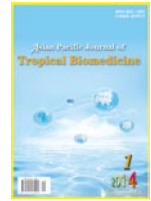


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## Malaria or flu? A case report of misdiagnosis

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## PEER REVIEW

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## Comments

This is an interesting and important case report in which authors have described a case of misdiagnosis of malaria infection with flu in north of Iran. The results are helpful in order to prevent misdiagnosis of malaria infection which is not uncommon in sub tropical and tropical areas with initial clinical manifestations of other conditions particularly flu and viral diseases.

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## ABSTRACT

We present and discuss elaborately a case of malaria misdiagnosis in a 27-year-old woman in Chalus, Mazandaran Province, North Iran in 2013. The patient has been complaining of fever, shivering and myalgia for three months. Although she visited two physicians during this time, the problem still remained owing to misdiagnose. Eventually in hospital after a precise examination on her thick and thin blood film, the causative agent of disease was diagnosed as *plasmodium vivax*. The patient received treatment accordingly and all clinical manifestations were vanished.

## KEYWORDS

Malaria, Infection, Tropical disease, Diagnose, Iran

## 1. Introduction

Malaria is an infectious disease in tropical and sub-tropical nations, with a considerable annual morbidity and mortality. Approximately up to 40% of the world's population is at risk for malaria infection and 100 countries are in endemic areas for malaria transmission[1,2]. This cosmopolitan and devastating disease is responsible for

nearly 216 million episodes and 665000 malaria deaths cases which were reported in 2010[3,4].

Malaria is transmitted from human-to-human by the female *Anopheles* mosquito which is definitive host and plays a prominent role in transmission of this life-threatening disease. Malaria caused by a parasite, *Plasmodium* includes species: *Plasmodium falciparum*, *Plasmodium vivax* (*P. vivax*), *Plasmodium ovale*, and

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*Plasmodium malariae*. The most serious clinical forms are caused by *Plasmodium falciparum* and *P. vivax* which accounts for the majority death cases in children under 5 years of age in tropical and sub-tropical countries[5].

Considering all aforementioned facts and socioeconomic burdens of malaria, there is no shadow of doubt that malaria diagnosis is a matter of high importance in all settings since misdiagnosis can result in noticeable morbidity and mortality. Therefore, we present a case of imported malaria which was misdiagnosed with flu from Northern Iran in order to notify our colleagues and authorities regarding the presence of this life-threatening disease and also the probability of misdiagnosis.

## 2. Case report

Our patient, a 27-year-old female housewife and resident of Chalus, Mazandaran Province, north of Iran in May 2013 had complaints of recurrent fever and shivering. And also she experienced intermittently a recovery feeling after every 2 d for three month. She pointed out that she has already visited by two physicians since three months ago and was diagnosed and treated with flu protocol. Although she felt a relatively recovery feeling just during receiving treatment due to incorrect diagnosis and treatment failure, symptoms returned and remained again. Eventually she was admitted to Taleghani hospital in Chalus.

On examination, she appeared febrile, pale and icteric. Besides, the patient suffered from headache, shaking chills, malaise, weakness, anemia, and joint pain. Overall, she was in critical condition and unconsciousness state. In addition, her blood pressure was 100/60 mmHg, pulse rate 95/min, respiration rate 20/min and body temperature 39 °C. Obviously all above mentioned symptoms pushed her to meet clinic at the time of submission in the hospital. Her history revealed that she had no transfusion, infection to malaria and also no travel to malarious area in the past.

On the third day of hospital admission, her thick and thin peripheral blood smears stained with Wright–Giemsa and examined by light microscope for assuring presence of malaria parasites for several times. Considering all crucial criteria, examination of blood films revealed sexual and trophozoite forms of *P. vivax* and the patient was treated accordingly. The patient responded well to the therapy and all clinical manifestations of the patient were disappeared.

## 3. Discussion

Not only early and accurate diagnosis of malaria leads to correct treatment but also it is essential for effective disease management and malaria surveillance. And on the other hand, delay in early diagnosis and treatment may result in severe complications including coma, sudden death or other symptoms of cerebral involvement[6].

Because malaria's signs often imitate other diseases, it is often under-diagnosed in regions where incidence is rare. Our patient inhabits in Chalus, Mazandaran Province, North Iran. Presently, this province is considered as an area with the imported cases. Besides, the potential risk of malaria transmission still remains uncertain[7].

Mazandaran province (36°33'56"N 53°03'32"E) is situated at 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 800–1200 mm annual rainfall. Even though before 1950s, Mazandaran Province had been considered as a hyper endemic area for malaria disease[7,8]. Fortunately, just three malaria cases were reported in 2011. This low incidence rate in recent years may lead to misdiagnosis and failure of treatment in our case in her first and second physician visits. Indeed, malaria is a life-threatening disease, so it requires immediate treatment; and this is not possible without the first and most important stage which is correct diagnosis. In this province, the major malaria vector and the prevalent species were *P. vivax* and *Anopheles maculipennis*, respectively[9]. Mazandaran annually attracts a great number of tourists, immigrants and refugees owing to its high potential for 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. Recently, the majority of malaria cases in Mazandaran Province were classified as imported malaria and our report is in agreement with this fact.

It goes without saying that while all major agents including vector, proper environmental condition and imported malaria case for transmission of malaria exist in Mazandaran Province. Its prevention and control play a significant role[9]. It is worthy to mention that in a similar misdiagnosis case which has been reported by our team in Mazandaran Province in 2013, the patient was being misdiagnosed with flu at first admission to hospital and in the second hospital admission she was diagnosed properly and this delay in diagnosis and treatment put her in serious and critical condition. In the clinical settings, patients who undergo misdiagnosed will receive unnecessary medication and our case was under-diagnosed and treated as flu[10].

Malaria symptoms and signs usually mimic common flu, with an infected person suffering fever, headache, and vomiting usually within 10 to 15 d after exposure to *Anopheles* mosquito. Of course, malaria initial clinical manifestations can resemble other conditions such as gastroenteritis, septicemia and viral diseases[11,12]. It is important to bear in mind that incorrect diagnosis increases the expense of treatment and the probability of parasite drug-resistance emergence and development.

In conclusion, the authors deduce that firstly, every case of malaria infection should be taken serious in Mazandaran Province which has a history of hyper endemic area and re-emerges malaria and either we lose or incorrectly diagnose we will give the parasite the opportunity to spread, develop

and establish itself in this proper area<sup>[13]</sup>. And the next point to be addressed is that this case is the first malaria case in 2013 in Mazandaran Province.

### Conflict of interest statement

We declare that we have no conflict of interest.

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### Comments

#### Background

Malaria disease unfortunately is still remained the most important parasitic disease in the world and is responsible of 2000 deaths every day in which the majority of victims are children. Hence, diagnosis of the disease is considered so important and is a matter of high importance. Differential diagnosis of malaria disease from other diseases is remarkable because certainly misdiagnosis leads to failure in treatment which follows by severe complications.

#### Research frontiers

The purpose was to report a case of malaria in area where incidence rate is rare and also it put emphasis on the significance of correct diagnosis which plays a major role in malaria treatment. Two required measures including persistent surveillance and reporting are necessary to monitor of malaria infection and the efficacy of control programmes.

#### Related reports

The report described a similar case of misdiagnosis of malaria infection in the same area and misdiagnose and delay in diagnosis and treatment put the patient in serious and dangerous condition.

#### Innovations and breakthroughs

Differential diagnosis between malaria and flu in this case was important. Owing to the importance of this life treating disease, people pay attention to diagnosis of malaria infection and its problems are rare.

#### Applications

It may apply for other similar cases of malaria infection. And also it can be helpful for physicians and laboratory technicians in order to consider the probability of

misdiagnosis and its serious consequences including putting patient in critical condition, development of parasite and waste of time and money.

### Peer review

This is an interesting and important case report in which authors have described a case of misdiagnosis of malaria infection with flu in north of Iran. The results are helpful in order to prevent misdiagnosis of malaria infection which is not uncommon in sub tropical and tropical areas with initial clinical manifestations of other conditions particularly flu and viral diseases.

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