Concurrent Infection of Severe Malaria and Dengue Hemorrhagic Fever

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Abstract: Dengue and Malaria are common infections in tropical regions but infection at the same time with both is a growing threat, particularly in tropical regions where both diseases are endemic. The case being reported is a 29-year-old male, presented with fever, rigors, abdominal pain, and drowsiness. His condition rapidly deteriorated, developing respiratory acidosis, acute kidney injury, and coagulopathy with hematemesis. Blood tests confirmed co-infection with cerebral malaria and dengue hemorrhagic fever. Despite aggressive treatment with ventilation, broad-spectrum antibiotics, multiple blood transfusions, plasma transfusions and hemodialysis, he developed ventilator-associated pneumonia, and Clostridium difficile secondary to broad-spectrum IV antibiotics. After 16 days of intensive care, his condition improved, and he was discharged. This case highlights the challenges of diagnosing and managing co-infection with severe malaria and dengue, where rapid deterioration can multi-organ failure can occur and can be potentially fatal.

Keywords: Dengue, Cerebral Malaria, Co-Infection, Fulminant Falciparum Malaria

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Introduction

Dengue and malaria are common vector-borne diseases. However, co-infection with these two diseases is relatively rare and is under-reported.¹ The first case of Dengue and Malaria co-infection reported in Pakistan was in 2007. In Pakistan, a total of 25,932 confirmed dengue cases were reported from 1st January to 27th September 2022.² In a 2016 study, most number of co-infection cases were found in the hot and humid months of September and October in Angul District of Odihsa, India.³ Dengue and malaria both cause febrile illness and co-infection should be considered in febrile patients who live in endemic areas. Suspicion of Dengue and Malaria co-infection should be a matter of concern for

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physicians as morbidity and mortality increases if diagnosis and treatment is delayed.⁴ This case highlights the complexities associated with coinfection. We will discuss the initial presentation of the patient, the treatment offered, and the challenges faced due to the disease course exacerbation. The successful management employed in this case will also be discussed emphasizing the importance of a multidisciplinary approach in handling such critical cases.

Case Report

A 29-year-old male patient presented to the Emergency department of Farooq Hospital (West wood branch) Lahore, with complaints of drowsiness, intermittent high-grade fever with rigors and chills and abdominal pain associated with vomiting. His baseline saturation was 96% on 5 liters of oxygen. Few hours after Admission his condition started to deteriorate and his ABGs revealed combined respiratory acidosis with metabolic compensation for which he was shifted on a ventilator. A suspicion of cerebral malaria/black water fever with acute kidney Injury was made. This

was confirmed on blood film and furthermore on screening for dengue fever he turned out to have positive dengue IgM antibodies which confirmed the concurrent infection of cerebral malaria with dengue hemorrhagic fever. Therefore, he was started on IV Artesunate and Broad-spectrum antibiotics (Vancomvcin and Ciprofloxacin) which was later modified according to culture and sensitivity report of deep tracheal aspirate which revealed gram negative bacteria. His blood picture revealed severe coagulopathy with (PT 20 seconds and APTT 75 seconds), severe anemia (6.9 g/dl) with elevated bilirubin levels (17.4 mg/dl) and thrombocytopenia with platelet count 20,000 \times 10^9/L. His renal function tests and liver function tests showed raised urea 312 mg/dl, creatinine 7.2 mg/dl and raised GGT (167 U/L) and ALP (544 U/L) respectively.

He remained on Ventilatory support for 5 days and then was weaned off but didn't tolerate extubation due to exhaustion. He was reintubated 10 hours later. Repeated chest x-ray showed bilateral infiltrates suggestive of Ventilator Dependent respiratory failure and Bilateral Ventilator Associated Pneumonia (VAP). He was treated with IV ceftazidime/ avibactam, tigecycline, colistin nebulization and doxycycline. His respiratory efforts improved after multiple sessions of Ps/Simv/T piece cycling and after 7 days he was weaned off from the ventilator. For his bilateral Chest Infiltrates, nonresolving fever and Candida growth he was also started simultaneously on IV Voriconazole to cover for fungal pneumonia. Later, because of IV antibiotics he developed Clostridium Difficile colitis confirmed on USG abdomen and stool for C diff toxin which turned out to be positive. IV Ceftazidime/avibactam was withheld, and oral Vancomycin 125 mg 6 hourly was started in addition to IV metronidazole which improved his diarrhea. Colistin Nebulization and Tigecycline were continued.

This condition had a mortality rate approaching almost 100%. He underwent 6 sessions of Hemodialysis as he had dialysis dependent Renal Failure (secondary to Sepsis/Black water fever due to Fulminant Falciparum Malaria) Which improved his renal function. In total he Received 2 Fresh frozen plasma transfusions as he had Hematemesis secondary to Coagulopathy, 3 Mega Kit Platelets transfusions and 6 packed red blood cells transfusions during Admission. Gradually his parameters improved, and he was discharged after 16 days of Intensive care hospitalization.

Discussion

Dengue and malaria are the most prevalent arthropod-borne diseases with an estimated global incidence of 390 million and 214 million cases per year, respectively.⁵ Overlapping of clinical signs and symptoms in concurrent infection with two different infective agents can lead to a diagnostic challenge for the physician.⁶ A recent study showed that, in the last 15 years, the greatest number of malaria and dengue co-infection cases were reported from Pakistan. Some of the reasons for the exponential rise in cases could be the rapidly changing environment, urbanization, deforestation and floods. This leads to an increased transmission period for both dengue and malaria.⁷ The most common species present in cases of malaria co-infections are P. falciparum and P. vivax, whereas, for dengue co-infections, dengue serotype 4 is the most common culprit serotype.⁸

Treatment option for co-infection can vary according to the condition of the patient. In the first case reported of malaria and dengue co-infection, due to persistent fever a suspicion of malaria was made, and the patient completed intra-venous Artesunate course. Later he was put on Primaguine therapy after measuring his G6PD and after two weeks all his labs were within normal range.' General practitioners in Pakistan lack the necessary knowledge regarding prevalent dual infectious diseases and their treatments and misdiagnose the cases as separate malaria or dengue attack. This is also possible due to lack of resources to diagnose each disease. The severity of co-infections is much more than single infections as the patients have a higher risk of developing complications.

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Authors Contribution

OF: Conceptualization of Project

- MA, JR: Data Collection
- **AM:** Literature Search
- AM: Statistical Analysis
- MR: Drafting, Revision
- MR: Writing of Manuscript