

Acute Colonic Pseudo-Obstruction in Severe Falciparum Malaria: A Case Report

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Abstract

Severe falciparum malaria is associated with multiple organ dysfunctions. The most manifestations of severe falciparum malaria are cerebral malaria, acute lung injury, and acute kidney injury. Acute colonic pseudo-obstruction is extremely rare. Early recognition and management are essential because a delay in diagnosis is associated with substantial morbidity and mortality. A 29-year-old peacekeeper in the Democratic Republic of Congo (DRC) was diagnosed as severe falciparum malaria with high-grade fever, jaundice, electrolyte disturbance, and thrombocytopenia. Although adequate antimalaria therapy with intramuscular artemether was given, the patient had persistent fever, shallow and fast breathing, and abdominal pain. Investigations suggested a diagnosis of acute colonic pseudo-obstruction. Antimalarial therapy was continued with intravenous artesunate. And rectal decompression and fasting were taken. Soon, symptoms of colonic obstruction mitigated. And the patient was cured and discharged. Acute colonic pseudo-obstruction should be considered for severe malaria patients with abdominal distention and pain. The early diagnosis and proper management of the patient with severe malaria complicated with acute colonic pseudo-obstruction are the keys to a good prognosis.

Keywords: Acute colonic pseudo-obstruction; Malaria; Severe

Introduction

Severe malaria is a medical emergency that can rapidly develop into serious illness. Failure to make timely diagnosis and give urgent and appropriate treatment to the patient will result in multisystemic dysfunction, and eventually, death. There were an estimated 405,000 deaths from malaria globally in 2018, and 93% of them were caused by severe falciparum malaria [1]. The acute colonic pseudo-obstruction (ACPO) is

a rare condition in the patient with severe malaria. There was no report so far. Early diagnosis and proper management are extremely important.

Case Report

Investigations

A 29-year-old male peacekeeper, deployed in the Democratic Republic of Congo (DRC) for 2 months, presented with a history of 3-day fever, headache, fatigue and 1-day jaundice. There was no past medical history. He was taking compound dihydroartemisinin tablets (dihydroartemisinin + piperazine phosphate + trimethoprim) weekly as chemoprophylaxis since entering the mission area. Physical examination showed fever (39.4 °C), acute sick looking, poor spirit, yellow staining of skin and sclera.

Diagnosis

Pulse oxygen saturation was 96%. Glasgow coma scale (GCS) was 15. Ultrasonic examination of the abdomen showed splenomegaly. The blood smear revealed 8% parasitemia. The laboratory results after admission were summarized in Table 1. Of note were hyperbilirubinemia (total bilirubin 81.3 μmol/L), electrolyte disturbance, and thrombocytopenia. Hepatitis series tests were negative. A rapid diagnostic test was positive for *Plasmodium falciparum*. A diagnosis of severe falciparum malaria was made.

Treatment

We carried out antimalaria therapy with intramuscular artemether 240 mg at admission and 160 mg at 12, 24 h later (artesunate was temporarily unavailable), correcting dehydration and the electrolyte disturbance, and protecting liver function. The patient did not sweat and the body temperature did not drop after antimalarial treatment. It was above 39.0 °C. Thirty-six hours after admission, he felt left upper quadrant pain, combined by nausea, vomiting, and diarrhea, all of which occurred for three times. The pain was so severe that he could not take a deep breath or cough, resulting in shallow and fast breathing, and a pulse oxygen saturation of 92%. And this was fol-

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Table 1. Laboratory Investigations

Variables	On admission	Day 2	Day 4	Day 11	Normal range
Hemoglobin (g/L)	171	131	128	140	110 - 160
Hematocrit (%)	50.6	38.1	37.6	41.6	37 - 54
White blood cells ($\times 10^9/L$)	3.9	4.9	5.8	6.0	4 - 10
Platelets ($\times 10^9/L$)	92	52	112	306	100 - 300
Sodium (mmol/L)	127.8	127.3	131.5	134.7	135 - 145
Potassium (mmol/L)	3.3	3.94	3.91	4.15	3.5 - 5.5
Chloride (mmol/L)	95.93	92.73	96.89	101.43	97 - 107
Creatinine ($\mu\text{mol/L}$)	77	64.8	76.5	98.8	53 - 115
Blood urea ($\mu\text{mol/L}$)	2.9	3.2	4.8	3.1	2.9 - 8.2
Total bilirubin ($\mu\text{mol/L}$)	81.3	189.5	150.2	33.5	3.4 - 17.1
Indirect bilirubin ($\mu\text{mol/L}$)	48.0	104.6	90.9	17.9	1.7 - 10.2
AST (U/L)	111	208	174	38	0 - 40
ALT (U/L)	108	181	169	65	0 - 40

AST: aspartate transaminase; ALT: alanine aminotransferase.

lowed with progressive abdominal distension and an inability to pass stool and flatus. On examination, the patient was extremely weak and tired. Without abdominal guarding and rigidity, tenderness was obvious in the left. There was no rebound tenderness. Bowel sounds disappeared. In addition, the blood smear revealed 5% parasitemia. Liver function deteriorated (total bilirubin $189.5 \mu\text{mol/L}$), and platelets decreased further ($52 \times 10^9/L$). Fifty-five hours after admission, his abdominal pain was significantly worse. The consciousness was gradually indifferent, and GCS was 13. Breath rate was 45/min, and pulse oxygen saturation was 89%. X-ray of the chest showed lung texture thickening and upright abdominal plain film indicating that the colon was dilated and gas accumulation in the splenic flexure (Fig. 1a). Ultrasound of the abdomen showed hepatomegaly and splenomegaly. So we considered the patient was complicated by ACPO. At this time artesunate was available and 2.4 mg/kg body weight administered intravenously (time = 0), then at 12 h and 24 h. At the same time, fasting, no retention enema, rectal

decompression tubes and oral 30 mL paraffin oil were taken. One day after these measures, he passed a small quantity of feces; and abdominal pain and distension were relieved. Body temperature also gradually decreased. Blood test showed bilirubin level dropped than before (total bilirubin $165.7 \mu\text{mol/L}$), platelets level rose to a certain extent ($81 \times 10^9/L$), and the blood smear revealed 1% parasitemia. X-ray of the abdomen revealed that dilation of the left colon disappeared, and intestinal gas accumulation decreased (Fig. 1b). Five days after admission, the patient could tolerate oral therapy, so he completed a treatment of 3-day artemisinin-based combination therapies.

Follow-up and outcomes

We concluded that ACPO was secondary to malaria. Ten days later, all symptoms disappeared and the patient was discharged. His 1-month follow-up was unremarkable.

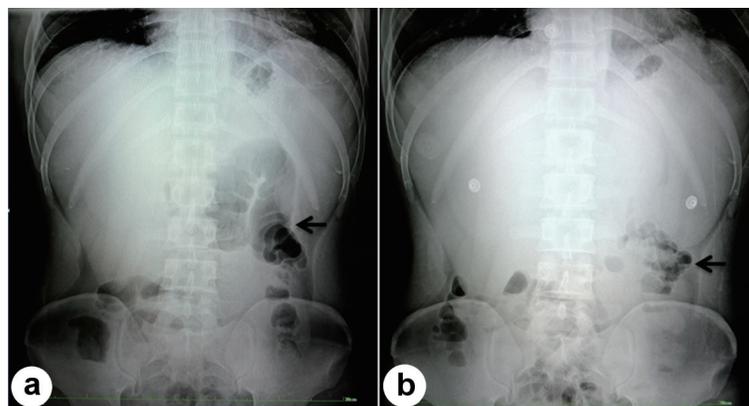


Figure 1. Upright abdominal plain film. (a) Fifty-five hours after admission, the colon was dilated and gas accumulation shown in the splenic flexure (arrow). (b) One day after taking new measures, dilation of the left colon disappeared and intestinal gas accumulation decreased (arrow).

Discussion

As a peacekeeper in the DRC from Asia, the risk for severe falciparum malaria is greater due to lack of immunity. Various symptoms may appear. Abdominal pain is a common symptom of malaria. The causes of abdominal pain in malaria are diverse, such as gastroenteritis, hepatitis [2], acute abdomen [3], splenic rupture [4], acute pancreatitis [5], sub-acute intestinal obstruction [6], and so on. In this patient, abdominal pain affecting respiration was related to ACPO. ACPO is a rare condition characterized by acute colonic dilatation in the absence of mechanical obstruction [7]. It is even less common in adult malaria cases, and there was no report so far. However, several cases of sub-acute bowel obstruction caused by malaria have been reported. One is a 42-year-old man in Cameroonian [6] and the other is an 18-month-old girl in India [2].

ACPO is a functional obstruction characterized by absent peristalsis or peristalsis which can be present but in a non-propulsive form. It usually occurs in hospitalized patients with severe illness or trauma, or follows general, orthopedic, neurosurgical, gynecological or other surgical procedures [7], with an associated mortality rate of 15% to 44% because of colonic ischemia or perforation [8]. The pathophysiology underlying ACPO resulted from malaria remains blurred.

After admission, the patient in this study was treated with artemether immediately, however his condition significantly aggravated. A non-immune adult and a few days of illness allowed a large number of plasmodium parasites to reproduce in the blood, leading to persistent hyperparasitemia. Infected red blood cell was sequestered in microvascular beds of multiple organs, and resulted in microvascular occlusion and tissue ischemia [9]. Infected erythrocytes also adhered to surrounding uninfected red blood cells to form rosetting, or activated platelets to form clumping. Both rosetting and clumping further contributed to microvascular obstruction [10]. The splenic flexure of the colon is at the junction of the blood supply at the end of two arteries, which is prone to insufficient supply of blood. When the local circulation continues to stagnate without improvement, it can cause colonic wall infarction or even perforation. However, we discovered the trouble early and adjusted the treatment in time. Artesunate acts faster and has a high intestinal distribution dose. So we switch from artemether to artesunate. And artesunate may kill late-staged sequestered parasites [11]. Clogged microvascular restored blood flow, and the colon function gradually recovered.

Electrolyte disturbance is also one cause of the ACPO. Electrolyte disturbances are common in patients with severe malaria, especially falciparum [12]. The patient in this study had hypokalemia, hyponatremia, and hypochlorous. The minimum potassium is 3.3 mmol/L, and the minimum sodium is 126 mmol/L. Changes in potassium and other electrolyte concentrations affect ion channel function and may alter pacemaker activity generated by interstitial cells of Cajal or smooth muscle activity [7].

Autonomic dysfunction is also one of the reasons. Colonic function is regulated by sympathetic and parasympathetic nerves systems. Most patients with major illness have increased systemic sympathetic drive, potentially contributing

to autonomic imbalance at the level of the colon [7]. An imbalance in autonomic nervous activity with an increased sympathetic tone and decreased parasympathetic tone leads to functional obstruction in the distal colon [13].

In conclusion, ACPO should be considered for severe malaria patients with abdominal distention and pain. Early recognition of ACPO in malaria is extremely important, and the appropriate conservative treatment can achieve a good prognosis.

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Conflict of Interest

The authors declare that there are no competing interests.

Informed Consent

The patient authorized the main author, in written form, to publish this case report and the accompanying image (X-ray).

Author Contributions

Peng Fei Yao wrote the paper. Yang Sun managed the case and Peng Jiang Zhang and He Dong analyzed the blood sample. All authors read and approved the final manuscript.

Data Availability

The authors declare that data supporting the findings of this study are available within the article.

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