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A Case Report of Malaria with Concurrent Dengue and Typhoid Fever

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ABSTRACT

Introduction: In Indonesia, malaria, dengue fever (DF), and typhoid fever are endemic infectious diseases that remain major public health concerns. Data from the Ministry of Health in 2025 show high incidence rates of these three diseases, especially in Papua, Bali, and urban areas, which increase the risk of coinfection and complicate diagnosis and treatment.

Methods: A case is reported of an 18-year-old man presenting with high fever, headache, nausea, and thrombocytopenia. Initial serological and laboratory tests indicated dengue fever and typhoid infection. Routine monitoring and peripheral blood examination were performed and malaria co-infection was detected.

Results: The patient's fever and platelets continued to decrease despite being given supportive therapy and antibiotics. Peripheral blood smear confirmed Plasmodium falciparum infection, prompting the addition of antimalarial therapy with dihydroartemisinin-piperaquine and primaquine. Following comprehensive treatment and close monitoring, the patient's condition improved, with normalization of vital signs and increased platelet count.

Conclusion: Coinfection of malaria, dengue fever, and typhoid in Indonesia is rare but requires special attention. Systematic diagnosis and intensive monitoring are essential for effective treatment and prevention of complications. Increased clinical awareness of possible multiple infections in febrile patients in endemic areas can improve prognosis and optimize patient management.

Keywords: Coinfection, malaria, dengue hemorrhagic fever, typhoid fever, Plasmodium falciparum.

INTRODUCTION

Infectious diseases such as malaria, dengue hemorrhagic fever (DHF), and typhoid fever are significant public health issues in developing countries, including Indonesia.[1] According to data from the World Health Organization (WHO), in 2020, there were approximately 229 million malaria cases worldwide, with the majority occurring in Sub-Saharan Africa and Southeast Asia. Meanwhile, DHF also remains a major health problem in Southeast Asia, including Indonesia, with the number of cases rising sharply in recent years.[2] Typhoid fever, caused by infection with the bacterium *Salmonella enterica* serovar Typhi, also remains a major challenge in developing countries, with an estimated 11–20 million cases per year globally.[1]

Malaria is a parasitic infection transmitted by female *Anopheles* mosquitoes that can cause life-threatening acute illness and is a significant global health threat. Two billion people are at risk of contracting malaria each year, including those in 90 endemic countries and 125 million travelers, with 1.5 to 2.7 million deaths annually. The *Plasmodium* parasite has a multistage life cycle, leading to a characteristic cyclic fever. With timely treatment, most individuals experience rapid symptom resolution; however, significant complications may occur, including cerebral malaria, severe malaria anemia, coma, or death. Preferred antimalarial therapeutic and chemoprophylactic regimens are determined by species, geography, susceptibility, and patient demographics. Latent infections or reactivations may be reported years after exposure.[1]

Dengue is a viral infection transmitted by mosquitoes and is highly common in tropical-subtropical regions around the world, putting over four billion inhabitants at risk. According to records from the World Health Organization (WHO), approximately 500,000 people with severe forms of dengue infection require hospitalization each year, including pediatric groups. According to the same report, 2.5% of the hospitalized population end up dying due to complications associated with severe dengue. Studies also indicate that the likelihood of contracting dengue is highest among

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people aged 30 to 45 years, and this group accounts for the majority of dengue-related deaths annually.[2]

Typhoid and paratyphoid fevers are multisystemic febrile diseases that are clinically indistinguishable, caused by *Salmonella enterica* serotypes Typhi (*S. Typhi*) and Paratyphi (*S. Paratyphi*) A, B, and C. Collectively known as enteric fever, more than 9 million people are infected, and 110,000 die from these diseases each year globally.[9] Enteric fever is a leading cause of community-acquired bloodstream infections in South and Southeast Asia. A reportable disease in the United States and many other developed countries, enteric fever ranks second only to malaria as a cause of severe and potentially life-threatening infections in travelers. After an incubation period of 6 to 30 days, enteric fever insidiously presents with gradual onset of fever accompanied by fatigue, anorexia, headache, lethargy, and abdominal symptoms.[10] If treatment is delayed or inadequate, meningitis, sepsis, or intestinal perforation may occur. With a history of *S. Typhi* and *S. Paratyphi* rapidly developing antimicrobial resistance due to repeated antibiotic use, the recent emergence of extensively resistant strains has significantly complicated treatment and raised serious concerns.[3]

In Indonesia, malaria, dengue hemorrhagic fever (DHF), and typhoid fever remain endemic infectious diseases that continue to burden the healthcare system. According to 2025 data from the Indonesian Ministry of Health, 418,546 malaria cases were recorded, with 89% originating from Papua Province, which has the highest Annual Parasite Incidence (API) of 52.99 per 1,000 population, followed by East Nusa Tenggara with an API of around 3.42 per 1,000 population. Meanwhile, DHF cases showed a significant increasing trend. By the end of 2024, 244,409 DHF cases with 1,430 deaths were recorded. Areas with the highest number of cases include Bandung City (3,902 cases), Tangerang Regency (3,105 cases), Bogor City, as well as West Jakarta and East Jakarta. Bali Province, particularly Gianyar Regency, also recorded high DHF incidence with a rate of 319 per 100,000 population. As for typhoid fever, although recent incidence data is more limited, the disease remains endemic especially in areas with poor sanitation and limited access to clean water. The

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combination of these three diseases is highly likely in Indonesia due to tropical environmental factors, high rainfall, and uneven sanitation infrastructure, making coinfections such as reported cases of concurrent malaria, dengue, and typhoid possible.[19]

In developed countries, although the prevalence of these diseases is lower, coinfection cases are still reported. For example, in Europe and North America, malaria cases imported from endemic countries are often accompanied by other infections such as DHF or typhoid, particularly among individuals traveling to endemic areas.[4]

Malaria and dengue fever are common in tropical countries. Coinfection of malaria and dengue in the same patient remains rare because the two diseases differ in several aspects. Malaria, a protozoal infection, is caused by the bite of a female *Anopheles* mosquito, whereas dengue is a viral infection transmitted to humans through the bite of an infected *Aedes aegypti* mosquito. Dengue mosquitoes are considered daytime biters, whereas malaria mosquitoes bite at night.[5]

In general, malaria is a protozoal infection. Its pathogen is one of five human-infecting *Plasmodium* species. The primary mosquito vector is the female *Anopheles*. Meanwhile, dengue is a viral infection. Its pathogen is the dengue virus. The primary mosquito vector is *Aedes*. Both diseases can cause acute febrile illness. However, malaria may be chronic whereas dengue is not. The specific dengue triad — atypical lymphocytosis, hemoconcentration, and thrombocytopenia — may aid in differentiating dengue from other tropical infections including malaria. There is no doubt that in tropical countries, high prevalence of both malaria and dengue is observed. However, concurrent malaria and dengue infections are uncommon. Coinfection is a scenario in which both malaria and dengue are present in a patient at the same time.[6]

Dengue is a viral disease caused by the dengue virus and transmitted through the bite of an infectious *Aedes aegypti*mosquito, whereas typhoid is a bacterial disease caused by a motile gram-negative bacillus called *Salmonella typhi* and/or *Salmonella paratyphi* and transmitted orally through contaminated food and water. Dengue and typhoid are different entities with overlapping signs and

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symptoms that are indistinguishable, and several reports exist of concurrent infections from endemic regions in Nepal. Symptom similarities make accurate clinical diagnosis and treatment difficult. Both are major health concerns in Nepal during the monsoon season, and if coinfection is not diagnosed and treated promptly, it can be fatal.[7]

Dengue fever and malaria are the most common arthropod-borne diseases caused by mosquito bites and also share similar signs and symptoms. Typhoid fever, caused by *Salmonella typhi* and 3 types of *Salmonella paratyphi*, also presents symptoms similar to those of malaria and dengue fever. Coinfection of malaria and dengue was first reported in 2005, while Orhe et al. in 2003 reported malaria and typhoid coinfection, and some reported cases indicate that coinfection may be more severe than single infections (malaria or dengue fever), although there are few reports on dengue and typhoid coinfection. In many cases, the initial diagnosis is usually suspected to be malaria when fever syndrome is observed in a patient, followed by suspicion of typhoid and even empirical treatment. Dengue virus infection is rarely considered by medical practitioners because the disease is not viewed as endemic, which can lead to fatal consequences. Therefore, early diagnosis of dengue infection will not only prevent complications such as dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS) but also reduce unnecessary antimalarial and antibiotic usage, thereby reducing the threat of antimicrobial resistance.[8]

Coinfection between malaria, DHF, and typhoid fever is a rare but significant clinical phenomenon as it may worsen patient prognosis and challenge diagnostic and therapeutic strategies. Several case reports have documented such coinfections, including a report from Nepal describing concurrent DHF and malaria in a young patient with no prior infection history. Additionally, a report from Sudan documented a case of concurrent DHF and malaria in an adult male who recovered after supportive care and antimalarial treatment.[9]

These coinfections often present overlapping clinical symptoms, such as high fever, muscle pain, thrombocytopenia, and gastrointestinal disturbances, requiring careful diagnostic approaches

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and appropriate therapy.[10] Increasing clinical awareness and diagnostic capacity in endemic areas is crucial to effectively identify and manage these coinfections.

METHODS

This study used a retrospective observational case-based design to analyze the management of malaria patients with dengue hemorrhagic fever and typhoid coinfections. Data were obtained from patient medical records treated in a tertiary hospital in Indonesia. The study subject was an 18-year-old male patient diagnosed with malaria with dengue hemorrhagic fever and typhoid fever coinfection. Data collection was conducted by reviewing the patient's medical records, including medical history, physical examination, laboratory results, and therapies administered. Therapy data included the use of antibiotics, fluid resuscitation, and other supportive therapies. Therapy outcomes were monitored through normalization of laboratory parameters and the patient's overall clinical condition. Data analysis was descriptive, focusing on the appropriateness of treatment according to evidence-based guidelines. This research was conducted in accordance with medical ethical principles, and ethical approval was obtained from the hospital ethics committee where the study was conducted.

RESULTS

Case Report

An 18-year-old male presented to the Emergency Department of Ibnu Sina Hospital Makassar with complaints of fever lasting the past three days. The fever was intermittent, tending toward high intensity, especially in the late afternoon, accompanied by chills and cold sweats. The patient also complained of headache for one week before hospital admission, which worsened after the onset of fever. Other symptoms included nausea and vomiting. No history of spontaneous bleeding or family members with similar complaints was found. The patient had a history of living for five months in the Papua region. No history of systemic disease such as hypertension, type 2 diabetes mellitus, heart disease, or kidney disease was found.

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Physical examination revealed vital signs with blood pressure 100/80 mmHg, pulse 104 beats per minute, respiratory rate 21 breaths per minute, and temperature 39.1 °C (axillary). Eye examination showed no pale conjunctiva or icteric sclera. Thoracic and abdominal examinations were within normal limits, with auscultation revealing increased abdominal peristalsis. Extremities were warm with no edema, and capillary refill time was less than two seconds. No spontaneous bleeding was found during examination.

Complete blood count revealed leukopenia (WBC $3.6 \times 10^3/\mu L$) with lymphocytopenia (12.1%), thrombocytopenia (54,000/µL), along with other parameters such as hemoglobin 15.6 g/dL, hematocrit 48.1%, MCV 80.4 fL, MCH 26.1 pg, and MCHC 32.4 g/dL. Serological Tubex TF test was positive with a value of 4, indicating *Salmonella typhi* infection. Blood chemistry showed random blood glucose 102 mg/dL and SGPT 30 U/L. The patient was diagnosed with grade 1 dengue hemorrhagic fever and typhoid fever.

Initial management included bed rest education, Ringer's lactate infusion at 32 drops per minute, and pharmacological therapy consisting of intravenous paracetamol 1 g every 6 hours, ondansetron 4 mg every 8 hours, lansoprazole 30 mg every 24 hours, and intravenous ceftriaxone 2 g every 24 hours. Follow-up complete blood counts and peripheral blood smears for malaria detection were scheduled daily.

On day two, the patient's fever persisted and body aches emerged. Vital signs remained stable with blood pressure 102/80 mmHg, pulse 100 bpm, temperature 39 °C, and respiratory rate 20 bpm. Lab results showed WBC dropped to $2.9 \times 10^3/\mu L$ and platelets fell to 24,000/µL. Peripheral smear for malaria (DDR) was positive for *Plasmodium falciparum*. The patient was then diagnosed with malaria and received antimalarial therapy with Dihydroartemisinin-Piperaquine (DHP) tablets for three days at a dose of three tablets once daily plus a single dose of primaquine. Lab monitoring was scheduled again after 24 hours.

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On day three, fever remained intermittent with a peak temperature of 38.5 °C in the late afternoon, accompanied by body aches. Vital signs remained stable. Lab tests showed WBC $3.2 \times 10^3/\mu L$ and platelets 25,000/µL. If fever and low platelet count persisted, a platelet transfusion was planned. Lab monitoring continued every 24 hours.

On day four, the patient's temperature decreased to 36.4 °C and body aches began to subside. Vital signs were within normal ranges. Laboratory showed WBC increased to $4.2 \times 10^3/\mu L$ and platelets 27,000/µL. The DHP antimalarial therapy entered its third day. Hemodynamic and laboratory monitoring continued.

By day five, the fever had resolved and the patient no longer complained of body aches. Vital signs were stable with blood pressure 104/67 mmHg, pulse 73 bpm, temperature 36.3 °C, and respiratory rate 20 bpm. Lab tests showed platelets rising to 46,000/µL. DHP antimalarial therapy was discontinued and the patient was allowed to continue outpatient monitoring.

DISCUSSION

This case report describes that coinfection of malaria, dengue hemorrhagic fever (DHF), and typhoid fever is rare but can occur, especially in tropical endemic areas. These three diseases have overlapping clinical symptoms such as high fever, thrombocytopenia, leukopenia, and systemic complaints like body pain and gastrointestinal disturbances.[10] This creates diagnostic challenges due to lack of specific signs distinguishing each disease. Therefore, diagnosis is established using supportive tests such as serology (NS1, dengue IgM, Tubex TF) and microscopical confirmation for malaria.[11] According to theory, accurate identification requires sharp clinical skills and relevant diagnostic tests. For example, dengue serology detecting IgM and NS1 can differentiate acute dengue infection, while Tubex TF confirms typhoid. Malaria is confirmed via microscopy or rapid antigen tests detecting *Plasmodium* species.[12] Precise diagnosis enables specific management that includes antibiotics for typhoid, antimalarials, antipyretics, and fluid therapy. Moreover, strict monitoring of vital signs and lab results is crucial to assess treatment progress and prevent serious complications.[13]

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In this case, the patient initially presented with stable hemodynamics but high fever up to 38.5 °C, without spontaneous bleeding or jaundice. Initial labs showed thrombocytopenia (54,000), leukopenia (3,600), and positive Tubex TF, pointing toward typhoid and grade 1 dengue. Supportive and antibiotic therapy was administered including Ringer's lactate, paracetamol, ondansetron, lansoprazole, and ceftriaxone. On the second day, despite therapy, fever persisted and body aches continued, while lab values showed further decrease in platelets and leukocytes. Peripheral smear eventually revealed *P. falciparum* malaria.[14] Malaria diagnosis was added, and antimalarial therapy with Dihydroartemisinin-Piperaquine (DHP) and a single dose of primaquine was administered. This aligns with malaria treatment guidelines emphasizing effective antimalarial combinations like DHP that have good activity against *P. falciparum*.[15]

The disease course then showed persistent but improving fever on day three, with significant improvement by day four, both in temperature and systemic complaints.[16] Lab tests showed platelet and leukocyte improvements reflecting positive response to treatment. Compared to theory, this case shows clinical and laboratory patterns consistent with literature, where overlapping symptoms and significant hematologic changes are observed.[17] Diagnosis was made stepwise and multi-etiologic management was aligned with theoretically recommended approaches in malaria, dengue, and typhoid coinfection.[18] As literature states, management in coinfection should consider all involved etiologies. Timely therapy and intensive monitoring are essential for optimal outcomes.

This case also emphasizes the importance of rigorous clinical and laboratory monitoring to prevent complications. Additionally, a high index of suspicion for possible multiple infections in patients with persistent fever, especially in endemic areas, is necessary.[19] In this context, research indicates that patients presenting with high fever and non-specific symptoms often require comprehensive examination to ensure accurate diagnosis given the potential for coinfection among these tropical diseases.[20] Hence, heightened clinician awareness of such coinfections will greatly improve patient prognosis and prevent serious complications.

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CONCLUSION

Coinfection of malaria, dengue hemorrhagic fever, and typhoid fever is rare but requires special attention as it can complicate diagnosis and treatment. The reported case demonstrates that systematic diagnostic approaches and periodic laboratory monitoring are crucial in detecting gradually developing infections. Management provided reflects comprehensive therapy based on disease etiology, and the patient's recovery highlights the importance of rapid and accurate intervention. This case also serves as an important reminder to increase clinical vigilance toward possible multiple infections in patients with unresolving fever, especially in endemic regions.

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