



## Case Report

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# Clinical aspects of malaria in south of Brazil – A case report

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### ABSTRACT

Malaria is a high life-threatening disease caused by parasites that are transmitted to people through the bites of infected female mosquitoes. This is a case report of RMM, 55 years old man, from Porto Alegre, who made a trip to Mozambique. In diagnosis, biochemical and hematological tests revealed hyperbilirubinemia, thrombocytopenia, high creatinine and urea levels and discreet leukopenia. The diagnostic carried out confirmed the presence of *Plasmodium* in the blood test by examining blood smear, with positive results for *Plasmodium falciparum*. This is a case report that showed the importance of the rapid and correct release of the examination of a patient diagnosed with malaria who was traveling in the endemic zone.

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## INTRODUCTION

Malaria is an infectious and life-threatening disease of which its etiological agent is a parasite of the genus *Plasmodium*. Infection with malaria parasites may result in a wide variety of symptoms, ranging from absent or very mild symptoms to severe disease and even death. The parasite is transmitted to humans through the bites of infected mosquitoes. These species are associated with human malaria such as *Plasmodium falciparum*, *Plasmodium vivax*, *Plasmodium ovale* and *Plasmodium malariae*.

Malaria infection starts from the parasites (sporozoites), which are inoculated into the skin through the bite of the vector, in which they are invaders such as liver cells and hepatocytes. A multiplication giving rise to one million new parasites which accumulate in the blood circulation, invading the red blood cells in these cells occurs, initiating the so-called schizogony cycle, which is the phase where the symptoms of malaria appear (Ministry of Health, Brazil 2010; Fiocruz News Agency, 2013; Atanaka-Santos et al., 2006).

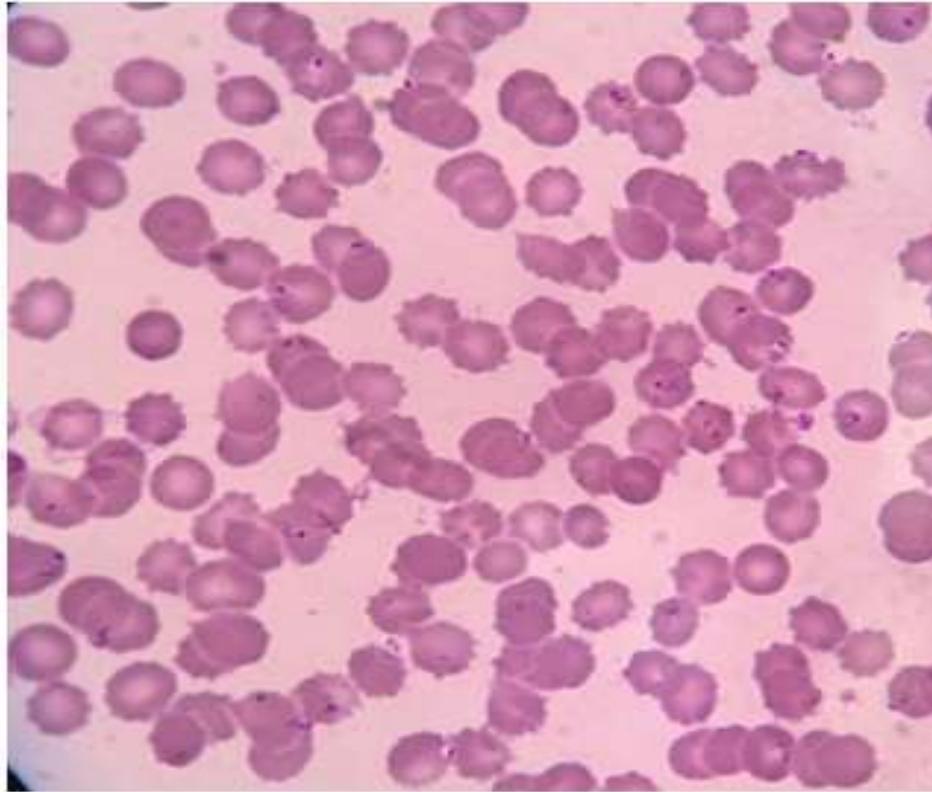
The areas of Brazil with the highest prevalence of the disease are the regions of the Legal Amazon, such as Acre, Amapá, Maranhão, Mato Grosso, Pará, Rondônia, Roraima

and Tocantins. *P. vivax* accounts for more than 90% of malaria cases and *P. falciparum* is responsible for the severe and lethal form of the disease (Ministry of Health, Brazil, 2010; Fiocruz News Agency, 2013). Risk groups such as children, the elderly, pregnant women, travelers and non-immune persons newly arriving in endemic areas may have more severe manifestations of the disease (Fiocruz News Agency, 2013).

The epidemiological outcome of malaria in Brazil is with more than 300.000 cases presently. Of these, 99.9% were transmitted in the Legal Amazon, with *P. vivax* being the species responsible for almost 90% of the cases.

However, transmission by *P. falciparum*, responsible for the severe and lethal form of malaria, has shown a significant reduction in recent years, reducing the number of hospitalizations by 1.3% (Ministry of Health, Brazil, 2010).

However, in spite of the small number of cases received in Rio Grande do Sul, it is extremely important that health professionals are aware of the presence of *P. falciparum* in the smear analysis, as well as, the main laboratory alterations caused by this parasite, since they occur without initial clinical suspicion, as earlier reported.



**Figure 1:** Blood smear with *Plasmodium falciparum* presence.

## CASE REPORT

RMM, 55 years old, male, from Porto Alegre (RS), made a trip to Mozambique in Africa, for fifteen days. Ten (10) days later returning to his hometown, he went on hospital emergency reporting discomfort, abdominal pain, inappetence and prostration. In attendance, the patient reported to the doctor to have consulted his doctor days before to travel and to have performed digestive endoscopy and abdomen ultrasound, not reporting alterations. During anamnesis, it was related antihypertensive (Losartan) and lipid lowering drugs (Simvastatin) use. In physical examination, fever, icterus, and hypotension were observed. Hence, laboratory parameters, abdominal tomography, chest X-ray and electrocardiogram were requested. The results confirmed the presence of malaria, being the notified case to Hospital Infection Control Committee. The presence of *P. falciparum* was identified with high parasitaemia (Figure 1). Table 1 shows the laboratory alterations.

After diagnosis confirmation, antimalarial drugs such as Artemether + Lumefantrine and Primaquine was initiated immediately. In the second day, the patient was stable, with good arterial pressure and renal function improvement, being transferred from Intensive Care Center to Intensive Care Unit. The patient was not with febrile activity from the first day; however, still presented headache,

diarrhea episodes and dark urine. On the second day of medical evaluation, there was significant improvement in the patient, with a parasitaemia decrease from  $>100.000/\text{mm}^3$  to  $301 - 500/\text{mm}^3$ . The patient was discharged from the hospital on the fourth day, and his treatment extended with Clindamycin for 7 days and Artesunate + Lumefantrine for 3 days.

## DISCUSSION

According to the World Health Organization (WHO), it is estimated that 2.4 million people live with the risk of malaria contagion, which remains endemic in 106 countries due to the vectors presence, *Anopheles* genus (WHO, 2000). *P. falciparum* is the most severe genus, accounting for half of the world's cases registered annually, with a worse prognosis, being the major transmission focus in the African continent (Wilairatana et al., 2013).

Malaria is an infectious parasitic disease, characterized for fever cycles and chill associated with parasitic erythrocytes hemolysis. The gravity and clinical manifestations of the disease depends on infectious species, parasitaemia magnitude, parasite metabolic effects and release of cytokines (Baheti et al., 2003). In this case, we considered infection with disease most severe form, acquiring elevated parasitaemia.

**Table 1:** Biochemical and hematologic results.

Parameters	(1 <sup>st</sup> day)	(2 <sup>nd</sup> day)	(4 <sup>th</sup> day)	Reference values
<b>Biochemical</b>				
Urea (mg/dl)	67	42	-	15-38
Creatinine (mg/dl)	2.04	0.82		0.80-1.30
C reactive protein (mg/L)	131.47	-	68.12	Inferior to 5.00
AST (U/L)	82	72	51	15-37
ALT (U/L)	104	100	91	35-65
GGT (U/L)	263	153	-	15-85
Total bilirubin (mg/dl)	9.7	-	0.7	0-10
Direct bilirubin (mg/dl)	7.4	-	0.4	0-0.2
Indirect bilirubin (mg/dl)	2.3	-	0.3	0-0.8
Lipase (U/L)	65	-	-	73-393
Sodium (mmol/L)	127	138	139	135-145
<b>Hematologic</b>				
Erythrocytes (millions/ $\mu$ l)	4.06	3.54	3.52	4.50-6.10
Hemoglobin (g/dl)	12	10.5	10.2	13.8-17.8
Hematocrit (%)	36.1	31.5	31.3	39.0-53.0
MCV (fl)	88.9	89	88.9	80-98
MCH (pg)	29.6	29.7	29	27-33
MCHC (g/dl)	3,2	33.3	32.6	32-36
RDW (%)	13,6	13.3	13.4	11.5-16.0
Leukocytes ( $\mu$ l)	4800	4600	4800	5000-10000
Lymphocytes ( $\mu$ l)	576	1242	1392	1000-5000
Platelets/mm <sup>3</sup>	32000	40000	104000	140000-400000

Hepatic involvement in malaria is a common event, manifested, principally, by ictericia at the expense of direct bilirubin, hepatomegaly and mild to moderate elevation of serum transaminase levels. It is a disease with distinct histopathologic characteristics, and in some cases, may induce alterations in organ functions- reduced coagulations factors synthesis, metabolism difficulty in same antimalarial drugs and gluconeogenesis alterations, contributing to hypoglycemia and lactic acidosis occurrence, triggering, eventual hepatic acute insufficiency (Baheti et al., 2003). In this report, the patient presented alterations in hepatic enzymes, due *Plasmodium* infects and rupture the hepatocytes, thereby, increasing enzymes levels, which are extravasated into the bloodstream. This rupture damages the hepatocytes and bile duct cells, resulting in hepatosplenomegaly, which cause abdominal pain in patients.

Elevated C reactive protein is justified due to an inflammatory process caused by hemolysis, and premature destruction of erythrocytes by the merozoite parasite. Infected erythrocytes in microcirculation is the principal physiopatogenic factor of acute renal infection (ARI), including hemodynamic, imunologic events, metabolic alterations and seric creatinine and urea elevations (Cunnington et al., 2012). The parasitized red blood cells

increase creatinine and blood urea levels, as this red blood cells tend to adhere to the capillary endothelium, resulting in capillary microembolization, triggering micro-circulation of the internal organs and increased blood viscosity, which contributes to renal and ischemia. ARI is also associated with hemolysis and hyperbilirubinemia. In hematologic parameters, due to multiple factors, including, erythrocytes destruction, elevated indirect bilirubin and consequently, jaundice, can be observed anemia.

Thrombocytopenia is another hematologic manifestation that is important, but usually not associated with bleeding. The platelets reduction presented in the blood test is due to hepatic involvement, consequently, hepatocytes destruction caused by production of the merozoites invading the circulation and infecting the erythrocytes. Therefore, the spleen does not produce trombopoietin – a stimulator hormone for the production of platelets in the bone marrow, generating a thrombocytopenia (Da Silva, 2017; Gomes et al., 2011).

Specie determination is extremely important, principally, in malaria patients affected by *P. falciparum*, because, it helps to evaluate the rapid and effective diagnosis, since this form is the most severe, generating severe clinical manifestations in the infected individuals. Currently, new methods have been developed with the aim to facilitate the

diagnosis and treatment of the disease (Ferreira and Castro, 2016).

It is extremely important that health professionals have knowledge of the presence *P. falciparum* in smear analysis, mainly like in this case report, where there is no clinical suspicion. Malaria requires, therefore, a quick and effective diagnosis to obtain the correct prophylaxis.

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