which the patient presents with hemolysis, elevated liver enzymes, and low platelets. About 31% of the time, this syndrome manifests in the immediate postpartum period (1). While HELLP syndrome often occurs in the setting of preeclampsia or is thought of as a variant of the preeclampsia/eclampsia spectrum (4%–12%), it can occur independently, which can lead to a delay in diagnosis. While the clinical syndromes can overlap, risk factors for HELLP syndrome and eclampsia differ in that multiparous mothers and women older than 25 years old have an increased risk for HELLP syndrome, while classically preeclampsia/eclampsia is associated with maternal age less than 20 or greater than 45 and in the nulliparous.

Imaging abnormalities are rarely present in HELLP syndrome. However, when present, imaging and clinical presentations are characteristic and complementary in establishing the correct diagnosis. Clinicians and radiologists should be aware of the imaging manifestations, as prompt diagnosis and early treatment are imperative. We describe a case in which the imaging and clinical presentations were characteristic.

CASE REPORT

A 22-year-old woman presented with abdominal pain postpartum. Her pregnancy course was complicated by severe preeclampsia, idiopathic thrombocytopenic purpura, and systemic lupus erythematosus. Immediately in the postpartum period, she developed progressive epigastric abdominal pain that radiated to her back. Her hematocrit level decreased from 36.8% to 29.6%, while her aspartate aminotransferase level rose from 40 to 549 U/L and her alanine aminotransferase level rose from 30 to 321 U/L. During this time, her pain became severe, predominantly within the right upper quadrant. An initial hepatic sonogram was unrevealing. However, further evaluation with

contrast-enhanced computed tomography (CT) showed multiple areas of low attenuation within the liver parenchyma that were nonenhancing compared with the rest of the liver (*Figure*). These low-density areas were preferentially located within the right hepatic lobe. There was no evidence of a subcapsular hematoma. The patient was treated supportively. Her symptoms resolved and laboratory findings normalized. She was discharged home in good condition.

DISCUSSION

Approximately 70% of patients who develop the HELLP syndrome present in the antepartum period and about 30% of patients present after delivery, as in our case. Typical onset is within 48 hours of delivery, with symptoms varying from simple generalized malaise to epigastric pain, nausea, vomiting, and headache. While it is less common to progress from eclampsia and/or the HELLP syndrome to a hypovolemic state and shock, clinicians must maintain a high index of suspicion for hepatic hemorrhage and/or rupture in patients with perinatal complicating disorders.

One study indicated that only 0.53% of 586 women with perinatal HELLP syndrome or preeclampsia had positive imaging findings for hepatic rupture or hemorrhage. Hepatic hematomas were most commonly found in the right hepatic lobe, believed to be secondary to its larger size and subsequent blood flow in most patients; 75% of patients experienced right hepatic lobe injury, while only about 10% had isolated left hepatic lobe hematoma, and 14% had involvement of both hepatic lobes. Imaging evaluation can be done with ultrasound or contrast-enhanced CT for improved sensitivity and specificity.

Sonographic findings include irregularly shaped regions of heterogeneous echoes, both regions of hyper- and hypoechogenicity within the hepatic parenchyma without intrinsic blood flow. The regions are often wedge shaped, appearing similar to a hepatic infarction. Often heterogeneous echoes are also seen in the subcapsular regions compatible with associated subcapsular hemorrhage and/or hematoma. Regions of abnormality can

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Figure. (a, b) Axial contrast-enhanced CT images show ill-defined hepatic hypodensities predominantly located within the right hepatic lobe (arrow). Notice the appearance of a gallstone (arrowhead). (c) A coronal image shows ill-defined hepatic parenchyma hematomas predominantly within the right hepatic lobe (arrow).

be solitary or multiple and sometimes can be associated with hepatic enlargement and edema.

Contrast-enhanced CT examination may be preferable in the unstable patient if fast multislice technology can be employed, given its rapidity and increased sensitivity and specificity. On contrast-enhanced examination, hematoma and/or hemorrhage will appear as single or multiple ill-defined or sometimes wedge-shaped regions of hypoattenuation. Hemorrhage tends to be located near the portal triads, while hematomas can arise from anywhere in the parenchyma. As in ultrasound, pericapsular hemorrhage can occur and appears as a crescent-shaped fluid density, usually hypoattenuating to adjacent normally perfused hepatic parenchyma. An advantage of contrast-enhanced CT is its ability to evaluate active extravasation of intravascular contrast, suggesting active hemorrhage. If contrast is seen outside a vessel and appears the same density as the intravascular contrast,

the source of hemorrhage may be arterial in origin, and close observation or potentially catheter-directed arterial embolization might be needed for treatment.

As the speed and accuracy of CT examination improves with the employment of new low-dose techniques, clinicians are becoming more inclined to employ CT imaging in the diagnosis of patients with these perinatal complications. It is imperative that radiologists be aware of the characteristics and potential lethality of HELLP syndrome and other perinatal complications to ensure correct and timely treatment.

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2. Padden MO. HELLP syndrome: recognition and perinatal management. *Am Fam Physician* 1999;60(3):829–836, 839.