

Case Report

## Splenic Infarction Due to Acute Malaria in a 10-Year-Old Girl

Sirajuddin Soomro, Ishrat Mahtam, Roshan Ali, Baqa Muhammad

Department of Pediatric Surgery, Chandka Medical College Children Hospital, Larkana, Sindh, Pakistan

### Keywords

Falciparum Malaria  
Splenomegaly  
Splenic infarction  
Splenectomy  
Complication

### Abbreviations

SI - Splenic infarction

### Abstract

*Non-tender enlargement of the spleen is common in malaria; but splenic infarction is a rare complication. It is frequently masked under acute clinical condition. Until now only a few cases of splenic infarction in patients with falciparum malaria have been published. We describe a 10-year-old girl who presented with signs and symptoms of malaria along with tender massive splenomegaly and worsening pain in the left upper quadrant of the abdomen which was not responding to medications. Contrast enhanced CT scan of abdomen revealed massive splenic infarction. The patient underwent laparotomy and total splenectomy. Her postoperative course was uneventful.*

### INTRODUCTION

Non-tender splenomegaly is a common finding in malaria. This can lead to complications such as hypersplenism, hyper-reactive malarial syndrome, splenic infarction (SI), and spontaneous rupture of the spleen.<sup>(1,2)</sup> SI is often masked by the acute febrile illness of malaria.<sup>(3)</sup> Hyperemia of spleen, plasmodium infection load, endotoxin and allergic response are the pathogenic mechanisms of splenomegaly in acute malaria.<sup>(4)</sup> The splenic artery is an end-artery with few anastomotic branches. Hence, with increased viscosity of the blood, hemorheology is slowed down, allowing the formation of thrombus and SI. It may be a small segmental infarct or a massive global infarct.<sup>(1,5)</sup>

Clinically SI patients presents with signs and symptoms of malaria along with severe pain in the left upper quadrant of the abdomen, pain that radiates to the left lower chest and tender splenomegaly.<sup>(4)</sup> Ultrasonography and computed tomographic (CT) scans can easily diagnose SI.<sup>(3)</sup> Failure to diagnose and treat it promptly can result in hemorrhage, rupture and abscess formation.<sup>(5)</sup> Management of SI may be either conservative or splenectomy.<sup>(1,6)</sup>

### CASE REPORT

A 10-year-old girl was admitted with high-grade fever with rigors for 6 days, severe pain, palpable left upper abdominal mass and pallor for 2 days. Fever appeared on alternate days and was associated with sweating and vomiting. Since two days

before admission she developed severe, continuous abdominal pain that was radiating to the left shoulder. Pain was not responding to any medications. Patient belonged to a village of the district that faced outbreak of malaria in recent floods.

On examination she was ill looking and distressed. She was irritable, crying and tossing in agony. Her temperature was 103°F, pulse rate was 140/min and she was grossly anemic. Lymph nodes were not palpable. The abdomen was scaphoid with a tender firm splenomegaly of 15 x 9 cm. Liver was not palpable. Rest of the physical examination was unremarkable.

Her hemoglobin was 4g/dl, total leukocyte count was 14000/mm<sup>3</sup>, platelet count was 48000/mm<sup>3</sup> and erythrocyte morphology was normal. Blood smear was positive for *Plasmodium falciparum*. Ultrasonography confirmed a massive splenomegaly. She was admitted to the hospital and treated with antimalarials, antipyretics, analgesics and blood transfusion. But, her abdominal pain persisted. A contrast enhanced CT scan confirmed massive splenic infarction. (Fig 1)

Patient underwent total splenectomy by open laparotomy. At surgery, the omentum was found to be adherent to the spleen. Large areas of splenic necrosis were noted. (Fig 2) Intra-operative rupture was avoided by careful dissections.

The post-operative course was uneventful and she was discharged on sixth postoperative day after prophylactic vaccination. Histological examination confirmed hemorrhagic infarction of the splenic parenchyma.

## DISCUSSION

Pakistan has 1.5 million cases of malaria each year which kills hundreds of thousands of people, especially children under five years of age.<sup>(7)</sup> Almost all severe cases of malaria are caused by

*Plasmodium falciparum* and the spleen is an important host-defense against such infection.<sup>(1)</sup> Non-tender splenomegaly is frequently seen in malaria and it resolves gradually with standard anti-malarial therapy. Splenic infarction as a complication of malaria is rare. Until now only a few cases of splenic infarction have been reported in young adults with falciparum malaria; but none in pediatric literature. Sub-acute bacterial endocarditis, polycythemia vera, Evans syndrome, sickle cell disease, thrombo-embolism and enteric fever are the other causes of splenic infarction in children.<sup>(5,6)</sup>

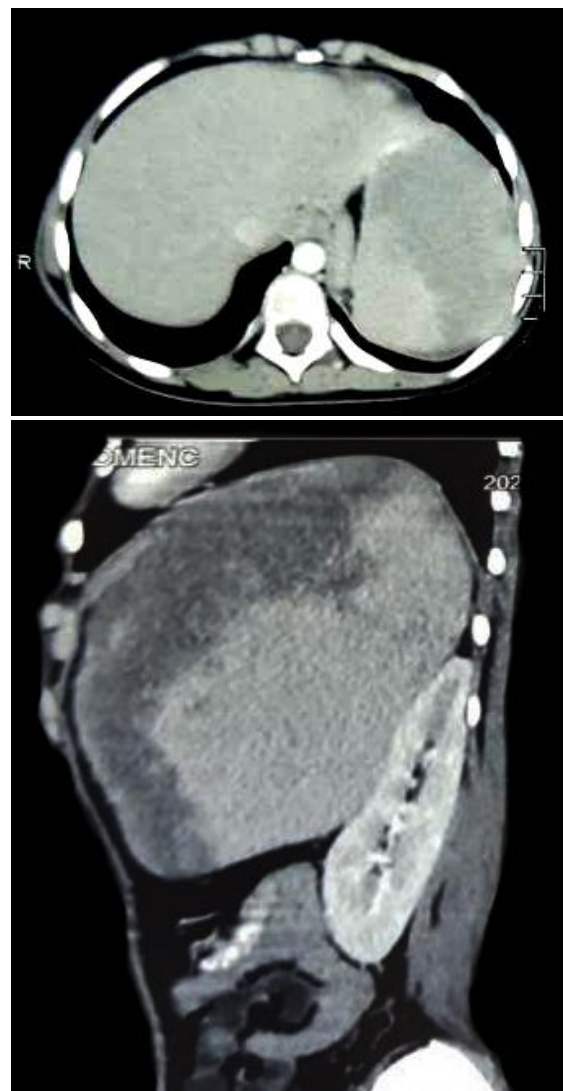


Fig 1. CT scan showing splenic infarction



**Fig 2.** Resected specimen of spleen showing white infarcted area

In splenic infarction, the magnitude of splenomegaly remains out of proportion to the lesion. This is attributable to inflammatory edema. The exact mechanism of splenic infarction in malaria is not fully known. However, various theories of pathogenesis have been proposed. They include: (i) hyper-coagulation state, (ii) alteration in the structure of spleen due to adhesion of malaria-infected red blood cells to endothelial cells, (iii) splenic cellular hyperplasia and (iv) anemia-induced hypoxia.<sup>(2)</sup>

Splenic infarction should be detected during the acute phase of malaria; but it is often masked by the acute febrile illness of malaria.<sup>(3)</sup> Gupta et.al<sup>(4,8)</sup> suggested that splenic infarction should be suspected in malarial patients if severe abdominal pain persists in the left upper quadrant, if the pain radiates to the left lower chest or shoulder and if tender splenomegaly occur during the course.

Splenic infarction on ultrasound abdomen is seen as wedge-shaped hypoechoic areas. In our patient ultrasound did not diagnose infarction but was simply suggestive of massive splenomegaly. In diagnosing splenic infarct and its extent, contrast enhanced CT scan has an edge over ultrasound.<sup>(6,9)</sup>

It is suggested that the antimalarials, analgesics and anticoagulants are effective in treating splenic infarction complicating malaria. But if fever, pain and enlarging tender splenomegaly persist despite adequate anti-malarial treatment, splenectomy is indicated to avoid infarction.<sup>(1)</sup> Our patient had undergone splenectomy as she was not responding with conservative treatment. Malaria induced splenic infarction shows thrombi in the arterioles, veins and sinusoids associated with hemorrhage, necrosis and infarction.<sup>(8)</sup> The patient with splenic infarction undergoing emergency splenectomy should receive post-surgical prophylactic vaccination against the *Pneumococci*, *Meningococci* and *Haemophilus influenzae*.

## REFERENCES

- [1] Lu Y, Zhang S, Jiang C. Splenic infarction during acute falciparum malaria: A case report. *Front Med.* 2022 Sep 14; 9: 951812.
- [2] Hwang JH, Lee CS. Malaria-induced splenic infarction. *Am J Trop Med Hyg.* 2014 Dec; 91(6): 1094-100.
- [3] Hakoshima M, Kitakaze K, Adachi H, Katsuyama H, Yanai H. Clinical, hematological, biochemical and radiological characteristics for patients with splenic infarction: case series with literature review. *J Clin Med Res.* 2023 Jan; 15 (1): 38-50.
- [4] Gupta BK, Sharma K, Nayak KC, Agrawal TD, Binani A, Purohit VP, Kochar DK. A case series of splenic infarction

- during acute malaria in northwest Rajasthan, India. *Trans R Soc Trop Med Hyg.* 2010 Jan; 104(1): 81-3.
- [5] Al-Salem AH. Splenic Infarction. In: *The Spleen. Anatomy, Physiology and diseases.* Springer Int 2023. pp 237-53.
- [6] Ashraf S, Masood S, Noorulain, Qamar S, Imran A, Rashid J. Splenic infarcts in an 8-years-old; a rare presentation of extensively drug resistant (XDR) enteric fever. *Pak Pediatr J* 2022 July; 46(1): 93-96.
- [7] Khan MI, Qureshi H, Bae SJ, Khattak AA, Anwar MS, Ahmad S, Hassan F, Ahmad S. Malaria prevalence in Pakistan: A systematic review and meta-analysis (2006-2021). *Heliyon.* 2023 Apr 11; 9(4): e15373.
- [8] Kim A, Park YK, Lee JS, Chung MH, Kim ES. A case of symptomatic splenic infarction in vivax malaria. *Korean J Parasitol.* 2007 Mar; 45(1): 55-8.
- [9] Rahimi MT, Rasooli AJ, Khaliqi S, Kashaf NS, Mohtaseb zada PW, Hares R. Splenic infarction following recurrent torsion of a wandering spleen: A case report. *J Pediatr Surg Case Rep* 2024 April; 103: 102793.

**Address for communication:** Prof. Sirajuddin Soomro  
Email: soomrosiraj@yahoo.com

© Authors; Distributed under Creative Commons CC-BY-NC-ND attribution 4.0 international license

Received: 17 April 2024; Accepted: 27 April 2024

Acknowledgements : None

Conflicts of Interest : None declared by authors

Source of Funding : None

Ethical concerns : None (Description of routine clinical care)

**Citation:** Soomro S, Mahtam I, Ali R, Muhammad B.  
*Splenic infarction during acute malaria in a 10 years old girl.*  
*Pediatr Surg Trop* 2024 July-Sep; 1(3): 171-174

