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Spontaneous rupture of falciparum malarial spleen presenting as hemoperitoneum, hemothorax, and hemoarthrosis

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

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Patient: Male, 29
Final Diagnosis: Spontaneous spleen rupture
Symptoms: Abdominal distension • abdominal pain • abdominal tenderness • disorientation • fever • hemothorax • hip pain • reduced urine output
Medication: —
Clinical Procedure: Splenectomy
Specialty: Infectious Diseases

Objective: Rare diseases
Background: Spontaneous rupture of a malarial spleen is uncommon even in the endemic regions of malaria. This may lead to delayed or missed diagnosis of splenic rupture, which may be life threatening.

Case Report: We are reporting a patient with *P. falciparum* malaria who developed a spontaneous splenic rupture encountered in our department. A 29-year-old male patient with history of high grade intermittent fever with chills for 4 days followed by disorientation and reduced urine output and abdominal pain with distension associated with bilateral hip pain and dyspnea with bilateral chest pain (mainly on the left side) for 1 day. There was no history of any trauma or abnormal bleeding. Investigations revealed *P. falciparum* malaria, hemoperitoneum, hemothorax, and hemoarthrosis. Laparotomy confirmed hemoperitoneum with about 1.5 L of blood-stained fluid, enlarged friable spleen with rupture of the splenic capsule on the inner surface, and active bleeding. Splenectomy was performed. The patient was diagnosed with malarial spleen and received antimalarial therapy.

Conclusions: Splenic rupture with hemoperitoneum should be managed with laparotomy and splenectomy, along with antimalarial drugs. A high index of suspicion is needed to detect these complications early.

Key words: spontaneous rupture • spleen • malaria

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Background

Spontaneous rupture of malarial spleen is uncommon even in the malaria endemic regions. This may lead to delayed or missed diagnosis of splenic rupture, which may be life threatening [1]. It is an important and life threatening complication of *Plasmodium vivax* infection, but is rarely seen in *Plasmodium falciparum* malaria [2-4]. Very few case reports are available in the literature documenting spontaneous rupture of malarial spleen [5-9]. We are reporting a patient encountered in our department with *P. falciparum* malaria who developed a spontaneous splenic rupture.

Case Report

This 29-year-old male patient had a history of high grade intermittent fever with chills for 4 days followed by disorientation and reduced urine output and abdominal pain with distension associated with bilateral hip pain and dyspnea with bilateral chest pain (mainly on the left side) for 1 day. There was no history of trauma or abnormal bleeding. On admission, he was febrile, appeared to be toxic, dehydrated, and pale and was disoriented. His extremities were cold and his pulse rate was 122/min. His abdomen was distended with diffuse tenderness mainly over the left hypochondrium, with hepato-splenomegaly. There was also bilateral diminished air entry. The hemoglobin level was 7.2 g% and peripheral smear showed *P. falciparum* species. Chest X-ray showing marked bilateral hemothorax on the left side, so left intercostal chest tube was inserted. Sonography of the abdomen revealed a splenic hematoma and enlarged spleen and liver with free fluid in the abdomen. Pelvic-abdominal CT showed a large perisplenic hematoma with multiple splenic lacerations (Figures 1 and 2). MRI pelvis showed bilateral hemoarthrosis in both hip joints (mainly on the left side) (Figure 3). The patient was taken for emergency laparotomy after receiving a transfusion of 4 units of whole blood. Laparotomy confirmed hemoperitoneum (Figure 4), with about 1.5 L of blood-stained fluid, enlarged friable spleen with rupture of the splenic capsule on the inner surface, and active bleeding (Figures 5 and 6). Intra-operatively, the spleen was found to be enlarged and friable, with both poles lacerated and multiple bleeding points. A splenectomy was performed. The patient received antimalarial therapy post-operatively. Histopathology of the specimen showed malarial pigments in macrophages and congested red pulp, thus confirming the diagnosis of malarial spleen.

Discussion

The present case presented to us on the sixth day after onset of fever. Although the patient showed initial clinical improvement



Figure 1. Enhanced CT scan of the abdomen (transverse) shows the ruptured spleen (arrow) and the perisplenic hematoma (arrowheads).



Figure 2. MRI pelvis was showing bilateral hip joints hemoarthrosis (mainly on left side).

following antimalarial therapy, the sudden onset of diffuse acute abdominal pain in the absence of any trauma was unexpected and its cause could not be ascertained. Splenic rupture with hemoperitoneum was only confirmed during the subsequent emergency laparotomy. Spontaneous rupture of the spleen is an uncommon condition. The causes include infectious, neoplastic, and hematological diseases. Only an estimated 2% of falciparum malaria cases present with spontaneous splenic rupture [1]. The first case of spontaneous rupture of the spleen was reported by Atkinson, an English surgeon, in 1874 [10]. A peculiar aspect of this complication is that it



Figure 3. Emergency laparotomy. Photograph demonstrating hemoperitoneum during the surgery.

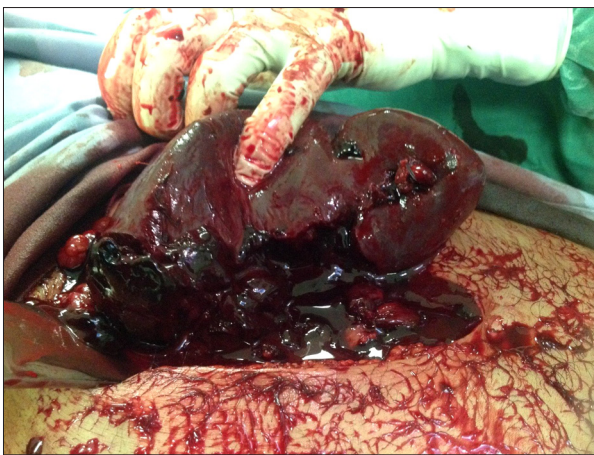


Figure 4. Emergency laparotomy. Photograph demonstrating enlarged, friable with lacerated both poles and multiple bleeding points during the surgery.

can occur in patients on antimalarial prophylaxis and treatment [11]. Although the exact mechanism of splenic rupture in malaria is still not clear, the following mechanisms have been suggested [12,13]: (i) cellular hyperplasia and congestion leading to increase in intrasplenic tension; (ii) splenic compression by increased intra-abdominal pressure during activities like sneezing, coughing and defecation; and (iii) reticuloendothelial hyperplasia resulting in venous congestion, thrombosis, and infarction, which cause sub-capsular hemorrhage and



Figure 5. Enhanced CT scan of the abdomen (3Dtr sagittal reconstruction) shows the ruptured spleen (arrow) and the perisplenic hematoma (arrowheads).



Figure 6. Post-operative splenectomy specimen. Photograph demonstrates an enlarged friable spleen with a rupture of capsule on the inner surface.

eventual stripping of the splenic capsule. A few diagnostic criteria for labeling a case as spontaneous rupture have been recommended by Orloff and Peskin [14]: (i) absence of any history of trauma; (ii) absence of any pre-existing splenic disease; (iii) absence of adhesions or scarring in the spleen; and (iv) presence of grossly normal spleen. To detect this complication early, a high index of clinical suspicion is required, along with

abdominal ultrasonography or contrast-enhanced CT scan of the abdomen. Clinically, left hypochondrial pain occurring during or following treatment of malaria is the commonest presentation of splenic rupture in malaria [15]. Our case presented with left hypochondrial pain but no history of trauma could be elicited. The trigger was probably violent movements by the patient due to the cerebral malaria.

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Conclusions

Spontaneous splenic rupture in complicated falciparum malaria is extremely rare. Splenic rupture with hemoperitoneum should be managed with laparotomy and splenectomy, along with antimalarial drugs. A high index of suspicion is needed to detect these complications early.