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# Pulmonary embolism in the setting of HELLP syndrome

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**ABSTRACT**
HELLP syndrome (hemolysis, elevated liver enzymes and low platelets) complicates 0.5–0.9% of pregnancies and is frequently associated with multiorgan dysfunction. Treatment relies on prompt diagnosis, delivery and supportive care. The clinical presentation may make the concurrent diagnosis and management of other disease entities challenging. This case report describes a patient with postpartum HELLP syndrome complicated by severe multiorgan dysfunction and pulmonary embolism.


***Keywords***: HELLP syndrome; Pulmonary embolism; Amniotic fluid embolism; Acute fatty liver of pregnancy; Critical care; Multiple organ failure

## Introduction

The first case of HELLP syndrome was described by Pritchard et al. in 1954,[1] although it was not recognized as a distinct entity until 1982.[2] It affects 0.5–0.9% of all pregnancies and 10–20% of parturients diagnosed with severe preeclampsia.[3] Although the diagnosis of HELLP syndrome requires evidence of hemolysis, hepatic dysfunction and thrombocytopenia, specific diagnostic criteria and clinical presentations vary, making the precise diagnosis challenging.[3–6] Furthermore, HELLP syndrome may be complicated by multiorgan dysfunction, which makes it difficult to differentiate from disseminated intravascular coagulation (DIC), pulmonary embolism (PE), amniotic fluid embolism (AFE), acute

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fatty liver of pregnancy (AFLP), and thrombotic thrombocytopenic purpura (TTP). This case report describes a patient with postpartum HELLP syndrome complicated by severe multiorgan dysfunction and pulmonary embolism.

## Case report

A 29-year-old nulliparous woman was admitted from the outpatient clinic at 26 weeks and three days of gestation for anhydramnios and fetal intrauterine growth restriction (IUGR). She denied vaginal bleeding, amniotic fluid leakage or contractions and described normal fetal movements. Oligohydramnios and symmetric IUGR were diagnosed 10 days previously. Her past medical history was significant for a hemoglobin A variant. Her current pregnancy was complicated by hyperemesis gravidarum, gestational hypertension and complete breech position of the fetus.

On admission, she was hypertensive (blood pressure 160/90 mmHg) with a heart rate of 64 beats/min. Blood tests were within the normal range for pregnancy (Table 1). Intermittent variable fetal heart rate decelerations were noted on external monitoring. The obstetric plan was for pregnancy to continue for as long as maternal and fetal conditions allowed. The obstetric anesthesia team was consulted on the day of admission to prepare for possible emergent cesarean delivery. The patient weighed 76 kg; she had a Mallampati class 3 airway and normal spinal anatomy. It was decided that the urgency of delivery would determine anesthetic management: general anesthesia to expedite a category 1 delivery and, barring development of coagulopathy, spinal anesthesia for a category 2–4 delivery.[7]

Magnesium sulfate was prescribed on hospital day 1 for fetal neuroprotection, but discontinued due to nausea. A 24-h urine collection contained protein 577 mg, which in combination with the patient's elevated blood pressure indicated a diagnosis of preeclampsia. Blood pressure remained moderately elevated over the next few days ranging from 117/60 mmHg to 157/80 mmHg, but no treatment was initiated, as she did not develop severe hypertension (>160/110 mmHg). She remained on continuous external fetal heart rate monitoring, and variable fetal heart rate decelerations persisted intermittently with increasing duration. Although initially magnesium sulfate was discontinued, it was restarted and administered as tolerated through to hospital day 7 when the patient vomited and complained of abdominal discomfort. At this time, external fetal monitoring showed fetal bradycardia with minimal variability and it was decided to proceed with a category 1 cesarean delivery.

The patient was transferred to the operating suite where standard American Society of Anesthesiologists monitoring was commenced. General anesthesia was induced with intravenous propofol 150 mg. Rapid-sequence intubation was facilitated with succinylcholine 150 mg and anesthesia maintained with sevoflurane 1.5% in oxygen. A low-transverse cesarean delivery was performed. The fetus was delivered within 2 min of incision, but died shortly thereafter (Apgar scores 1

**Table 1 Laboratory investigations during hospital course**

| Hospital day | 1 | 6 | | | 7 | | | | 8 | | | 9 | 10 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time | 18:00 | 06:00 | 03:00 | 07:30 | 10:00 | 16:00 | 20:00 | 00:00 | 04:00 | 08:00 | 20:00 | 10:00 | 06:00 | 06:00 |
| Event location | Labor ward | | CD | Recovery Area | | ICU | | | OR1 | | ICU | OR2 | ICU | Ward |
| Hemoglobin (g/dL) | 11.2 | 11.6 | 11.7 | 4.2 | 6.0 | 7.4 | 8.8 | 8.2 | 6.8 | 7.9 | 9.2 | 6.9 | 8.3 | 7.9 |
| Hematocrit (%) | 33.1 | 32.7 | 32.8 | 12.1 | 17.1 | 20.7 | 25.4 | 23.1 | 19.8 | 22.2 | 25.4 | 20.1 | 24.2 | 22.9 |
| White cells ($\times 10^9$/L) | 7.9 | 8.1 | 7.7 | 3.6 | 8.8 | 17.8 | 13.6 | 16.6 | 18.3 | 16.8 | 12.3 | 9.1 | 10.9 | 13.4 |
| Platelets ($\times 10^9$/L) | 207 | 204 | 175 | 20 | 30 | 41 | 78 | 83 | 67 | 102 | 86 | 63 | 45 | 202 |
| Glucose (mmol/L) | 4.0 | 5.0 | | 3.3 | 7.6 | 3.3 | 3.8 | 4.4 | 14.6 | 8.4 | 6.0 | 6.8 | 6.9 | 4.9 |
| Creatinine (mg/dL) | 0.76 | 0.70 | | 0.39 | 1.22 | 2.10 | 2.00 | 2.38 | 2.78 | 2.73 | 2.78 | 2.51 | 1.82 | 0.73 |
| Lactate (mmol/L) | | | | | | 8.5 | | 9.5 | 8.7 | 5.8 | | 3.2 | 1.5 | |
| AST (U/L) | 20 | 31 | | | | 706 | 648 | 1053 | 1572 | 1969 | 1903 | 1135 | 674 | 51 |
| ALT (U/L) | 10 | 25 | | | | 533 | 629 | 1264 | 1714 | 1736 | 1306 | 1229 | 1082 | 203 |
| $Bilirubin_{total}$ (mg/dL) | 0.2 | 0.2 | | | | 2.3 | 2.3 | 2.5 | 2.0 | 2.6 | 5.3 | 3.5 | 1.9 | 1.0 |
| LDH (U/L), | | | | | | | | | | 2242 | | 890 | 526 | |
| ALP (U/L) | 90 | 94 | | | | 105 | 91 | 98 | 74 | 87 | 113 | 129 | 111 | 96 |
| PT (s) | | | | 30.5 | 26.3 | 23.0 | 20.2 | 22.0 | 25.4 | 24.6 | 20.1 | 19.3 | 16.4 | 15.0 |
| PTT (s) | | | | 61.7 | 47.8 | 44.1 | 42.6 | 40.6 | 42.1 | 44.4 | 37.9 | 34.3 | 29.5 | 26.4 |
| INR | | | | 3.1 | 2.5 | 2.1 | 1.8 | 2.0 | 2.4 | 2.3 | 1.8 | 1.7 | 1.4 | 1.2 |
| Fibrinogen (g/L) | | | | 0.6 | 0.9 | 1.0 | 1.4 | 1.6 | 1.7 | 1.7 | 3.0 | 3.6 | 5.2 | |

CD: cesarean delivery; OR1: decompression laparotomy, followed by return to ICU; OR2: washout and closure, followed by return to ICU; AST: aspartate transaminase; ALT: alanine transaminase; LDH: lactate dehydrogenase; ALP: alkaline phosphatase; PT: prothrombin time; PTT: activated partial thromboplastin time; INR: international normalized ratio.