

Analysis of pulmonary manifestations in patients infected with *Plasmodium vivax*

Análise das manifestações pulmonares em pacientes infectados por Plasmodium vivax

Maria Deise de Oliveira Ohnishi¹, José Antônio Cordero da Silva¹, Nathalya Botelho Brito¹, Renyer dos Santos Gonçalves¹, Ricardo Miranda de Brito Costa¹, Ingrid Correa da Silva¹

Recebido do Instituto Evandro Chagas e Hospital Universitário João de Barros Barreto.

ABSTRACT

OBJECTIVE: To evaluate pulmonary manifestations in patients infected with *Plasmodium vivax*. **METHODS:** This was a cross-sectional, retrospective study of 50 patients diagnosed in 2006 to 2008 with vivax malaria at the Evandro Chagas Institute and referred to the University Hospital João de Barros Barreto to examine the pulmonary manifestations. **RESULTS:** 72% of the patients were men, 28% were 21 to 30 years of age, 30% had parasitaemia 50 to 2000 p/mm³, 88%, 94% and 92% of the patients presented respectively with fever, chills and headache respectively, 56% of the patients had cough, 62% felt breathlessness, 28% presented dyspnea and 86% experienced chest pain. **CONCLUSION:** The majority of patients surveyed had parasitaemia in the range 50 to 2000 p/mm³. The classic triad fever, chills and headache was present in most patients. Among pulmonary manifestations, cough, chest pain and shortness of breath were reported by the majority of patients.

Keywords: Malaria, vivax/complications; *Plasmodium vivax*; Lung/physiopathology; Parasitemia

RESUMO

OBJETIVO: Analisar as manifestações pulmonares em pacientes infectados por *Plasmodium vivax*. **MÉTODOS:** Estudo transversal realizado por meio da análise de 50 prontuários de pacientes diagnosticados com malária vivax entre 2006 a 2008, no Instituto Evandro Chagas, e encaminhados para o Hospital Universitário João de Barros Barreto para análise das manifestações pulmonares. **RESULTADOS:** Observou-se que 72%

dos pacientes eram homens, 28% possuíam de 21 a 30 anos de idade, 30% apresentaram parasitemia de 50 a 2000 p/mm³. Entre as manifestações clínicas, 88%, 94% e 92% dos pacientes apresentaram, respectivamente, febre, calafrio e cefaleia, 56% apresentaram tosse, 62% sentiram falta de ar, 28% dispneia e 86% dor torácica. **CONCLUSÃO:** A maioria dos pacientes pesquisados apresentou parasitemia no intervalo de 50 a 2000 p/mm³. A tríade clássica da malária esteve presente na maioria, já dentre as manifestações pulmonares pesquisadas, a tosse, a dor torácica e a falta de ar corresponderam aos sintomas mais relatados pelos pacientes.

Descritores: Malária vivax/complicações; *Plasmodium vivax*; Pulmão/fisiopatologia; Parasitemia

INTRODUCTION

Malaria is a disease that can lead to death if the patient is not treated promptly and effectively. The main symptoms are fever, chills, headache and sweating, while others symptoms such as dizziness, asthenia, myalgia, cutaneous-mucosal pallor, signs of dehydration, nausea, vomiting, epigastric pain and/or abdominal pain, diarrhea, dry cough, dyspnea, tachycardia, jaundice, hepatomegaly and splenomegaly are detected with some variability⁽¹⁻³⁾.

The assumption that the *Plasmodium vivax* is only responsible for “benign or uncomplicated” malaria compared with *Plasmodium falciparum*, which is responsible for severe malaria and death, is not necessarily true. Recent reports have shown that this is not always the case, once pulmonary impairment is a serious presentation of vivax malaria⁽⁴⁻⁷⁾.

Severe pulmonary manifestations of vivax malaria have been reported, including acute lung injury and acute respiratory distress syndrome (ARDS)⁽⁸⁻¹¹⁾. A benign form of pulmonary involvement in vivax malaria has been reported which may present with mild respiratory discomfort, pleural effusion, interstitial edema or lobar consolidation. It is often undiagnosed or unrecognized as part of the clinical and radiological diagnosis of malaria and is probably much more common⁽¹²⁻¹⁵⁾.

Reports of acute lung injury and ARDS related to mono-infection with *P. vivax* have increased, especially in the last decade^(12,16). The pathophysiology of pulmonary malaria is not well understood. Similarly, changes in pulmonary function have

1. Universidade do Estado do Pará, Belém, PA, Brazil.

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Correspondence address:

José Antônio Cordero da Silva
Avenida Governador José Malcher, 1.343, Apto. 1.300 – Nazaré
CEP: 66060-230 – Belém, PA, Brazil
Phone: +55 (91) 9941-6842 / 3225-2051
E-mail: corderobel4@gmail.com

not been defined⁽¹⁷⁾. Given this knowledge gap, we have analyzed the pulmonary manifestations in patients infected with *P. vivax*.

METHODS

This study was conducted in compliance with the precepts of the Declaration of Helsinki and the Nuremberg Code, and the Standards for Research involving Human Subjects (Res. CNS 196/96) of the National Health Board. The project was approved by the review board of the Evandro Chagas Institute (ECI), authorized by the Head of the University Hospital João de Barros Barreto (HUJBB). All study participants gave informed, written consent.

Fifty patients were recruited for this cross-sectional study. Patients diagnosed with vivax malaria at the ECI were referred within 24 hours of presentation to clinic of Pneumology at the HUJBB. Study participants were interviewed using a standardized questionnaire developed by the authors.

The study included patients of all sexes and ages attending the ECI.

Data were analysed using Excel 2007 and BioStat 5.0.

RESULTS

In this study, 72% of the patients were men, 28% were 21 to 30 years of age, 30% had parasitaemia 50 to 2000 p/mm³. Table 1 shows the parasitaemia found in patients referred to HUJBB was mostly within the range of 50 to 2,000p/mm³.

Table 2 shows that 88%, 94% and 92% of the patients presented respectively with fever, chills and headache - the classic triad. It also shows that 56% of the patients had cough, 62% felt breathlessness, 28% had dyspnea and 86% experienced chest pain.

DISCUSSION

We found that cough was present in 28 of our 50 patients (56%) and that it was the third most common symptom among respiratory symptoms. Anstey et al.,⁽¹⁷⁾ found a similar percentage of cough among his patients, with 59%, however, in their research, it was the most common pulmonary manifestation.

Table 1. Parasitaemia of patients referred to the University Hospital João de Barros Barreto in the years 2006 to 2008

Parasitaemia (p/mm ³)	n (%)
50-2,000	15 (30)
2,001-4,000	9 (18)
4,001-6,000	4 (8)
6,001-8,000	8 (16)
8,001-10,000	5 (10)
10,001-40,000	9 (18)
Total	50 (100)

Source: research protocol.

Table 2. Symptoms of malaria in patients referred to the University Hospital João de Barros Barreto in the years 2006 to 2008

Symptoms	Presence (n=50) n (%)
Classic triad	
Fever	44 (88)
Chills	47 (94)
Headache	46 (92)
Pulmonary symptoms	
Cough	28 (56)
Breathlessness	31 (62)
Dyspnea	14 (28)
Chest pain	43 (86)

Source: research protocol.

Breathlessness was the second most common pulmonary manifestation found in 62% of the surveyed patients. It is a common symptom in many lung diseases, even though the pathophysiological changes in respiratory *P. vivax* malaria remain unknown.

The frequency of dyspnea (28%) and chest pain (86%) are of similar frequency to those found by Botelho et al.⁽¹⁸⁾ in two case reports on falciparum malaria. This fact partly justifies such a proposition, given that such symptoms are relative expressions in similar disease cases^(19,20).

The respiratory rate of most of the patients (60%) remained in the normal range in contrast to the patients described by Boulos et al.⁽²¹⁾, which stated that an increased respiratory rate is a pulmonary manifestation in falciparum malaria. This disparity may be explained by differences in clinical manifestations of vivax and falciparum malaria, since falciparum malaria is, generally, much more aggressive, composing cases compromising much the health of the infected patient⁽²²⁾.

CONCLUSION

The frequency of pulmonary manifestations in vivax malaria was substantial and the most common symptoms observed were chest pain, breathlessness and cough. The respiratory frequency was in the normal range in the majority of patients surveyed. More research will be needed to understand the pathophysiological mechanisms of malaria.

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