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# Postpartum hepatic rupture and intestinal fistula associated with severe pre-eclampsia

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**Summary**

Here, the authors present a case of severe pre-eclampsia complicated by postpartum HELLP syndrome. A 29-year-old pregnant woman with severe pre-eclampsia at 30 weeks of gestation was admitted to the present clinic with hypertension and proteinuria. A cesarean section was performed at $31^{+3}$ weeks of gestation due to fetal distress and a history of cesarean section. The postpartum period was uneventful until two days after the cesarean section, when the patient began to experience epigastric pain, nausea, and vomiting. Subsequent laboratory tests were consistent with HELLP syndrome. Development of hemoperitoneum led to the patient being conveyed to surgery whereupon the authors discovered a large hematoma. They also identified that the liver capsule had a 5-cm tear. Unfortunately, the patient was diagnosed with an intestinal fistula 12 days after surgery. They therefore recommend that caution should be exercised closely monitoring for new symptoms in patients with pre-eclampsia in order to detect the potential development of postpartum HELLP syndrome.

Key words: HELLP syndrome; Hepatic rupture; Intestinal fistula; Postpartum period; Pre-eclampsia.

## Introduction

HELLP is a syndrome featuring hemolysis, elevation of liver enzymes, low platelet counts, and blood smears which are microangiopathic. An earlier prospective study indicated that HELLP syndrome developed solely in patients with pre-eclampsia, and was detected in 19.3% of preeclamptic cases [1]. The risk of recurrence for HELLP syndrome is 3–5%, while that of pre-eclampsia lies within a range of 19.5–25% [2]. Risk is higher if the occurrence is early in pregnancy and is associated with chronic hypertension [3]. Fortunately, only approximately 15% of HELLP syndrome cases are recognized before the 27$^{th}$ week of pregnancy.

HELLP syndrome is associated with several adverse maternal complications which commonly involve abruptio placentae, disseminated intravascular coagulation (DIC), pulmonary edema, acute renal failure, and subcapsular liver hematoma [3]. However, subcapsular hematoma and hepatic rupture are very unusual catastrophic complications of pre-eclampsia/eclampsia and HELLP [4], which could progress rapidly and carries a high mortality rate. Under normal circumstances, hepatic rupture would predominantly occur during the final trimester, but to a lesser extent, can occur in the first 24 hours of birth [5].

Here, the authors present an unusual case of severe pre-eclampsia which was complicated with postpartum HELLP syndrome. This was an atypical case since prior to diagnosis of a ruptured liver and hepatic hematoma, the patient had not shown any symptoms of HELLP syndrome.

## Case Report

Written informed consent was obtained from the patient involved in this study. The study was approved by the Ethics Committee at the Second Affiliated Hospital, Zhengzhou Medical University, China.

The case was a 29-year-old pregnant woman (gravida 2, para 1) who presented in March 2014 to the Department of Obstetrics & Gynecology, Second Affiliated Hospital, Zhengzhou Medical University with pre-eclampsia in her 30$^{th}$ gestational week. Her blood pressure was 147/114 mmHg and pretibial edema (++) was detected during her physical examination. Laboratory data, including hematological, biochemical, and coagulation profile were within their respective reference intervals. Urine was positive for protein, with a 24-hour specimen containing 580 mg of protein. According to these findings, the patient was diagnosed with mild pre-eclampsia. Treatment included sedatives, antispasmodics, and the promotion of fetal lung maturity. Magnesium sulfate infusion (2 grams/hour; two days) and steroids were administered (dexamethasone; totally 30 mg for two days), with supportive therapy as required.

The patient remained stable until $31^{+3}$ weeks of gestation, at which point, she complained of abdominal pain without vomiting. Subsequently, the fetus developed bradycardia, and was unstable. Hematological parameters were unremarkable; hemoglobin was 11.7 g/dl and platelet count was $107\times103/mm^3$. For this reason, and because of the patient's previous cesarean history, the authors performed a cesarean section. A live male was born weighing 1,317 grams, exhibiting an Apgar score of 2 in the first minute of life, and an Apgar score of 9 in the fifth minute. Specialist care was provided by the neonatal intensive care unit.

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Table 1. — *Clinical data arising from laboratory tests at presentation and at follow-up. Normal ranges are based on the Chinese population (Op = operation; N = not detected).*

| Variable | 6-hr pre-op | 18-hr post-op | 30-hr post-op | 40-hr post-op | 7-day post-op | 15-day post-op | Normal range |
|---|---|---|---|---|---|---|---|
| Erythrocyte count ($\times 10^{12}.L^{-1}$) | 2.39 | 1.93 | 1.61 | 3.78 | 3.92 | 3.23 | 3.8-5.1 |
| Hemoglobin ($g.L^{-1}$) | 74 | 59 | 47 | 108 | 114 | 82 | 115-150 |
| Hematocrit (%) | 21.3 | 17.3 | 14.0 | 31.7 | 32.1 | 34 | 35-45 |
| White-cell count ($\times 10^{9}.L^{-1}$) | 38.52 | 47.45 | 7.50 | 13.95 | 19.82 | 7.9 | 3.5-9.5 |
| Platelet count ($\times 10^{9}.L^{-1}$) | 73 | 77 | 25 | 21 | 54 | 45 | 125-350 |
| Aspartate aminotransferase ($U.L^{-1}$) | N | 11100 | 12980 | 6460 | 164 | 65 | 13-35 |
| Alanine aminotransferase ($U.L^{-1}$) | N | 7960 | 11940 | 4520 | 138 | 55 | 740 |
| Albumin (g.L-1) | N | 27.2 | 27.8 | 27.3 | 34.2 | 35 | 40-55 |
| Alkaline phosphatase ($U.L^{-1}$) | N | 163 | 223 | 123 | 87 | N | 35-100 |
| Lactate dehydrogenase ($U.L^{-1}$) | N | 13386 | N | 6470 | 210 | N | 115-220 |
| Potassium (mmol.L-1) | N | 8.42 | 5.11 | 4.39 | 4.76 | 4.51 | 3.5-5.3 |
| Creatinine ($\mu mol.L^{-1}$) | N | 218 | 145 | 150 | 49 | 43 | 44-115 |
| Urea nitrogen ($mmol.L^{-1}$) | N | 12.20 | 9.30 | 9.41 | 20.20 | 9.9 | 3.90-7.10 |
| prothrombin time (s) | 16.4 | 25.5 | 24.6 | 38 | 54 | 34 | 11-14 |
| Fibrinogen ($g.L^{-1}$) | 2.38 | 1.9 | 1.18 | 2.46 | 8.12 | 4.42 | 2-4 |
| Fibrin degradation product ($\mu g.mL^{-1}$) | 17.3 | 52.8 | 48.9 | 27.6 | 150.5 | 72.5 | 0-5 |
| d-dimer (μg.mL-1 | 10.2 | 25.4 | 30.1 | 17.3 | 65 | 35.5 | 0-1 |

An estimated 1 L of abdominal ascitic fluid was drained from the patient during the operation. Blood pressure remained around 100/80 mmHg during the cesarean operation. The postpartum period remained uneventful until two days following the operation, when the patient became pale and exhibited shortness of breath. The authors then transferred her to the surgical intensive care unit. A few minutes later, she appeared to undergo respiratory arrest, requiring acute endotracheal intubation. Laboratory findings were consistent with those of HELLP syndrome, including haemolysis (hemoglobin: 7.4 g/dl, lactate dehydrogenase [LDH]: 13,300 IU/L), elevated liver enzymes (aspartate aminotransferase [AST]: 7,960 IU/L; alanine aminotransferase [ALT]: 11,100 IU/L), and low platelet counts ($73\times 10^{3}/mm^{3}$) at the $18^{th}$ hour of the postpartum period (Table 1). Based upon these findings, the patient was observed for the potential development of postpartum HELLP syndrome.

The patient then rapidly developed anuria, dyspnea, confusion, and hypotension with blood pressure of 70/50 mmHg. Hyperkalemia (8.42 mmol/L) and an acute rise of SCr to 166 μmol/L indicated acute renal failure. Meanwhile, the authors initiated plasma exchange via fresh frozen plasma infusion and continuous renal replacement therapy (CRRT). Anticoagulant therapy for DIC and central retinal artery occlusion (CRAO) were also carried out.

An ultrasound examination revealed 500-700 ml of seroperitoneum, and had increased over time. Immediate surgical exploration revealed a large hepatic hematoma and a 5-cm rupture of the liver capsule and hemoperitoneum (Figure 1). The authors transferred surgery to the liver transplant team who evacuated the hemoperitoneum and explored, and the liver transplant team took lead in terms of surgical intervention and carried out surgical exploration, but without hepatectomy, embolization, gauze packing, and artery ligation. Five days after delivery, the hemorrhage was controlled. However, the patient had received more than 50 units of packed cells, large quantities of fresh frozen plasma, cryoprecipitated antihemophilic factor (CRYO), and platelets, without improvement in her coagulation disorder. The patient remained hemodynamically unstable and required additional transfusion of fresh frozen plasma, platelets, and blood. She developed acute kidney failure, lactic acidosis, respiratory insufficiency, liver failure, and major coagulopathy.

Seven days after liver surgery, the gauze was removed from the abdominal cavity, and the authors found that the bleeding had reduced significantly, and that liver function had improved. Unfortunately, the patient asked to be transferred to another hospital 12 days after operation, following the diagnosis of an intestinal fistula. Six months post-delivery, the patient was discharged in a stable condition, and allowed to go home. The patient recovered very well at follow-up so far.

## Discussion

Pre-eclampsia is a condition involving hypertension, the onset of which occurs in the second half of pregnancy. The characteristic features of this condition are proteinuria and edema. Untreated, this condition can develop into pre-eclampsia which is associated with convulsions and in some cases, HELLP syndrome. The diagnosis of HELLP syndrome involves identifying patients with increased LDH (>600 U/L), increased AST and ALT (>70 U/L), and reduced platelets (<100,000/μL) [6, 7]. The presence of severe epigastric pain, low platelet count, and high ALT and AST levels, are typical clinical characteristics that could indicate HELLP syndrome [8].

In spite of improvements in antenatal care, HELLP syndrome is a disease of variable presentation with high mortality and morbidity. Maternally, HELLP syndrome has been associated with DIC (20%), placental abruption (16%), acute renal failure (7%), acute pulmonary edema (6%), and less commonly, sub-capsular liver hematoma (1.8%) and hepatic rupture (0.9%) [6]. While hepatic rupture is particularly rare, and fewer than 200 cases have been published [7]. However, when sub-capsular hematomas rupture spontaneously, they are associated with high maternal mortality (86%), and up to 70% fetal mortality [9].

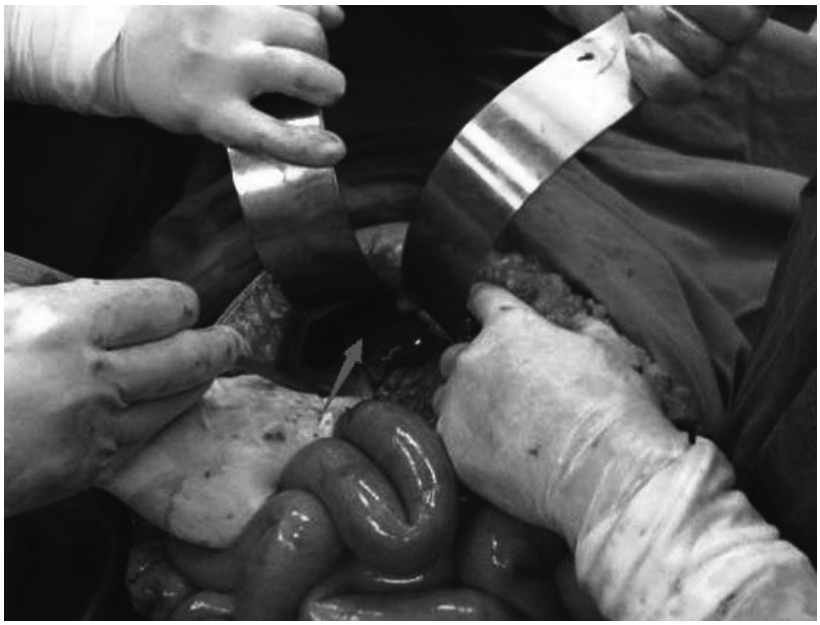

Figure 1. — Image acquired during emergency surgery showing a hepatic subcapsular hematoma with a maximal depth of 5 cm.

Consequently, it is very important to be very vigilant with such patients in order to recognize the relevant symptoms and act accordingly [10].

Approximately 30% of HELLP syndrome cases occur during the postpartum period, typically occurring within 48 hours. Hepatic rupture can occasionally occur within the first two days of birth but has been known to manifest as long as six weeks post-delivery [6]. Whether these complications occur before or after birth, they can represent serious obstetric conditions, and can rapidly lead to life threatening situations. The maternal mortality rate of such consequences can be as high as 24% [11]. In the present patient, the first symptom of postpartum HELLP syndrome emerged around 20 hours post-delivery, and all symptoms had appeared by 24 hours postpartum. Following delivery, the condition of the present patient deteriorated rapidly. Acute renal insufficiency required treatment with hemodialysis, and the patient went on to develop progressive liver failure, along with extensive peritoneal ascites.

If the patient is stable and sub-capsular hematoma is the only symptom, then all that is required is simple but close observation. However, immediate surgical treatment is recommended when patients show signs of hemodynamic instability. Patients with HELLP syndrome, who then suffer sub-capsular rupture of a hepatic hematoma need urgent treatment as this condition is a clear medical emergency. The appropriate course of action is to immediately deliver the fetus by involves immediate cesarean section and the repair the liver surgically, which will involve extensive packing of the liver in order to control blood loss. In some cases, patients in this situation may require interruption of the hepatic artery, embolization, or even hepatic resection. Vigil-De Gracia *et al.* [12] reported that the best survival rates and total survival rate of patients undergoing liver transplantation, or hepatic artery embolization, was 92–100% and 96.7%, respectively, when carried out with or without surgical exploration. The most common procedure involves surgical exploration with embolization and artery ligation but without hepatectomy. However, survival rates for this procedure was reported to be 74.2%. Over the last decade, this specific treatment protocol has reduced maternal morbidity to 51%. Supportive therapy, such as the transfusion of blood, and non-surgical medical support, is routinely used in patients experiencing hepatic hemorrhage but without rupture, and hepatic artery ligation shows high rates of survival [12].

Hepatic hematomas rarely occur in patients with pre-eclampsia and HELLP syndrome, but if they do, this represents a serious condition which can be life-threatening. In such cases, prompt radiological assessments are vital in reducing morbidity and mortality [13]. The present case therefore clearly highlights the need for urgent sonographic examinations in patients who experience sudden pain in the right upper quadrant during the post-delivery period. It should also be noted that patients experiencing more severe symptoms exhibit a more protracted course. Furthermore, renal function in these patients takes a longer period of time to return to normal [14, 15]. The present case also demonstrates how intensive support for such patients is very important, including the management of fluids, and hematological support. It is also vital to assess renal and hepatic function on a regular basis.

When pre-eclampsia patients present with epigastric pain during the postpartum period, clinicians should take due consideration that this is one of the first signs of HELLP syndrome. This could prevent the development of permanent sequelae of HELLP syndrome and maternal mortality. Prognosis depends upon the early recognition of diagnos-

tic indicators, prompt investigation, and surgical intervention. Early involvement of a surgeon with experience on liver surgery is essential in order to optimize the chance of successfully controlling hemorrhage.

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