



Contents lists available at ScienceDirect

## Asian Pacific Journal of Tropical Biomedicine

journal homepage: www.elsevier.com/locate/apjtb



Document heading

doi: 10.1016/S2221-1691(13)60150-1

© 2013 by the Asian Pacific Journal of Tropical Biomedicine. All rights reserved.

## A case of misdiagnose of malaria infection

Mahdavi Seif Ali<sup>1</sup>, Raeesi Ahmad<sup>2</sup>, Faraji Leyla<sup>2</sup>, Youssefi Mohammad Reza<sup>3</sup>, Rahimi Mohammad Taghi<sup>4\*</sup><sup>1</sup>Department of Paramedics, Mazandaran University of Medical Sciences, Amol, Mazandaran, Iran<sup>2</sup>Malaria Control Organization of Ministry of Health, Tehran, Iran<sup>3</sup>Department of Parasitology, Islamic Azad University, Babol Branch, Babol, Mazandaran, Iran<sup>4</sup>Young Researchers club, Islamic Azad University, Babol Branch, Babol, Mazandaran, Iran

## PEER REVIEW

## Peer reviewer

Hamid Badali, Assistant Professor, Parasitology and Mycology Department, Sari Medical School, Mazandaran University of Medical Science, Sari, Iran.

Tel: +981513502475

Fax: +98 151 354 3087

E-mail: badalii@yahoo.com

## Comments

This is a valuable case report in which authors have tried to present a problem of misdiagnose of malaria in Mazandaran Province which has history of being endemic, hyper endemic area and remerge malaria. In general, these cases are rare and can help us to evaluate our control and monitor program in these areas, and also to know the condition of disease in this region.

Details on Page 750

## ABSTRACT

A case of malaria infection in a 42-year-old woman in rural area of Mahmodabad, Mazandaran Province, North Iran was reported and discussed elaborately. She was complaining about recurrent fevers, sweating, headache and myalgia in back. After her first admission to hospital due to misdiagnose she did not receive proper treatment and the patient suffered from clinical manifestations again. Eventually in the second admission to another hospital, after a precise examination on her thick and thin blood smear the agent of disease was recognized appropriately as *Plasmodium vivax* and treated accordingly.

## KEYWORDS

Malaria, *Plasmodium vivax*, Infection, Tropical disease, Iran

## 1. Introduction

Malaria is still known as a parasitic devastating global health problem. The causative agent is an obligate intraerythrocytic protozoon which belongs to the genus *Plasmodium*. Humans acquire infection with the following four species: *Plasmodium falciparum* (*P. falciparum*), *Plasmodium vivax* (*P. vivax*), *Plasmodium ovale* (*P. ovale*), and *Plasmodium malariae* (*P. malariae*). *Plasmodium* primarily transmits to human by the bite of an infected female Anopheles mosquito. According to World Health

Organization estimation in 2010, a number of 219 million documented cases of malaria were recorded and at least 660 000 resulting in death<sup>[1,2]</sup>.

Malaria has worldwide distribution and about 100 countries are considered as endemic areas for malaria transmission<sup>[1,3]</sup>. One of these countries is Iran which is located in Eastern Mediterranean Region. In the past, before competition against malaria nearly 60% of population of Iran was at risk of malaria infection particularly in north and south of Iran. During 1950–1979s, an effective national malaria control program's was undertaken persistently

\*Corresponding author: Rahimi Mohammad Taghi, Young Researchers Club, Islamic Azad University, Babol-branch, Babol, Mazandaran, Iran.  
Tel: +9809122930625  
E-mail: rahimint@gmail.com

## Article history:

Received 26 Jun 2013

Received in revised form 7 Jul, 2nd revised form 15 Jul, 3rd revised form 27 Jul 2013

Accepted 21 Aug 2013

Available online 28 Sep 2013

and lead to almost interruption of malaria transmission and nearly elimination of malaria in the north areas of Iran[4,5]. Presently in Iran, the most engaged and important malaria transmission regions are Sistan–Baluchestan, Hormozgan provinces and south part of Kerman province which are placed in southeast part of the country[5,6].

According to malaria report in 2011, Iran situated in region with low, geographically limited malaria transmission and efficient malaria programmes. Nonetheless, two malarious neighbors countries including Afghanistan and Pakistan which are placed in area with high malaria transmission in the WHO Eastern Mediterranean Region play a prominent role on prevalence rate of malaria infection in Iran by their considerable immigrants and travelers[7].

The major plasmodium species in Iran is *P. vivax* (88%) which is followed by *P. falciparum* (12%). Based on the National Strategy Plan for Malaria Control, Iran has been classified into four strata and northern parts of the country including Mazandaran, Gilan and Golestan provinces are considered areas where the imported cases are found and the potential risk of malaria transmission still exists[5]. In the current report, we present a rare case of introduced malaria in a 42 years old woman from Mahmodabad, Mazandaran Province, north of Iran. The objective of this case report is to inform colleagues and authorities concerning the existence of this dreadful disease and also the probability of misdiagnose in north of Iran.

## 2. Case report

A 42 years old woman who is a housewife and inhabits in rural area of Mahmodabad, Mazandaran Province, North Iran, was admitted for the second time to one of Babol hospitals complaining for recurrent fevers for two months. The major symptoms which pushed her to meet clinic at the time of submission in the hospital were fever, shaking chills, sweating, myalgia in back, joint pain, headache and recovery feeling after nearly two days.

She mentioned that she already (2 weeks ago) was hospitalized in one of Amol hospitals for three days but she observed no healing and efficient treatment and symptoms were still remained. Besides, the patient spent a considerable time, energy and money. Eventually the patients' persistence for taking herself case serious led to correct diagnose in her second admission.

In the second admission the patient blood specimen was collected in EDTA and sent to hematology laboratory for routine work-up. Moreover, from her peripheral blood a thick and thin smear were prepared, stained with Wright–Giemsa and examined by light microscope. After precise examination and considering all crucial criteria, the case was diagnosed as *P. vivax* and the patient was treated accordingly. On third day of receiving treatment, all symptoms of the patient were disappeared and she did not have any complaints. In order to monitor the patient treatment, four slides were prepared on 7th, 14th, 21st and 28th day and all of them were recorded negative. In addition, two thick and thin smears were prepared from her family and were negative.

Considering the patient major history, she had not other diseases and experience of a travel to areas of risking for malaria transmission. In addition, she had no history of transfusion and infection to malaria in the past. After inquiry on the patient house surrounding we noticed that the windows does not equipped with net.

## 3. Discussion

Mazandaran province (36°33'56"N 53°03'32"E) is located at the northern part of Iran and on the southern coast of the Caspian Sea. This province has a particular geographical condition with moderate and subtropical climate with 70%–100% relative humidity, 10–35 °C average temperature and 800–1 200 mm annual rainfall. Before 1950 Mazandaran province had been regarded as a malaria hyper endemic area[5,8]. Whereas after an efficient national malaria control program's performed in the north of Iran during 1950–1979s almost disease transmission was interrupted effectively. Presently, this province is considered as a region with the imported cases. In addition to, the potential risk of malaria transmission still remains[4,5]. In Mazandaran province, malaria vector is *Anopheles maculipennis* and the prevalent species is *P. vivax* that this case is also identified as *P. vivax*[9].

In recent years the majority of malaria cases in Mazandaran province were due to imported malaria. More intriguing, the current case either did not have a history of travel to malaria transmission areas or transfusion history. During last decade the highest infection rate of malaria (21.3%) was observed in Babolsar county. The latest case of *P. malariae*, mixed malaria (*P. vivax* and *P. falciparum*) and *P. falciparum* in Mazandaran province were seen in 1997, 2004 and 2006, respectively[9]. A considerable fluctuation was seen in term of the number of positive cases in this province from 1997 to 2011. During 1997 to 2000, the number of positive individual was low (almost 100 cases in each year) though it was elevated noticeably during 2001–2005 (almost 300 cases in each year) and then abruptly reduced to 40 cases in 2005–2006 and gradually decreased to 3 in 2011. Considering all epidemiological and patient history the present case was recognized as introduced malaria. The latest introduced malaria was reported in 2007. Moreover, during recent five years 28 cases in Mazandaran province were recorded as positive and all of them were classified as imported malaria[9]. Mazandaran annually attracts a great number of tourists, immigrants and refugees owing to its high potential regarding holidays, job-seeking and financial activities. Indeed, these may have an effect on parasite populations and cause the re-introduction of malaria in this province. Considering all the aforementioned facts, a regular monitoring program should be taken in this province[5,10].

This report accentuates some interesting points: Firstly, every report of malaria infection in Mazandaran province should be taken serious and it can be considered an alarm for authorities. Since this province is located in subtropical area with a history of hyper endemic area and re-emerges malaria in 1994 and also this Province is prone to experience problems as the result of re-emerge of malaria[10].

Secondly, one may consider that this case is not the only case of malaria infection in these areas. Because mostly three major agents of malaria transmission including final host and intermediate host (travelers and immigrants from malarious regions) and also geographical condition are prepared.

Furthermore, every case of malaria potentially can be considered as a trigger for re-emerge of malaria based on above mentioned conditions for completing the life cycle of this terrifying disease. Last but not least, this point is noteworthy to mention that malaria initial clinical manifestations are similar to flu-like signs and can resemble other conditions such as gastroenteritis, septicemia and viral diseases. Hence, this point may lead to misdiagnose of patients such as this report at first admission<sup>[11–13]</sup>. And this significant point should not neglected if we cannot recognize a case of malaria infection correctly in the first examine either there is probability of relinquishment of treatment follow up or we put the patient more at danger of disease. Finally we highly suggest further investigations on individuals and vectors to monitor and follow malaria control program in north of Iran, particularly in rural areas which do not access to enough Public Health Centers.

### Conflict of interest statement

We declare that we have no conflict of interest.

### Acknowledgements

We wish to express our sincere thanks to Malaria Control Organization of Ministry of Health for their kind and helpful collaboration.

### Comments

#### Background

Malaria is a matter of high importance due to its noticeable morbidity and mortality throughout the world. This dreadful disease is a major concern for those who inhabit in endemic and hyper endemic areas. Malaria diagnose is so significant because of its different clinical manifestations which may lead to misdiagnose of patient.

#### Research frontiers

The manuscript pays attention to all cases from 1997 to 2011 in Mazandaran areas, generally a passive case. It depicts to fluctuation during these years.

#### Related reports

The report considers 28 cases in 5 recent years and also three cases in 2011. Moreover, the latest introduced malaria is mentioned in 2007.

#### Innovations and breakthroughs

The innovations in the present report is presentation of misdiagnose and putting emphasis on time, energy and

money wasting owing to first admission to hospital without promising results. The case description is good because the reader can understand the condition properly.

### Applications

From the report it has been found that differential diagnosis plays a critical role in malaria patients and there is probability of malaria misdiagnosis with diseases with similar symptoms. This case tries to draw our attention to such disease with different and sometimes ambiguous clinical manifestations.

### Peer review

This is a valuable case report in which authors have tried to present a problem of misdiagnose of malaria in Mazandaran Province which has history of being endemic, hyper endemic area and reemerge malaria. In general, these cases are rare and can help us to evaluate our control and monitor program in these areas, and also to know the condition of disease in this region.

### References

- [1] World Health Organization. 10 facts on malaria. Geneva: World Health Organization; 2013. [Online] Available from: <http://www.who.int/features/factfiles/malaria/en/index.html>. [Accessed on 20 April, 2013].
- [2] Nayyar GML, Breman JG, Newton PN, Herrington J. Poor-quality antimalarial drugs in southeast Asia and sub-Saharan Africa. *Lancet Infect Dis* 2012; **12**(6): 488–496.
- [3] Feachem RG, Phillips AA, Hwang J, Cotter C, Wielgosz B, Greenwood BM, et al. Shrinking the malaria map: progress and prospects. *Lancet* 2010; **376**(9752): 1566–1578.
- [4] Sadrizadeh B. Malaria in the world, in the eastern Mediterranean region and in Iran. Egypt: WHO; 2001, p. 1–13.
- [5] Edrissian GH. Malaria in Iran: Past and present situation. *Iran J Parasitol* 2006; **1**(1): 1–14.
- [6] Youssefi MR, Rahimi MT. Prevalence of malaria infection in Sarbaz, Sistan and Baluchistan province. *Asian Pac J Trop Biomed* 2011; **1**(6): 491–492.
- [7] World Health Organisation. World malaria report 2011. Geneva: WHO; 2011, p. 62.
- [8] Borhani A, Badalyian SM, Gharibian NN, Mosazadeh SA. Diversity and distribution of macro fungi associated to beech forests of northern Iran (case study Mazandaran province). *World Appl Sci J* 2010; **11**(5): 151–158.
- [9] Ghaffari S, Mahdavi SA, Moulana Z, Mouodi S, Karimi-Nia H, Bayani M, et al. Malaria in Mazandaran, Northern Iran: Passive case finding during 1997–2012. *Iran J Parasitol* 2012; **7**(30): 82–88.
- [10] Zakeri S, Mehrizi AA, Mamaghani S, Noorzadeh S, Snounou G, Djajid ND. Population structure analysis of *Plasmodium vivax* in areas of Iran with different malaria endemicity. *Am J Trop Med Hyg* 2006; **74**(3): 394–400.
- [11] Nadjm B, Behrens RH. Malaria: An update for physicians. *Infect Dis Clin North Am* 2012; **26**(2): 243–259.
- [12] Bartoloni A, Zammarchi L. Clinical aspects of uncomplicated and severe malaria. *Mediterr J Hematol Infect Dis* 2012; **4**(1): 26–28.
- [13] World Health Organization. World Malaria Report 2012. Geneva: WHO; 2012.