Spontaneous rupture of the Spleen due to Malaria: A Case Report

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Introduction:

Malaria infects humans through the bite of the Anopheles mosquito that transmits the Plasmodium parasite. There are five species of plasmodium: falciparum, vivax, ovale , Malariae and Knowlesi[1]. Some Authors have suggested that Malarial splenic complications are associated with plasmodium vivax infection[2] Malaria infection alone has the greatest impact on global health, affecting more than 500 million individuals with more than 2.5 million deaths every year. It can manifest as an acute febrile illness, but it can lead to severe complications such as shock, respiratory distress, severe anemia, convulsions, intra-abdominal organ inflammation, and bleeding caused by spontaneous splenic rupture [3] According to the WHO, malaria is endemic in Sudan, and over 1.8 million cases have been reported in 2019, representing 12.4% of all diseases surveyed by the health sector with a mortality rate of 13 per 10,000. [4]. Malarial infection incidence in Sudan was estimated to be 9 million cases per year in 2007 with 44,000 deaths related to malaria complications[5]. The spleen plays an important role in immunity against malaria by producing antibodies against malaria parasites, this can lead to splenic enlargement making it more susceptible to complications such as hematoma formation and rupture [6].

Case Presentation:

We present a 51years old with a clear medical background who presented to the emergency room with a 2 days history of dull aching pain in the left upper quadrant that radiates to the left shoulder) and abdominal examination showed tenderness and rigidity in the upper quadrant. He denied any history of trauma. The patient received anti-malaria treatment 5 days ago after he was diagnosed with malaria infection. He was tachycardic and hypotensive. The patient was resuscitated in the emergency department with iv fluids, blood transfusion, and iv antibiotics. Computed Tomography (CT) scan of the abdomen and pelvis demonstrated a 4 cm subscapular splenic hematoma with free peritoneal fluid indicating grade III splenic rupture [Fig.1]. No active bleeding or contrast extravasation was visualized. The liver appearance was remarkably normal. An attempt for conservative management was tired, but the patient had not responded to supportive treatment and an exploratory laparotomy and splenectomy were performed [Fig 2-3]. The patient had an uneventful postoperative recovery. Follow-up one month later in the outpatient department showed a return to his baseline function and he received prophylactic vaccination against pneumococcal, Neisseria, and Hemophilus. Fig 1: Computed Tomography (CT) scan of the abdomen and pelvis Fig 2: operative Specimen Showing splenic rupture Fig 3: Fig 2: operative Specimen Showing splenic rupture

Discussion:

Spontaneous rupture of the spleen is a rare etiology with a mortality rate ranging from 15% to 70% depending upon the cause. Orloff and Peskinin 1958 described diagnostic criteria for spontaneous rupture of the spleen that include: the absence of previous trauma, the absence of pathology that could affect the spleen, the absence of splenic adhesions, and the need for a normal spleen on anatomical, histological and infectious workup.[7] Causes of spontaneous splenic rupture include malaria, amyloidosis, infectious mononucleosis, rupture of a splenic aneurysm, malignancy-induced coagulopathy, bleeding disorders, and anticoagulant use. Some authors have reported spontaneous rupture of the spleen due to exostosis of the 10th. [7] The exact mechanism behind spontaneous rupture of the spleen is not known, but several mechanisms have been described in Literature as a hypothesis: Cellular hyperplasia and venous engorgement leading to congestion and increased tension upon the capsule, vascular occlusion, and hyperplasia resulting in thrombosis or ischemia and occasional increase in intra- abdominal pressure with coughing, laughing, sneezing and vomiting leading to increase stress on the abnormal spleen. All these factors combined can lead to subcapsular hematoma formation and rupture of the splenic capsule. Spontaneous splenic rupture happens in the acute phase of the infection, as in the recurrent or chronic malaria infection because spleen enlargement is gradual and tension on the capsule is less pronounced. Moreover, fibrous tissue from the previous infection prevents the development of this complication [8]. Clinical features can be divided into main categories. Systemic features due to intra- abdominal loss manifest as tachycardia, tachypnoea, hypotension, oliguria, and altered mental, and local features due to peritoneal irritation manifest as left upper quadrant pain that radiates to the shoulder (Kehr's sign), abdominal tenderness and guarding on examination. Local abdominal symptoms may be absent in up to half of the cases causing delayed or missed diagnosis with potentially fatal complications and so a high index of clinical susception is required to detect spontaneous splenic rupture, especially in endemic areas [8]. Abdominal ultrasound can detect splenic rupture, subcapsular hematoma, peri splenic collections, and free fluid (blood in the peritoneal cavity. But Computerized tomography (CT) scan of the abdomen can spot the smallest hematoma before the development of splenic rupture and a CT scan is the most useful in the diagnosis and monitoring of patients in whom conservative management is warranted. [6] Management of spontaneous rupture of the spleen can be divided into conservative management and surgical management. Conservative management can be by administration of anti-malarial medications as per local guidelines, observation in the hospital with strict bed rest for up to 14 days, administration of fluids and blood products as required, and monitoring of patient vital signs. Assessment of the spleen by CT scan is required to monitor healing. Splenectomy is reserved for patients who have uncontrollable bleeding, hemodynamic instability, and shock that is not responding to fluid resuscitation. Some authors have described embolization of the splenic artery as an alternative, but it requires well-equipped facilities. [3] . Our case presented with acute shock and hemodynamic instability that did not respond to resuscitation, which warranted surgical intervention. historically, splenectomy was the treatment of choice in all cases of malarial splenic rupture. But recently some authors have advocated conservative treatment as an alternative, especially in hemodynamically stable to prevent the adverse effects of splenectomy [5]. Conclusion: Spontaneous splenic rupture due to malaria is an uncommon complication even in an endemic area and it requires a high index of clinical suspicion, especially in patients having malarial infection presenting with abdominal pain, and hemodynamic instability. Attempts to manage the case conservatively can be offered to patients, but splenectomy should always be done when conservative management has failed or become contra-indicated.

Declarations:

-Ethical:

Ethical approval was obtained from the Department of Surgery, Omdurman Teaching Hospital

-consent:

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal

-Availability of supporting data:

Availability of data is presented in the reference section and its openly available

-Competing interests:

The authors declare no competing interests.

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