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Autoimmunity, preeclampsia and splenic rupture: a case report and literature review

Abstract: Antiphospholipid antibody (APLA) syndrome is an autoimmune disease which is associated with preeclampsia and can cause thromboembolic events in several organs including the spleen. This report includes a case of post-partum splenic rupture in a woman with preeclampsia in the presence of APLA syndrome and a literature review of splenic rupture during the third trimester and puerperium. Unlike the prominent clinical manifestation of liver hematoma and rupture during preeclampsia, rupture of the spleen can be silent and mistakenly underdiagnosed.

Keywords: Antiphospholipid antibody syndrome; post thrombotic hemorrhage; preeclampsia; splenic rupture.

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Introduction

We present an atypical case of a woman with preeclampsia who had a post-partum splenic rupture that was managed conservatively. Subsequently, she was diagnosed with antiphospholipid antibody (APLA) syndrome and autoimmune hemolytic anemia. Up until this report, all cases of splenic rupture that had been reported resulted in a splenectomy due to their severity. Our report suggests the possibility that subtle cases of splenic rupture may be underdiagnosed and proposes that splenic involvement in preeclampsia may have a similar mechanism to that of hepatic involvement.

Case report

A 24-year-old primigravida, at 35 weeks’ gestation, presented to the obstetrical emergency department with bilateral leg pain and elevated blood pressure. During gestation, she was treated with low-molecular-weight heparin (LMWH) due to a prior deep vein thrombosis (DVT) at the age of 18 years. Thrombophilia work-up was not done prior to pregnancy. Upon admission, her blood pressure was 150/91 mm Hg with bilateral +3 leg edema without any other significant findings. Laboratory results showed mild proteinuria, lactate dehydrogenase (LDH) of 820 U/L, hemoglobin of 7.1 g/dL, negative schistocytes and prolonged partial thromboplastin time of 73 s. Liver enzymes, bilirubin, platelet count, prothrombin time and fibrinogen levels were normal. Fetal ultrasound exam demonstrated an estimated fetal weight compatible with the 10th percentile. Due to fetal growth restriction, hemoglobin decrease and the possibility of hemolysis according to the laboratory findings, the patient was diagnosed as having severe preeclampsia [1]. Infusion of magnesium sulfate was initiated as well as treatment with 2 U of packed red blood cells; eventually, the patient delivered a healthy newborn weighing 2130 g, by an uneventful Cesarean delivery due to failed induction.

During puerperium, hemoglobin levels decreased furthermore to 6.1 g/dL, with no obvious vaginal or intra-abdominal bleeding, and the patient was transfused with additional 2 U of packed red blood cells. In addition, due to her complaints regarding leg pains, she was treated with a therapeutic dosage of LMWH for 2 days until a repeated venous duplex scan was performed, demonstrating only an old left femoropopliteal vein DVT. In spite of repeated blood transfusions, the patient’s hemoglobin concentration decreased to 5.5 g/dL with no hemodynamic compromise. In addition, she had elevated LDH levels, a repeated test for schistocytes that turned positive in her blood smear, and a positive direct as well as an indirect Coombs test, with no specific alloantibodies. A possible diagnosis of autoimmune hemolytic anemia was suggested. In addition, in search of the source of the intra-abdominal bleeding, an abdominal computed tomography was performed, demonstrating an enlarged spleen with surrounding varicose veins (see Figure 1), left spleno-renal shunt, third-grade splenic multiple ruptures and a large splenic hematoma without active bleeding (see Figure 2). An additional 2 U of packed red blood cells was transfused, and...
the patient was transferred to the intensive care unit (ICU) for observation.

At the ICU, the patient continued to be symptomatic; as a result, an investigating laparoscopy was performed, demonstrating an enlarged spleen with a hematoma in the inferior pole with no impending rupture; so conservative management was chosen and splenectomy was not performed. Concomitantly, high concentrations of antiphospholipid antibodies supported the diagnosis of APLA syndrome (anti-cardiolipin IgM 70 U/mL, anti-cardiolipin IgG 79 U/mL, anti-β2 glycoprotein I IgM 188 U/mL, anti-β2 glycoprotein I IgG 47 U/mL and β2 microglobulin 3490 μg/L), while anti-nuclear antibodies and double-stranded DNA antibodies were negative; thus systemic lupus erythematosus was ruled out. Treatment with oral glucocorticosteroids and LMWH were initiated, and the patient was discharged 3 weeks after admission for ambulatory follow-up.

### Discussion

Splenic rupture during the third trimester or post-partum is a rare event. We searched the literature using MEDLINE for all cases reported in apparently normal spleens since 1988 using the terms postpartum/post-partum/pregnancy and splenic rupture (see Table 1). Cases of rupture occurring in the first trimester, or in association with a prior known pathology of the spleen, were excluded. Of note, all cases resulted with a splenectomy, two cases occurred following LMWH treatment, and four others in association with preeclampsia/eclampsia.

The etiology of splenic rupture is traditionally divided into traumatic or spontaneous rupture. The latter is usually associated with a prior splenic disease, which is then termed pathological rupture. The differential diagnosis of pathological splenic rupture is diverse including infections, malignancies, hematological disorders influencing the spleen or cardiovascular disorders [12]. In our patient, a possible cause for rupture was hemolytic anemia (which caused enlargement of the spleen) or possible splenic thrombosis as demonstrated by the tomographic picture of the surrounding varicose veins. Similar to other thrombotic events, splenic thrombosis can be a manifestation of APLA syndrome, as shown in prior studies [2, 13], making APLA syndrome a possible cause for splenic rupture.

Preeclampsia, which is known to be associated with APLA syndrome [8], might be an additional cause of pathological splenic rupture in our case. Although the association between preeclampsia and hepatic subcapsular or ruptured hematoma is well known, the relationship with splenic rupture is infrequent.
Table 1  Case reports of splenic rupture during pregnancy or post-partum.a,b

<table>
<thead>
<tr>
<th>Case</th>
<th>Presenting symptom and outcome</th>
<th>Additional diagnosis</th>
<th>Rupture timing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>G1P0, 34 weeks' gestation, acute left upper abdominal pain. Emergent cesarean due to suspected placental abruption, delivery of stillbirth [18].</td>
<td>Placenta previa</td>
<td>Antepartum</td>
</tr>
<tr>
<td>2</td>
<td>G3P2, term pregnancy, two previous cesarean deliveries, chronic hypertension. Repeated cesarean section due to contractions [16].</td>
<td>Superimposed preeclampsia and HELLP syndrome</td>
<td>Postpartum</td>
</tr>
<tr>
<td>3</td>
<td>G5P1, 41 weeks' gestation, one previous cesarean delivery. Elective repeated cesarean section [14].</td>
<td>Antithrombin-III deficiency, anticoagulation</td>
<td>Postpartum</td>
</tr>
<tr>
<td>4</td>
<td>G1P0, 28 weeks' gestation, upper left abdominal pain. Delivery of stillbirth and patient death [7].</td>
<td>Carrier of double heterozygosis for hemoglobin C/β-thalassemia</td>
<td>Antepartum</td>
</tr>
<tr>
<td>5</td>
<td>G4P2, 34 weeks' gestation, diffuse abdominal pain. Emergent cesarean section due to suspected placental abruption [15].</td>
<td>Homozygous MTHFR deficiency, anticoagulation</td>
<td>Antepartum</td>
</tr>
<tr>
<td>6</td>
<td>38 years old with unknown gestational age, hemodynamic collapse. Emergent cesarean section, newborn with severe perinatal asphyxiation [6].</td>
<td></td>
<td>Antepartum</td>
</tr>
<tr>
<td>7</td>
<td>G6P3, 32 weeks' gestation, one previous cesarean delivery. Elevated blood pressure and severe headache. Delivery of stillbirth and patient death [11].</td>
<td>Preeclampsia, ruptured liver</td>
<td>Antepartum</td>
</tr>
<tr>
<td>8</td>
<td>G2P0, 36 weeks' gestation, triplet pregnancy. Cesarean hysterectomy due to uterine atony [17].</td>
<td>Eclampsia</td>
<td>Postpartum</td>
</tr>
<tr>
<td>10</td>
<td>G2P1, 37 weeks' gestation. Elevated blood pressure and proteinuria [3].</td>
<td>Severe preeclampsia</td>
<td>Postpartum</td>
</tr>
<tr>
<td>11</td>
<td>G1P0, term pregnancy and delivery. Left hypochondrial pain with radiation to shoulders [5].</td>
<td>Huge splenic cyst</td>
<td>Postpartum</td>
</tr>
<tr>
<td>12</td>
<td>G3P2, term pregnancy, abdominal and back pain. Emergent cesarean section due to fetal bradycardia [9].</td>
<td>Partial splenic torsion, presumably during labor</td>
<td>Antepartum</td>
</tr>
</tbody>
</table>

aAll cases went through splenectomy and had normal spleens on pathological examination, except cases number 4 and number 11.
bG=Gravidity; P=Parity; HELLP=Hemolysis, Elevated Liver enzymes, Low Platelets; MTHFR=Methyl-Tetra-Hydro-Folate-Reductase.

Indeed, we found only four publications describing splenic rupture in the presence of preeclampsia. Barton and Sibai [4], who reviewed the entity of acute pancreatitis associated with preeclampsia, suggested that vascular endothelial injury can be the underlying cause of pancreatic injury as it is in other manifestations of preeclampsia. We propose that a similar mechanism of vascular injury and thrombosis, especially in the presence of APLA syndrome, can be the cause of postpartum splenic rupture complicating preeclampsia. Moreover, it is possible that some cases remain sub-clinical and underdiagnosed, provided that the patient is hemodynamically stable. In such cases with concealed bleeding, the spleen can be spared and conservative management can be used.

In summary, we suggest that the unique combination of APLA syndrome and preeclampsia could have caused splenic rupture following a thrombotic hemorrhage in the splenic vasculature caused by an APLA syndrome thrombotic event and enhanced by the vasculature damage in a similar pattern associated with preeclampsia. Since scarce previous reports [10] failed to demonstrate any correlation between anticoagulation...
treatment and splenic rupture, it is not clear whether it had an additional effect. Our case suggests that, in the absence of hemodynamic compromise, diagnosis of splenic rupture can be delayed or misdiagnosed. It is therefore vital for clinicians to consider the possibility of concealed splenic bleeding in patients with APLA syndrome and/or preeclampsia, since symptoms may be subtle and implications may be severe.

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References


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