Annals of Case Reports and Clinical Studies
Review Article (ISSN: 2834-5673)

Subcapsular Liver Hematoma Associated with Preeclampsia: A Two-Case Series and Literature Review

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Citation: *El Karoini D, Marfour H, Bouadi O, Gotni A, Assal A, Benssouda M, et al. Subcapsular Liver Hematoma Associated with Preeclampsia: A Two-Case Series and Literature Review. Ann Case Rep Clin Stud. 2026;5(2):1-7.*

Received Date: 18 February 2026; **Accepted Date:** 20 January 2026; **Published Date:** 21 January 2026

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ABSTRACT

Subcapsular liver hematoma (SLH) is a rare but potentially life-threatening complication of severe preeclampsia and HELLP syndrome. Diagnosis is often delayed because of nonspecific clinical manifestations, exposing affected patients to a high risk of maternal and fetal mortality.

We report a two-case series of SLH occurring in patients managed for complicated preeclampsia. Clinical, biological, radiological, therapeutic, and outcome data were retrospectively analyzed and compared with findings from the literature.

The first patient, a 30-year-old woman, developed severe HELLP syndrome with massive hepatic cytolysis, profound thrombocytopenia, and multiorgan failure. The diagnosis of SLH was confirmed by ultrasonography and computed tomography, revealing a 6 × 5 cm hematoma. Multidisciplinary conservative management resulted in a favorable outcome after a prolonged intensive care stay. The second patient, a 44-year-old woman admitted with hemorrhagic shock, was found intraoperatively to have a large hepatic subcapsular hematoma during an emergency cesarean section. Despite conservative surgical management with hepatic packing, the clinical course was rapidly fatal.

These cases illustrate the clinical and prognostic heterogeneity of SLH in the setting of preeclampsia and HELLP syndrome. Prognosis is closely related to the timeliness of diagnosis, initial hemodynamic status, and prompt multidisciplinary management.

SLH should be systematically considered in any preeclamptic patient presenting with atypical abdominal pain. Early imaging and individualized management may significantly improve maternal and fetal outcomes.

INTRODUCTION

Subcapsular liver hematoma is a severe complication of preeclampsia, resulting from spontaneous bleeding between the Glisson's capsule and the hepatic parenchyma. Its first description in the context of pregnancy dates back to 1844 [1,2]. Although rare, this complication is particularly feared, occurring in less than 2% of

pregnancies complicated by HELLP syndrome [3] and in approximately 1 in 40,000 to 250,000 pregnancies [4]. It is associated with a maternal mortality rate reported to reach 18–86% [5].

The diagnosis of subcapsular liver hematoma relies on a high index of clinical suspicion in the presence of atypical pain, particularly abdominal, epigastric, or referred pain [3–6]. Given the potentially life-threatening nature of this condition, prompt multidisciplinary management, sometimes including emergency delivery, is often required [1,2].

In this context, we report two cases of subcapsular liver hematoma occurring in patients presenting with preeclampsia or eclampsia.

CASE REPORTS

Case 1

A 30-year-old woman, gravida III para III, with no significant medical history, was admitted at 31 weeks and 6 days of gestation for severe preeclampsia complicated by HELLP syndrome. On admission, her blood pressure was 170/110 mmHg, associated with severe neurological signs.

An emergency cesarean section was performed, resulting in the delivery of a male newborn weighing 1300 g, with an Apgar score of 5/10.

Intraoperative exploration revealed a retroplacental hematoma with complete placental abruption (300 g), with no visible hepatic lesions.

In the immediate postpartum period, the patient was transferred to the intensive care unit and treated with magnesium sulfate and continuous nicardipine infusion. Postoperative laboratory tests showed a decrease in hemoglobin levels to 10.7 g/dL compared with 12.6 g/dL on admission, thrombocytopenia at 70,000/mm³ rapidly worsening to 15,000/mm³, and marked hepatic cytolysis with AST at 2104 IU/L and ALT at 5160 IU/L (versus 149 and 79 IU/L, respectively, prior to delivery). Lactate dehydrogenase levels increased to 1196 IU/L from 747 IU/L, and serum creatinine was 9.16 mg/L.

Given the clinical and biological deterioration, abdominal ultrasonography and computed tomography were performed, revealing a subcapsular liver hematoma measuring 6 × 5 cm **(Figure 1)**.

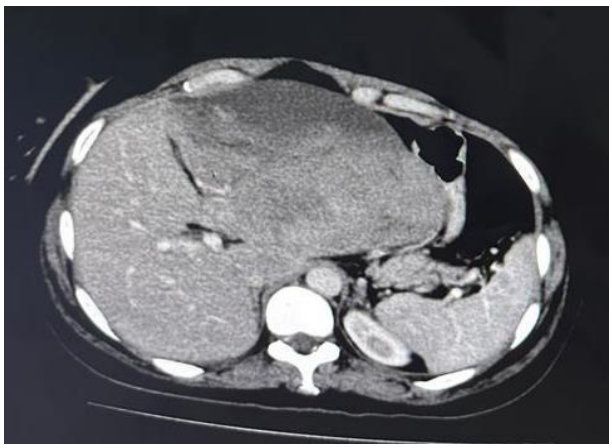

Figure 1. Subcapsular liver hematoma involving the left hepatic lobe, measuring 6 × 5 cm.

A multidisciplinary conservative management strategy was adopted, including hemodynamic stabilization, blood transfusions, albumin administration, non-invasive ventilation, corticosteroid therapy, and appropriate antibiotic treatment. Under this approach, the patient's clinical, radiological, and biological status gradually improved.

Follow-up laboratory tests demonstrated an increase in hemoglobin to 9.3 g/dL, normalization of platelet count to 284,000/mm³, marked improvement in renal function with serum creatinine decreasing to 6.5 mg/L, and normalization of liver enzymes (AST 62 IU/L, ALT 28 IU/L). Serial follow-up ultrasonography confirmed progressive liquefaction and reduction of the hematoma size, decreasing successively to 10 × 5 cm, then 8 × 3.5 cm, and finally 6.7 × 4 cm, before near-complete resolution.

After a 32-day stay in the intensive care unit, the patient was discharged in good clinical condition with stabilized laboratory parameters. **(Table 1 and Figure 2)** illustrate the biological and ultrasonographic evolution, highlighting an initial phase of deterioration followed by gradual recovery.

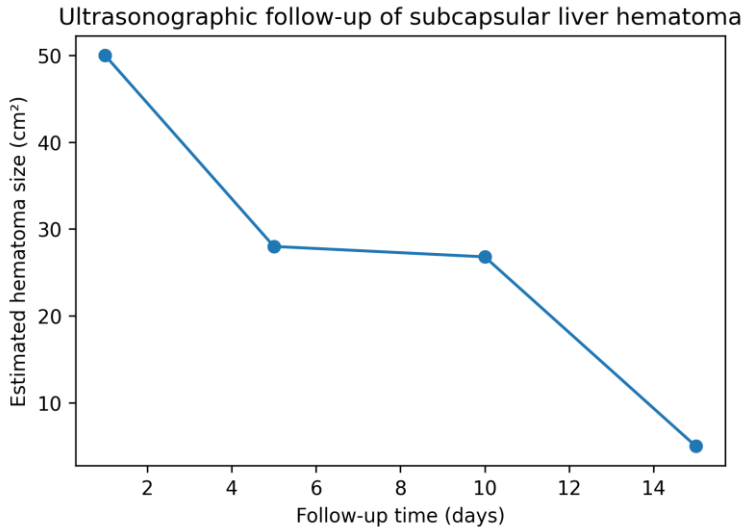

Figure 2. Ultrasonographic evolution of the subcapsular liver hematoma in patient 1, showing a progressive decrease in the estimated surface area (length × width) between day 1 and day 15.

Table 1. Biological evolution (hemoglobin, platelet count, and LDH) in patient 1 presenting with subcapsular liver hematoma in the setting of preeclampsia/HELLP syndrome.

Patient	Parameter	H0	H6	H12	H24	H30
Patient 1	**Hemoglobin (g/dL)**	**12.6**	**10.7**	**7.9**	**5.3**	**8.0**
	Platelets (/mm³)	**150,000**	**70,000**	**66,000**	**90,500**	**186,000**

	AST (IU/L)	**149**	**2,104**	**3,500**	**2,220**	**1,970**
	ALT (IU/L)	**79**	**5,160**	**6,207**	**1,393**	**1,465**
	LDH (IU/L)	**747**	**1,196**	**1,706**	**2,752**	**3,120**

Case 2

A 44-year-old woman, gravida I para I, with no significant medical history, was admitted at 38 weeks and 4 days of gestation with hemorrhagic shock.

Given the patient's hemodynamic instability, an emergency cesarean section was indicated.

The procedure resulted in the delivery of a female newborn weighing 2470 g, with an Apgar score of 6/10.

Intraoperative exploration revealed a retroplacental hematoma with complete placental abruption. Hepatic exploration showed a large subcapsular liver hematoma measuring approximately 15 cm.

As hemostasis was achieved and the patient was stabilized intraoperatively, a conservative surgical approach was adopted with placement of hepatic packing **(Figure 3)**.

In the immediate postoperative period, the patient was stabilized and transferred to the intensive care unit.

Three hours postoperatively (H3), the patient developed recurrent hemodynamic instability complicated by non-resuscitable cardiorespiratory arrest.

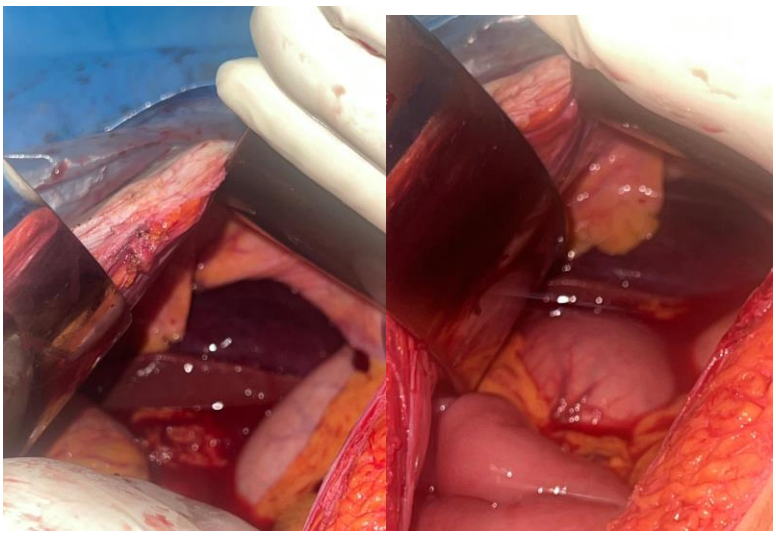

Figure 3. Intraoperative appearance of a subcapsular liver hematoma.

DISCUSSION

Subcapsular liver hematoma is a rare but feared complication of HELLP syndrome and severe preeclampsia. Its incidence is estimated to range from 1 in 40,000 to 1 in 250,000 pregnancies [1,3], and it is associated with a reported maternal mortality rate varying from 17% to 86% across different series [2]. In this context, each new clinical observation contributes to improving the understanding and management of this severe obstetric complication.

The pathophysiology of subcapsular liver hematoma is not fully elucidated. Several authors suggest that pregnancy-related endothelial dysfunction leads to platelet activation and microthrombus formation, resulting in fibrin deposition within hepatic sinusoids, circulatory obstruction, and hepatic necrosis [5-8]. Arterial hypertension and relative hypovolemia are also thought to contribute to hematoma formation [9-11]. In our series, the first patient presented with massive hepatic cytolysis associated with profound thrombocytopenia and multiorgan involvement, whereas the second patient exhibited only moderate cytolysis without thrombocytopenia or renal impairment, reflecting the pathophysiological heterogeneity described in the literature.

Reported risk factors include advanced maternal age, multiparity, chronic hypertension, and a history of preeclampsia or HELLP syndrome [7,12,13]. These factors were present in our cases: the first patient was multiparous, while the second had advanced maternal age (44 years), highlighting the importance of close monitoring in high-risk profiles.

Clinically, symptoms are most often atypical and include abdominal, epigastric, or scapular pain, nausea, headache, or malaise [8,9]. These nonspecific manifestations may delay diagnosis. Imaging therefore plays a crucial role. Ultrasonography is often the initial examination, although its sensitivity is limited, whereas computed tomography and magnetic resonance imaging allow a more accurate assessment of the hematoma and its complications [5,4]. Nevertheless, several authors emphasize the importance of bedside ultrasonography in the emergency setting. Any increase in intra-abdominal pressure—such as vomiting, constipation, trauma, or external compression—may promote the formation and rupture of a subcapsular liver hematoma [9]. Thus, when clinical suspicion exists, immediate hepatic ultrasonography should be performed to confirm the diagnosis. This relatively simple examination can be mastered by trained clinicians, and it is recommended that obstetricians, anesthesiologists, emergency physicians, and intensivists involved in the management of these patients receive specific training to promptly recognize such abnormalities [14]. In our series, ultrasonography enabled suspicion of the hematoma in the first patient, subsequently confirmed by computed tomography demonstrating a large subcapsular hematoma. In the second patient, imaging also contributed to the diagnosis, with an unusual left-lobe localization, reminding that although the right lobe is involved in approximately 75% of cases, left-lobe involvement remains possible [15].

Management depends on maternal hemodynamic status and the extent of the hematoma. In hemodynamically stable patients, a conservative approach is preferred, based on strict bed rest, blood transfusions when necessary, albumin administration, prophylactic antibiotic therapy, and serial ultrasonographic monitoring [1,15]. In cases of rupture or hemodynamic instability, surgical intervention (hepatic packing, hepatectomy, vascular ligation) or arterial embolization may be required, and liver transplantation has been reported in extreme cases, although its benefits remain controversial [2,9].

Prognosis primarily depends on the timeliness of diagnosis, the severity of hepatic involvement, and the initial hemodynamic status. Despite the high maternal and perinatal mortality rates reported in the literature [14,15], neonatal outcome largely depends on gestational age at delivery and the severity of maternal disease.

CONCLUSION

Subcapsular liver hematoma occurring in the context of preeclampsia and HELLP syndrome remains a rare but extremely severe complication, associated with high maternal and fetal mortality. Diagnosis is challenging due to the nonspecific nature of clinical symptoms but must be systematically considered in any preeclamptic patient presenting with atypical abdominal pain. Imaging, particularly emergency ultrasonography followed by computed tomography, plays a central role in the confirmation and follow-up of this condition. Prognosis mainly depends on early diagnosis and the quality of multidisciplinary management.

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