Diagnostic challenges: Concomitant dengue fever with mycoplasma pneumonia in an adolescent

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SUMMARY

Dengue fever is a mosquito-borne viral infection that is endemic in more than 100 countries and has the highest incidence among infectious diseases in Malaysia. While the dengue virus typically causes dengue fever, bacterial and fungal co-infections are relatively rare, often complicating diagnosis. We report an unusual case of a 13-year-old boy with dengue fever, presenting with acute respiratory symptoms, later diagnosed as co-infection of Mycoplasma pneumoniae. The diagnostic challenge in this case arose due to the overlapping clinical features of dengue and viral upper respiratory tract infection (URTI), including persistent high-grade fever, cough, and headache, which initially led to a misdiagnosis of viral URTI. This delayed the performance of specific dengue diagnostics, such as NS1 antigen testing and resulted in the progression of respiratory symptoms. Resolution of the diagnostic dilemma was achieved through chest X-ray (CXR) imaging, which revealed lobar pneumonia and the subsequent confirmation of Mycoplasma pneumoniae co-infection alongside dengue through serological testing. This case highlights the importance of maintaining a high index of suspicion for co-infections in febrile patients presenting with atypical respiratory symptoms. Early and combined use of serological testing and imaging can help avoid delays in diagnosis and improve patient outcomes, particularly in dengue-endemic regions where concurrent infections may be under-recognized.

INTRODUCTION

Dengue is a mosquito-borne viral disease caused by the dengue virus (DENV), primarily transmitted by Aedes aegypti mosquitoes.[1] The disease can range from mild febrile illnesses to severe complications, particularly in cases of secondary infection. Early symptoms of dengue, such as fever and headache, often overlap with those of other viral infections, leading to potential diagnostic delays or misdiagnoses.[2] Although bacterial co-infections in dengue are relatively uncommon, they can significantly complicate the clinical course and delay appropriate treatment. Timely recognition and management of such co-infections are crucial, as antibiotics may improve outcomes and prevent further complications.

Bacterial co-infections, while underreported, pose notable diagnostic challenges. Cases involving Mycoplasma pneumoniae have illustrated these difficulties, as symptoms of *Mycoplasma pneumoniae* infection can overlap with those of dengue.[3] For example, an 8-year-old girl in Thailand with dual infections of Mycoplasma pneumoniae and dengue hemorrhagic fever exhibited liver failure, demonstrating significant diagnostic challenges in pediatric cases. Another study reported a tourist from Thailand who developed dengue hemorrhagic fever and Mycoplasma pneumoniae pneumonia, further complicated by clostridial colitis.[4-5] These cases highlight the complexity of diagnosing concurrent infections and underscore the importance of integrating clinical, laboratory, and radiological assessments.

This report presents a rare case of a teenager whose initial presentation of respiratory symptoms and viral-like features led to a delayed diagnosis of dengue fever. The subsequent identification of a Mycoplasma pneumoniae co-infection further complicated the clinical picture and delayed appropriate treatment. This case underscores the need for heightened awareness and comprehensive diagnostic approaches in managing dengue, particularly in the presence of co-infections.

CASE PRESENTATION

A 13-year-old boy presented to our primary care clinic on his third day of illness with persistent fever, cough, and headache consistent with a viral infection. He has a recent travel history to Taiping, Bentong, and Thailand; however, he has no history of visiting recreational parks or jungle trekking. Despite the initial clinical presentation supporting the diagnosis of viral URTI, there is a concern about the decreasing trend of low normal platelet counts. The decision to repeat the full blood count was carried out till day 5 of the illness, in which the platelet count still showed within low normal range values. Even though the suspicion of dengue fever grew due to the absence of typical symptoms such as rash or severe thrombocytopaenia, dengue serology was still not prioritised. His vital signs remained stable during his follow-up, and systemic examinations were unremarkable. By the sixth day of illness, with the persistent fever, headache and further reduction of platelet counts, dengue serology (IgM) was finally conducted, revealing evidence of dengue infection. Interestingly, respiratory symptoms remained subtle throughout this period until the eighth day of illness, when he presented to the emergency department (ED) with worsening shortness of breath in two days. At a presentation to the ED, he appeared to have tachypnea with a respiratory rate of 20 per minute and an oxygen saturation rate of 95% in room air. Respiratory examination revealed crepitation

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Table I: Laboratory findings in the case of Mycoplasma Pneumonia and Dengue Fever

Day of illness	Day 3	Day 4	Day 6	Day 8
RBC count	15.3	15.1	13.9	
Platelet	146	140	132	
Hematocrit	47.6	47.1	44.5	
WBC	6.0	6.5	4.9	4.5
Total bilirubin				6.8
ALT				59
AST				58
Urea				2.6
Creatinine				59.3
CRP				3.3
Dengue IgM			Positive	
Dengue IgG			Negative	
NS1			Negative	
Mycoplasma				Positive
Mycoplasma Pneumoniae Total Antibody				1 : 1280
COVID-19				Negative
BFMP				No parasite seen
HSV 1 and 2				Negative
Leptospira				Negative
Blood Culture and Sensitivity (Aerobes and Anaerobes)				No growth for 5 days

Table II: Summary of laboratory findings and its interpretations

Test	Patient's results	Normal values	Interpretation
White blood cell count	6.5 → 4.9 → 4.5	4.0- 11.0 x10³/µL	Reduction in WBC count consistent with viral infection, likely dengue.
Platelet count	146 → 140 → 132	150 -450 x10³/µL	Persistent low normal trend, indicative of potential dengue-related thrombocytopenia.
Dengue IgM Serology	Positive	Negative	Confirmed dengue infection.
Chest X-ray (CXR) imaging	Right Upper Lobe Consolidation	Normal	Revealed pneumonia, indicating co-infection.
Mycoplasama Serology	Positive 1 : 1280	Negative	Confirmed co-infection with Mycoplasma pneumoniae.
Liver Function Test	Elevated (Transaminitis)	Normal: ALT < 40 U/L, AST < 40 U/L	Elevated liver enzymes, consistent with dengue and/or bacterial infection and complications.
COVID-19 test	Negative	Negative	Ruled out COVID-19 as a cause of respiratory symptoms.

over the right upper chest. The sudden manifestation of respiratory distress triggered the concern of dengue-related respiratory complications; hence, a chest X-ray (CXR) and some blood parameters were arranged. His CXR findings showed right upper lobe lobar pneumonia changes, and his liver function tests revealed transaminitis, prompting immediate reevaluation and subsequent hospital admission.

Given the atypical respiratory symptoms alongside confirmed dengue fever, a secondary bacterial infection was suspected, with Mycoplasma pneumoniae being a common cause of atypical pneumonia in children. Mycoplasma serology was ordered to confirm this, and the positive result guided the initiation of appropriate antibiotic (Augmentin and Azithromycin) therapy, resulting in significant clinical improvement. He was discharged on day 4 of admission with follow-up as an outpatient. His repeat CXR improved, and his liver function test normalised

DISCUSSION

Dengue cases surged globally over the past two decades, with reported instances increasing tenfold from 2000 to 2019, reaching 5.2 million. Despite a slight decline during 2020-2022 due to the COVID-19 pandemic, a significant upsurge occurred in 2023, marked by outbreaks spreading into previously unaffected regions.[1] In Malaysia, a tropical country, dengue cases in 2024 are rising sharply compared to the same period last year, based on alarming data from the Ministry of Health.[6]

Dengue typically manifests as an acute febrile illness. Early recognition is crucial for prompt management and prevention of complications like severe dengue and dengue shock syndrome. Our case highlights the complexities of diagnosing dengue when initial symptoms mimic those of a viral respiratory infection. Although fever and headache are well-documented primary symptoms of dengue, this case is unique due to the atypical progression and concurrent Mycoplasma pneumoniae infection.[7]

Previous studies, such as those by Wilder et al. (2005) and Castilho et al. (2022), document that typical dengue cases present with leukopenia and thrombocytopenia, hallmark features of the disease.[8-9] However, in our case, lab results deviated from the usual dengue profile, likely due to

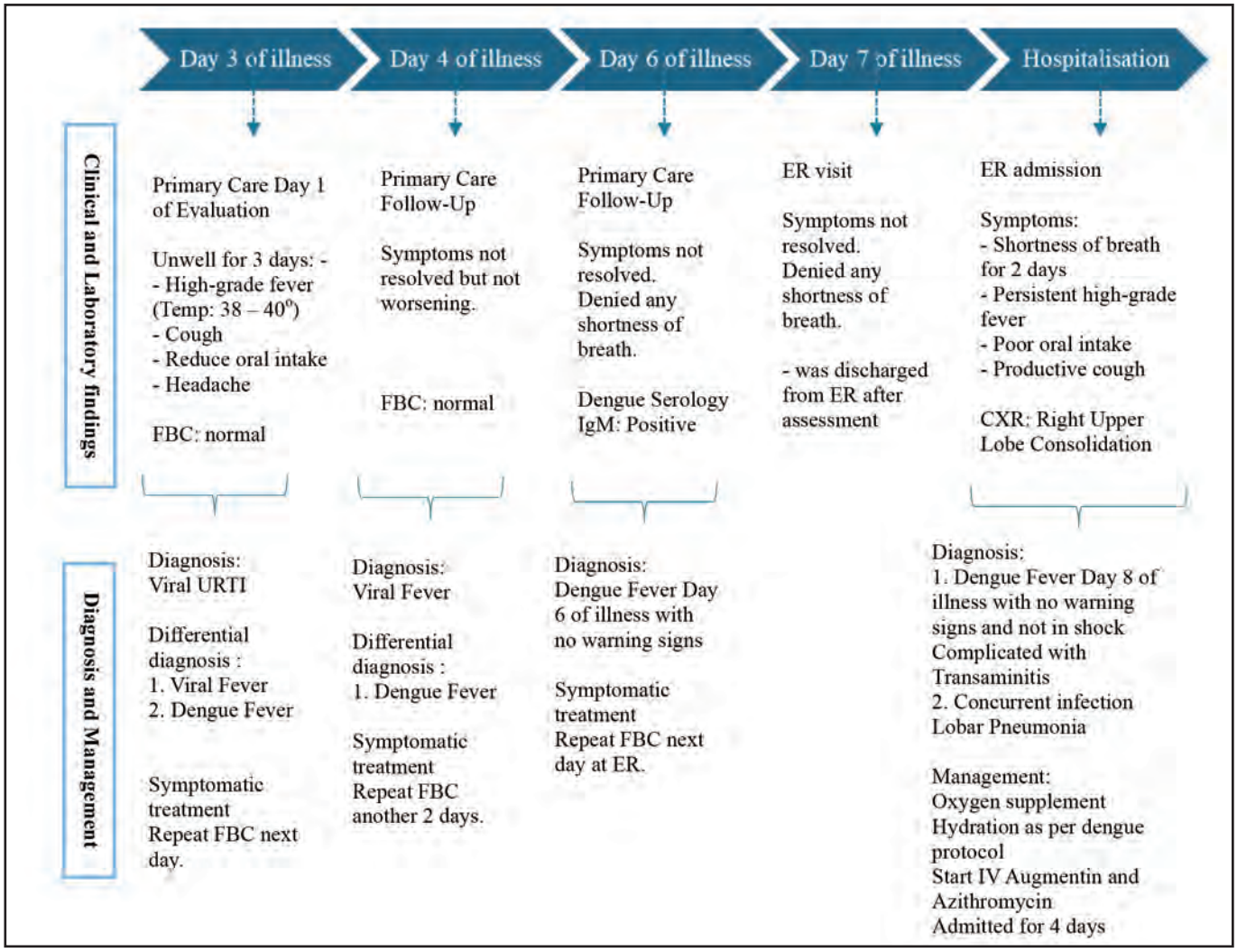

Fig. 1: Timeline of disease course

concurrent bacterial infection. This emphasizes the need for heightened clinical suspicion in endemic areas, especially when symptoms do not fit the classic dengue pattern. Typically, when evaluating suspected dengue fever, a reduction in platelet counts warrants testing for dengue serology, namely the NS1 antigen, which is most effective within the first five days of illness. However, its sensitivity decreases as the illness progresses, as seen in this case, where the NS1 antigen test was negative on day 6.[10]

Rapid combo dengue tests, including NS1 antigen and IgM/IgG antibody tests, are valuable tools in primary care settings for early detection. The NS1 antigen test, effective in the first 1-5 days, aids early diagnosis. In this case, the NS1 test was negative on day 6, contributing to the delayed diagnosis. Using combination tests that detect both NS1 antigen and IgM/IgG antibodies could provide more comprehensive diagnostic information, facilitating timely treatment. Establishing protocols or algorithm approach that recommend such combination tests in primary care settings may help clinicians make timely and accurate diagnoses, particularly in cases where the initial presentation is atypical or symptoms appear late in the disease course.

The patient's extensive travel history to endemic areas added further complexity, underscoring the need for heightened suspicion of co-infections in such contexts. Travelers returning from regions where dengue is prevalent present an increased risk of local transmission, and overlooking this history may lead to underestimation of the true incidence due to varying reporting standards. This highlights the importance of incorporating travel history into diagnostic protocols, especially in areas where dengue is endemic.

After a diagnosis of dengue fever was confirmed, the patient returned to the emergency department with worsening respiratory symptoms. A dengue-related complication, likely dengue pneumonia, was suspected. Given the potential for rapid progression and severe respiratory compromise, it is important to remain vigilant for concurrent infections that can occur alongside dengue. Chest X-rays and clinical assessments are vital for diagnosing pneumonia and detecting lobar involvement. Introducing protocols that include the use of chest imaging and Mycoplasma serology for patients with persistent respiratory symptoms, despite initial dengue diagnosis, could enhance early detection of co-infections and improve patient outcomes.[11]

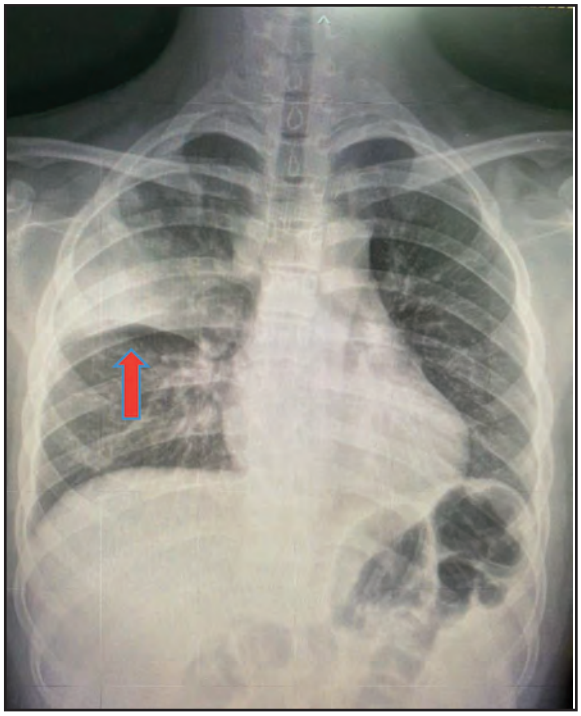

Fig. 2: Chest radiography showing an ill-defined area of increased density in the right upper lobe without volume loss

Diagnosing lobar pneumonia can be challenging as initial symptoms such as fever and cough overlap with many respiratory and viral infections. Lobar pneumonia, also known as atypical pneumonia, can present subtly at first, making it difficult to differentiate from other respiratory conditions. Pediatric patients, who may not always exhibit classic signs and symptoms, add to diagnostic uncertainty, often delaying pneumonia diagnosis in primary care. A persistent high-grade fever for six days despite regular paracetamol should warrant referral to secondary care for further evaluation. Recognizing the complexities and uncertainties of such cases in primary care settings is essential, especially given limited diagnostic resources.

Mycoplasma pneumoniae is a common cause of atypical pneumonia, particularly in children and adolescents. While macrolide antibiotics are recommended for treatment, diagnosing *M. pneumoniae* can be difficult based on clinical symptoms alone due to its variable presentation.[12] Dual infections of *M. pneumoniae* and dengue fever in pediatric cases are especially challenging, potentially leading to severe complications, such as dengue hemorrhagic fever, liver failure, and clostridial colitis.[4] In our case, the patient developed transaminitis but fortunately did not progress to liver failure due to prompt treatment. A similar case of concurrent *M. pneumoniae* and dengue hemorrhagic fever in a tourist from Thailand was reported in Russia in 2022, showing similar clinical presentations to our case.[5]

The association between *M. pneumoniae* and dengue fever is an emerging area of interest in infectious disease research. Both conditions pose significant health concerns in tropical and subtropical regions. Understanding their potential co-occurrence is crucial for improving patient outcomes. Recognizing a patient's epidemiological history is key to identifying not only the primary diagnosis but also the potential coexistence of other equally severe infectious diseases.

Clinicians should remain vigilant, identifying early warning signs, utilizing diagnostic tools effectively, and initiating prompt antibiotic treatment to prevent worsening morbidity and mortality. Establishing standardized protocols that recommend early screening for co-infections in patients with atypical symptoms and ensuring access to rapid combo dengue tests can enhance diagnostic accuracy. Furthermore, reinforcing the importance of referral to secondary care for persistent or worsening symptoms will ensure appropriate management. Our patient's positive response to combined dengue management and antibiotic treatment for *Mycoplasma pneumoniae*, without severe complications such as liver failure, further underscores the uniqueness of this case.

By integrating our findings with existing literature, we highlight a novel aspect of this case—the identification of Mycoplasma pneumoniae amidst dengue fever. This rare scenario contributes to the growing understanding of how co-infections can complicate the clinical and diagnostic landscape. The positive Mycoplasma serology, alongside the development of lobar pneumonia, emphasizes the need for a high index of suspicion and a multi-faceted diagnostic approach in such cases. Our case underscores the growing importance of co-infections due to global travel and changing epidemiology, emphasizing the need for updated pediatric care protocols that integrate broader diagnostic strategies to ensure timely and effective treatment.

CONCLUSION

This case highlights the underappreciated occurrence of co-infection by the dengue virus and bacteria, emphasizing the need for heightened clinical awareness. Particularly in pediatric patients, atypical presentations or prolonged symptoms should prompt consideration of bacterial co-infection, as seen here with *Mycoplasma pneumoniae*. This case underscores the critical role of thorough diagnostic testing, including serology for potential co-infections, to guide appropriate treatment and improve patient outcomes.

Beyond individual cases, this finding has broader implications for public health in dengue-endemic areas. It suggests that clinical guidelines may need to evolve to incorporate routine consideration of co-infections in febrile patients, especially those with unusual or persistent symptoms. Raising awareness of co-infections could lead to earlier diagnosis and prevent life-threatening complications, ultimately improving patient care in endemic regions.

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DECLARATION

The authors declare no conflicts of interest.

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