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Rare Malaria Case in Jakarta: Diagnostic Challenges and Treatment Strategies for General Practitioners in Non-Endemic Area

Melvin Andrean, Afif Faizi Assafah
Rumah Sakit Umum Daerah Cengkareng, Indonesia
E-mail: melvinandrean@gmail.com

***Correspondence:** melvinandrean@gmail.com

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ABSTRACT
Malaria remains a significant global health concern, though it is rarely encountered in highly urbanized, non-endemic areas such as Jakarta. This case report aims to explore the diagnostic challenges and treatment strategies associated with malaria, particularly in general practitioners who may lack familiarity due to its rarity in their practice regions. The report presents a 27-year-old male patient admitted with fever, chills, and body aches—symptoms initially suspected as dengue fever. Utilizing a case study method, the patient's diagnostic journey was documented in detail, including clinical manifestations, hematological findings, and treatment response. Further investigation and travel history revealed recent travel to Papua, a malaria-endemic region. Blood smear confirmed a rare mixed infection of Plasmodium vivax and Plasmodium malariae. The patient was successfully treated with dihydroartemisinin-piperaquine and primaquine. This case underscores the complexity of diagnosing malaria in non-endemic settings where dengue and other febrile illnesses are more common. It highlights the importance of comprehensive history taking, awareness of hematological markers, and the use of rapid diagnostic tests to support early and accurate diagnosis. In conclusion, improved clinician awareness and diagnostic preparedness are essential to managing imported malaria cases in urban settings, especially when atypical or mixed infections are involved. These findings advocate for updated training and policy reinforcement to avoid misdiagnosis and ensure timely intervention in non-endemic regions.

Introduction

Malaria, caused by Plasmodium parasites infecting red blood cells, is a major global health concern (Antono & Hamonangani, 2014). The known five species that causes human infections are P. falciparum, P. malariae, P. ovale, P. vivax, and P. knowlesi

(Organization, 2015). Among these, *Plasmodium falciparum* accounts for the majority of cases globally, while *Plasmodium vivax* contributes to approximately 8% of cases. The disease is transmitted through the bite of an infected female *Anopheles* mosquito, and its burden varies widely between regions (Caputo & Garavelli, 2016).

In Indonesia, malaria remains endemic with total cases of 443.530 (Indonesia, 2020). Regions with a significant proportion of cases are reported from regions of Penajam Paser Utara (East Kalimantan), Sumba Island (East Nusa Tenggara), and lastly Papua, where 89% of national cases occur (Puasa, 2017). Despite this, Jakarta, a highly urbanized area, reports very low malaria incidence, with only 268 confirmed cases in 2023 according to the Ministry of Health. This disparity arises from effective urbanization measures, including improved vector control, the destruction of mosquito breeding sites, better housing, and enhanced healthcare access (Organization, 2022).

While endemic regions have a high prevalence of malaria, allowing healthcare providers to maintain familiarity with its presentation, the situation is markedly different in non-endemic areas like Jakarta. Here, diseases such as dengue fever, which share overlapping symptoms like fever, chills, and muscle pain, are more prevalent and often prioritized in differential diagnoses (Muhajir et al., 2019; Obeagu et al., 2024). General practitioners in non-endemic regions may thus face significant diagnostic challenges due to the rarity of malaria cases, limited experience, and reliance on clinical presentations that mimic other febrile illnesses (Santana et al., 2010).

This report aims to present a rare case of malaria in Jakarta, highlighting the diagnostic challenges faced by general practitioners in non-endemic settings. It underscores the critical role of thorough history-taking, including potential exposure to endemic areas, and the necessity of laboratory confirmation to ensure accurate diagnosis and timely treatment.

Case Report

A 27-years-old male patient presented to the emergency department (ED) with complaints of fever, chills, headache, and body aches for the past 7 days. The fever was present daily, without any fever free days. The patient denied having symptoms like nosebleeds, gum bleeding, or red spots on the body. The patient also had no prior history of dengue fever, malaria, or typhoid fever.

On physical examination, vital signs were stable: blood pressure 110/78 mmHg, heart rate 77 bpm, respiratory rate 20/min, and temperature 38.2°C. There were no signs of bleeding, and no hepatomegaly or splenomegaly was noted.

Routine laboratory tests revealed a decreased hemoglobin level of 10.4 g/dL and a platelet count of 68,000/µL. Electrolytes and renal function tests showed no significant abnormalities. Based on the clinical history and routine blood tests, the initial diagnosis was dengue fever, and the patient was treated with supportive therapy and fluids according to dengue management protocols.

On the second day of hospitalization, further history taking revealed that the patient had recently traveled to Papua, a malaria endemic region. Malaria was then suspected, and thick and thin blood smears were performed. By the fourth day of hospitalization, the blood smear confirmed the presence of Plasmodium vivax and Plasmodium malariae parasites. The patient was treated with a combination of dihydroartemisinin piperaquine (DHP) for 3 days and primaquine for 14 days. The patient showed improvement, with no severe malaria symptoms, and platelet counts gradually increased. On the 8th day of hospitalization, the patient was discharged with a prescription

for continued primaquine treatment for 14 days and symptomatic treatment with paracetamol.

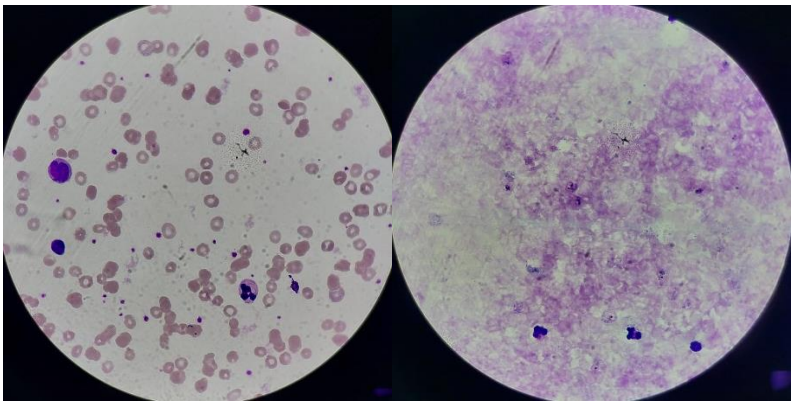

Figure 1. Thin and Thick Blood Smear Showing Plasmodium vivax and Plasmodium malariae Observed and Reported by RSUD Cengkareng Pathologist.

Previous studies have explored the diagnostic challenges of malaria in non-endemic areas. Zaki and Shanbag (2011) highlighted the atypical presentations of malaria in urban settings, noting that non-specific symptoms such as continuous fever and body aches can lead to frequent misdiagnosis with other febrile illnesses like dengue. Similarly, Mane and Sangwan (2020) reported the complexity of detecting mixed infections of Plasmodium vivax and Plasmodium malariae in rural India, emphasizing the risk of underdiagnosis due to morphological overlaps and unfamiliarity among healthcare providers.

The urgency of this study lies in the increasing movement of individuals from endemic to non-endemic regions, especially urban centers like Jakarta, due to work or travel. This geographical mobility creates diagnostic blind spots in areas where malaria is not commonly considered, thereby delaying accurate diagnosis and appropriate treatment. With urban physicians typically more attuned to dengue and other common tropical diseases, the potential for fatal outcomes due to misdiagnosed malaria is significantly increased. This case report thus serves as a critical reminder of the need for improved diagnostic vigilance and updated clinical training for general practitioners in non-endemic regions.

Despite existing literature on malaria in endemic zones, few studies have documented real-world diagnostic errors in non-endemic urban settings, particularly involving mixed Plasmodium infections. There remains a gap in understanding how overlapping symptoms with other endemic diseases, combined with insufficient diagnostic infrastructure and lack of clinician exposure, contribute to missed or delayed malaria diagnoses. This gap highlights the need for clinical documentation of rare urban cases that could inform both diagnostic guidelines and public health strategies.

The novelty of this case report is its focus on a mixed Plasmodium vivax and Plasmodium malariae infection in Jakarta—a highly urbanized, non-endemic area—misdiagnosed initially as dengue fever. The inclusion of hematological decision-tree support and the role of recent travel history as a diagnostic trigger represent a practical and underreported angle. This case underscores the importance of contextual and epidemiological awareness in differential diagnoses, offering new insights for urban medical practitioners in similar settings globally.

The purpose of this study is to raise awareness among general practitioners about the possibility of malaria in urban, non-endemic regions through the documentation of a real case misdiagnosed as dengue. It aims to highlight the clinical, hematological, and diagnostic tools necessary for accurate identification of malaria. The expected benefit is to enhance diagnostic accuracy, reduce treatment delays, and ultimately improve patient outcomes in similar non-endemic urban environments.

Research Methods

The case report method is a research approach that involves the detailed and systematic presentation of an individual case or a series of related cases, providing valuable insights into specific phenomena. This method is particularly useful in fields such as medicine, psychology, and social sciences, where unique or rare instances can offer important lessons and deepen understanding of particular issues. By documenting and analyzing the case thoroughly, researchers can highlight patterns, raise awareness of uncommon occurrences, and contribute to the development of new theories or practices. The case report method allows for a comprehensive examination of the case's context, challenges, and outcomes, making it a critical tool in applied research.

Results and Discussions

Clinical manifestation and challenges of mixed plasmodium infections

One of the major challenges in diagnosing malaria in Jakarta is the overlap of clinical symptoms with other febrile diseases, particularly dengue fever, which is a common tropical disease in Jakarta (Khairi et al., 2024). In this case report the patient has mixed plasmodium infection, P. vivax and P. malarie. This mixed infections of plasmodium can often present without the classical presentation of malaria, such as paroxysms of fever with bouts of illness alternating with symptom-free periods, such as in this case report.[11] The classical presentation of malaria is only seen in 50-70% of cases, and usually not seen early in the course of malaria, and therefore the absence of periodic, synchronized fevers does not rule out a diagnosis of malaria (Crutcher et al., 1996; Zaki & Shanbag, 2011).

This atypical presentation of symptoms like fever, chills, headache, and body aches can overlap with other common tropical infections in non-endemic areas, such as dengue fever, complicating initial diagnosis. This can lead to misdiagnosis or delays in treatment initiation, as seen in the current case, where the initial diagnosis was dengue fever. Therefore, In Jakarta, a non endemic areas where malaria cases are rare, this case serve as a reminder that GPs should consider malaria in their differential diagnosis. The patient's travel history to a malaria endemic region was critical in guiding the diagnostic approach. According to the Ministry of Health's malaria guidelines, all patients presenting with fever should be asked about recent travel to malaria endemic areas.

Microscopy, the gold standard for malaria diagnosis, is prone to misidentification in cases of mixed infections. Morphological similarities between *P. vivax* and *P. malariae*, particularly in the early ring stages, can lead to errors, especially if slides are examined by less experienced personnel. Distinctions based on RBC size (normal in *P. malariae* and enlarged in *P. vivax*) and gametocyte morphology may be subtle and require meticulous examination under optimal conditions (Guo et al., 2016; Mane & Sangwan, 2020).

Molecular diagnostic techniques such as polymerase chain reaction (PCR) provide a more sensitive and accurate alternative for detecting mixed infections. PCR is

particularly valuable in identifying low-density parasitemia and distinguishing between species that are morphologically similar. However, the availability of PCR in non-endemic regions like Jakarta is often limited to specialized laboratories, hindering its routine use in general practice settings.

Hematological differences

One of the simple test to differentiate between dengue fever (DF) and malaria in non endemic region is a complete blood count. In complete blood count, some of the key findings include reduced white blood cell (WBC), neutrophil, monocyte, eosinophil counts, and lower neutrophil-lymphocyte (NL) and monocyte-lymphocyte (ML) ratios in DF compared to malaria. Conversely, red blood cell (RBC) count, hemoglobin (Hb), hematocrit (Hct), mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), and mean corpuscular hemoglobin concentration (MCHC) were elevated in DF patients. These hematological trends reflect the pathophysiological divergence of the diseases, with malaria primarily targeting RBCs, leading to anemia and bone marrow suppression, while DF exhibits marked leukopenia and platelet reduction due to viral suppression of bone marrow activity.

A study done by Kotepui et al (2017) shows a decision tree model to help physician determined between dengue fever and malaria. this tree model further enhances diagnostic accuracy, integrating neutrophil count, lymphocyte levels, MCHC, and gender as discriminators. For instance, low neutrophils (<2,800/µL), Hb (>11 g/dL), lymphocytes (<800/µL), and MCHC (<33 g/dL) effectively predict DF, while malaria is suggested with opposite trends. This diagnostic framework offers a practical tool for early detection, enabling timely clinical intervention and optimizing resource allocation in febrile illness management. These findings underscore the utility of hematological parameters as non-invasive, accessible markers in distinguishing DF from malaria especially in non-endemic region (Kotepui et al., 2017).

Another specific hematological parameters that can be used to differentiate between DF and malaria is dengue virus non-structual protein (NS1). NS1 detect the dengue antigen in the blood and can be used in the first 0-7 days of symptoms. If the result show positive with blood count suggestive of dengue, then diagnosis of dengue fever can be made. IgM and IgG ELISA antibodies of dengue can help to differentiate between dengue fever and malaria after day 7 of illness. A positive result favors the diagnosis of dengue fever (Dengue, 2009).

A rapid diagnostic test (RDT) for malaria, is an alternate way of quickly establishing the diagnosis of malaria infection by detecting specific malaria antigens. Altough microscopic blood smear examination is the gold standard for malaria laboratory confirmation, it takes time to make the specimen and experienced microscopist to observe the result. Thus, RDT can help to rapidly determined the diagnosis of malaria. All of this specific hematological parameters can be used to help physician distinguish between dengue fever and malaria, when complete blood count alone difficult to determine the diagnosis.

In this case, the hematological findings of the blood count does align with the decision tree models done by Kotepui et al (2017). This case shows a hemoglobin levels of 10.4 gr/dL that favors the diagnosis of malaria. Although the specific hematological parameters is not used in this case, the diagnosis is done by the microscopic findings of plasmodiums.

Radiological differences

Although not as useful as hematological test, radiological findings can also help to differentiate between dengue fever and malaria. A study done by Jain et al (2020) shows hepatosplenomegaly found in both dengue fever and malaria. Though the numbers were greater in malaria (44%) compared to dengue fever (33%) , there aren't any statistical values (Jain et al., 2020).

Different from the hepatosplenomegaly finding, the findings of both ascites and pleural effusion provides statistically significant values. A significant difference found in number of ascites findings, only 2% in malaria and 49% in dengue fever. Pleural effusion also found more in dengue fever 46% compared to malaria, only 2%.[19] The explanation of the greater number of both ascites and pleural effusion in dengue fever is because the plasma leakage that is known to occurred in dengue. In this case, although the chest x-ray shows normal findings and the abdominal ultrasonography is not done, this case report shows physician especially GPs that radiological findings can also help differentiating between dengue fever and malaria in non-endemic areas.

Treatment Considerations

In this case, the patient responded well to a combination of Dihydroartemisinin piperaquine (DHP) and primaquine, in line with the Ministry of Health's malaria treatment guidelines. Timely initiation of appropriate treatment is crucial to prevent complications associated with malaria. This case emphasizes the importance of adhering to treatment protocols based on the identified Plasmodium species, especially in cases involving mixed infections, which can complicate the clinical picture.

Conclusion

This case of mixed Plasmodium infection in Jakarta underscores the diagnostic challenges faced by general practitioners in non-endemic urban areas, where the overlap of malaria symptoms with more common tropical diseases, like dengue fever, can result in delays or misdiagnoses. It emphasizes the need for thorough history-taking, including travel to endemic regions, and the importance of laboratory confirmation. General practitioners must remain alert to rare diseases like malaria, especially in patients with atypical presentations or travel histories. Utilizing rapid diagnostic tools, such as malaria RDTs, and increasing awareness of hematological and radiological findings can significantly enhance diagnostic accuracy. Additionally, incorporating molecular diagnostic techniques and decision-support models, when possible, can aid in distinguishing febrile illnesses, while improving access to better diagnostic tools and following updated guidelines will support early malaria identification and treatment, ultimately improving patient outcomes.

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