



# Falciparum malaria-induced acute pancreatitis

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## ABSTRACT

Falciparum malaria is one of the most common causes of acute febrile illness in India and frequently presents as severe malaria also known as complicated malaria or cerebral malaria with associated multiple organ failure. Acute pancreatitis secondary to malaria is very rare complication. Here we are presenting a case of severe falciparum malaria with acute pancreatitis.

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## Introduction

Malaria is one of the most common parasitic infections in humans with a high incidence rate in India and *P. falciparum* being the most common cause of complicated malaria. 1.8 % of cumulative deaths before the age of 70 years are attributed to malaria [1]. Severe malaria can present with a wide spectrum of complications including acute kidney injury, liver injury, cerebral involvement, coagulopathy, and anemia. However, acute pancreatitis is a rare complication with literature reporting only 22 cases [2]. Establishing a diagnosis of malaria related acute pancreatitis requires other causes to be excluded. Here, we report a case of severe malaria complicated with acute pancreatitis.

## Case history

A 45-year-old male, farmer by occupation, with no prior comorbidity presented with a history of fever for 4 days, high grade with chills and rigor, without any diurnal variation or any concomitant rash, joint pain, photophobia or burning micturition. He also complained of abdominal pain in the epigastric region for 2 days radiating to back and increasing on taking food, associated with nausea and vomiting. These symptoms were followed by mental confusion and decreased urine output. On examination, patient was febrile with a Glasgow coma scale (GCS) of E3V2M5 (10 out of 15). Abdominal examination revealed tenderness in the epigastric region without any guarding, rigidity or organomegaly. The rest of the systemic examination was unremarkable. He was kept nil per oral (NPO) and a nasogastric tube was inserted. Bedside

ultrasound abdomen was performed which revealed mild hepatomegaly, obscured pancreas and no evidence of any gall bladder stones. He was started with intravenous fluid (0.9 % normal saline), empirical antimicrobials (ceftriaxone) and opioid analgesics. Subsequent blood investigations revealed a deranged renal and hepatic function test consisting of raised lipase (1047 U/L) and amylase (533 U/L) levels (Table 1).

Based on characteristic pain and elevated pancreatic enzymes, patient was diagnosed to be case of acute pancreatitis as per Atlanta criteria [3]. His acute febrile illness work up was positive for *Plasmodium falciparum*. Multiple gametocytes and ring forms of plasmodium falciparum were detected in peripheral smear (Fig. 1). He was started on intravenous artesunate as per standard guidelines. Due to critically ill condition and deranged renal function, contrast was withheld and a non-contrast computed tomography (NCCT) of the abdomen was performed where a bulky edematous pancreas with few dilated bowel loops were noted (Fig. 2). Hence a diagnosis of *P.falciparum* malaria with acute pancreatitis was made. He was kept nil per oral, nasogastric tube was inserted and antibiotics were changed from ceftriaxone to meropenem in addition to continuing artesunate. However, his condition progressively deteriorated and subsequently required mechanical ventilator support. The patient relatives couldn't continue further treatment due to financial constraints and therefore him home against medical advice.

## Discussion

Our case depicts that acute pancreatitis can occasionally complicate the course of falciparum malaria. The diagnosis of falciparum malaria-induced acute pancreatitis was made by excluding other common causes of acute pancreatitis. There was no history of any chronic or binge alcohol consumption, no

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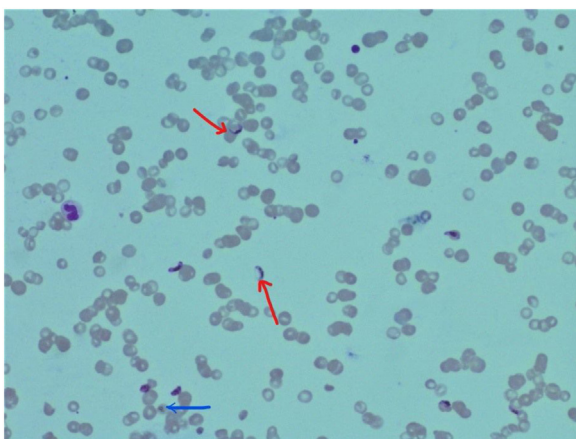
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**Table 1**  
Laboratory investigations.

INVESTIGATIONS	DAY OF ADMISSION		
	DAY 1	DAY 3	DAY 6
Hb (gm/dL)	9.02	8.9	7.5
Total Leucocyte Count (cells/ $\mu$ l)	10820	12700	14,500
Differential Leukocyte Count (N/L/M/E/B) (percentage)	67/13/8.3/8.6/1.91	67/21/11/00/0.3	87/8/4/0.5/0.5
Platelet Count(/mm <sup>3</sup> )	55000	20000	25000
Bilirubin (T)(mg/dL)	4.5	8.2	11.2
Bilirubin (D)(mg/dL)	3.59	5.8	6.3
SGPT(U/L)	96.6	196	233
SGOT(U/L)	152.7	469	476
Alkaline Phosphatase (U/L)	280	395	386
GGT(U/L)	48	42	49
Total protein(gm/dL)	5.6	5.1	5.2
Albumin(gm/dL)	2.7	2.2	2.1
Globulin(gm/dL)	2.9	2.9	3.1
A:G	0.93	0.8	0.8
B. Urea(mg/dL)	339	160	186
Creatinine (mg/dL)	2.42	2.13	3.45
Calcium(mg/dL)	7.6	8.0	7.8
PT/ INR	18.4/1.54	16.9/1.39	18.9/1.9
Reticulocyte count (%)	1 %		
DENGUE IgM antibodies	Negative		
DENGUE NS1 ANTIGEN	Negative		
Typhi dot	Negative		
Rapid card test for malaria parasite	PF-positive		
Lipase (u/L)		1047	
Amylase(u/L)		533	
Triglyceride(mg/dL)	156		

evidence of gallstones on abdominal imaging, no history of consumption of any drug known to cause pancreatitis and, normal serum calcium and triglycerides level. Acute pancreatitis was diagnosed according to Atlanta criteria which states that the diagnosis of acute pancreatitis requires two of the following three features: (i) abdominal pain consistent with acute pancreatitis (acute onset of a persistent, severe, epigastric pain often radiating to the back); (ii) serum lipase activity (or amylase activity) at least three times greater than the upper limit of normal; and (iii) characteristic findings of acute pancreatitis on contrast-enhanced computed tomography (CECT) and less commonly magnetic resonance imaging (MRI) or trans abdominal ultrasonography [3]. In this case, the classic abdominal pain with raised amylase and lipase values supported the diagnosis of acute pancreatitis. Hence the diagnosis was made in the absence of standard abdominal imaging (CECT or MRI). The pathophysiology of malaria causing pancreatitis is not well

understood. The proposed mechanism has been linked to acute ischemic injury to pancreatic parenchyma secondary to obstruction of capillaries by parasite-laden red cells. Malaria induced haemolysis has also been implemented in the pathogenesis [4,5]. Sometimes it may be difficult to suspect or diagnose this condition since non-specific pain abdomen is not an uncommon symptom in severe malaria [6]. Whenever pancreatitis is stated as a complication of severe falciparum malaria, a query arises whether it is a mere association or a causal relation [7]. Since a significant proportion of the population from an endemic area may be asymptomatic carriers of the parasite, it is difficult to ascertain if the organ involvement is due to malaria [8]. However, until further experiments establish this fact adequately, we have to suspect acute pancreatitis as a complication of malaria once other causes are ruled out.



**Fig. 1.** Peripheral blood smear showing gametocytes (red arrow) and ring form (blue arrow) of *P. falciparum*.



**Fig. 2.** NCCT abdomen showing bulky oedematous pancreas.

## Conclusion

Acute pancreatitis as well as severe falciparum malaria both are life threatening conditions and requiring critical care and close monitoring. When they occur simultaneously it poses a greater challenge for a physician. Hence, being vigilant to this rare but dreaded complication of falciparum malaria can help the clinician to detect, treat as well as prognosticate the patient efficiently.

## Author statement

None.

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## Consent

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

## Author contribution

**Shankar Roy** - Planning and Manuscript writing.  
**Ashwin Parchani** - Planning and manuscript editing.  
**Samaksh** - Data collection and compilation.

**Mohan S** - Reporting of work.

**Venkatesh S Pai** - Guidance and supervision of project.

## Declaration of Competing Interest

None.

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