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## Case Report

# Unmasking the mimic: when sepsis disguises as dengue shock syndrome

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## ABSTRACT

This case report delves into the diagnostic challenges faced when differentiating between sepsis and dengue shock syndrome (DSS), particularly in regions where both are endemic. A 23-year-old female initially diagnosed with DSS presented with fever, thrombocytopenia, and multi-organ dysfunction. Despite aggressive DSS management, the patient's condition worsened, prompting further investigation. Blood cultures eventually revealed *Klebsiella pneumoniae*, leading to a shift in diagnosis to sepsis. This case underscores the importance of comprehensive diagnostic evaluation, which included blood cultures, serological tests, and imaging. Prompt initiation of targeted antibiotics and comprehensive critical care resulted in significant improvement, highlighting the critical role of early recognition and intervention in optimizing outcomes. The complexities in distinguishing between sepsis and DSS underscore the need for continuous vigilance and a thorough diagnostic approach in similar clinical scenarios.

**Keywords:** Dengue shock syndrome, Sepsis, Diagnostic challenges, Timely intervention, Comprehensive evaluation

## INTRODUCTION

Sepsis, a well-known syndrome of biochemical, physiologic, and pathological abnormalities triggered by infection, remains a global health challenge. Among its severe forms, septic shock stands out, characterized by a mortality rate exceeding 40%. The definition of septic shock includes the need for vasopressors to maintain a mean arterial pressure of 65mmHg and a serum lactate level exceeding 2mmol/L in the absence of hypovolemia.<sup>1</sup> Sepsis, with its life-threatening nature, shares several clinical features with Dengue Shock Syndrome (DSS), further complicating the differentiation between these two conditions. Common manifestations of both sepsis and DSS encompass fever, hypotension, thrombocytopenia, and altered mental status.<sup>2</sup> The recognition of sepsis, particularly septic shock, is of paramount importance due

to its high mortality risk. Early intervention, including targeted therapy with appropriate antimicrobials, is the cornerstone of sepsis management.<sup>3</sup> DSS is a severe manifestation of dengue fever, a mosquito-borne viral illness endemic in numerous regions worldwide. The hallmark of DSS is the increased vascular permeability leading to plasma leakage, culminating in shock if not adequately managed. Clinical presentation of DSS often includes abrupt onset high fever, hemorrhagic manifestations, and thrombocytopenia.<sup>4</sup> However, the overlapping clinical features of sepsis and DSS create a diagnostic dilemma, particularly in areas where both conditions are prevalent. Key criteria predicting poor outcomes in sepsis include a respiratory rate greater than 22 breaths/minute, systolic blood pressure at or below 100 mmHg, and altered mental status. These indicators underscore the need for early, targeted intervention,

making timely diagnosis a life-saving imperative.<sup>3</sup> This case report sheds light on the intricacies of differentiating sepsis from DSS, with a particular focus on the diagnostic process. It underscores the challenges clinicians face in distinguishing these two life-threatening conditions, especially in regions where both are endemic. The case underscores the critical role of early and accurate diagnosis in providing timely and effective intervention, ultimately improving patient outcomes.

## CASE REPORT

A 23-years-old female presented to the emergency department with a five-day history of high-grade fever, headache, and severe myalgias. She reported no significant travel history or recent exposure to dengue virus.

**Table 1: Key learning points from a case of sepsis mimicking dengue shock syndrome.**

Learning points	Explanation
<b>Clinical overlap</b>	Sepsis and DSS exhibit overlapping clinical features, including fever, hypotension, thrombocytopenia, and altered mental status. Recognizing this overlap is crucial for accurate diagnosis.
<b>Diagnostic challenges</b>	In regions where both sepsis and DSS are prevalent, clinicians face diagnostic challenges due to similar initial presentations. The case emphasizes the necessity of a high index of suspicion and a comprehensive diagnostic evaluation.
<b>Importance of differential diagnosis</b>	The case underscores the importance of considering sepsis as a differential diagnosis, especially when presented with symptoms consistent with DSS. Timely recognition of sepsis is critical for appropriate intervention and improved patient outcomes.
<b>Dynamic nature of cases</b>	Clinical presentations can evolve, as seen in the case, with the patient's deterioration over 24 hours. Continuous assessment and re-evaluation of the diagnostic approach are essential when patients exhibit atypical features or clinical deterioration.
<b>Role of laboratory investigations</b>	Comprehensive diagnostic evaluation, including blood cultures, serological tests, and radiological imaging, is pivotal in unraveling the true etiology. Positive blood culture results played a key role in redirecting the diagnosis from DSS to sepsis.
<b>Early identification in sepsis</b>	Sepsis, particularly septic shock, demands early identification and intervention due to its high mortality risk. Recognizing key criteria such as respiratory rate, blood pressure, and mental status is crucial for timely management.
<b>Real-world impact</b>	The case highlights the real-world impact of both sepsis and DSS on patient outcomes. The challenges faced by clinicians in differentiating these conditions underscore the need for continuous medical education and awareness.
<b>Multidisciplinary approach</b>	The case emphasizes the importance of a multidisciplinary approach involving clinicians, laboratory experts, and imaging specialists for a comprehensive evaluation, especially in complex cases with overlapping symptoms.

On examination, she was febrile, had a heart rate of 120 beats per minute, and was hypotensive (blood pressure 90/60 mmHg). Laboratory investigations revealed a platelet count of 27,000 cells/mm<sup>3</sup>, leukopenia, and elevated liver enzymes. Based on these findings, she was initially diagnosed with DSS, and intravenous fluid resuscitation was initiated. She was also started on platelet transfusions and antipyretics. Despite aggressive management for DSS, the patient's condition deteriorated over the next 24 hours. She developed acute respiratory distress and signs of multi-organ dysfunction, including acute kidney injury and coagulopathy. The clinical team then re-evaluated the case and decided to broaden the diagnostic approach. Additional diagnostic tests were conducted, including blood cultures, serological tests for common tropical infections, and a chest X-ray. Blood cultures grew *Klebsiella pneumoniae*, and serological tests were negative for dengue, malaria, and other tropical infections. The chest X-ray showed infiltrates suggestive of pneumonia. Patient urine pregnancy test was done and it shows faintly positive. Based on the positive blood

culture results and clinical deterioration, the patient was diagnosed with sepsis due to *Klebsiella pneumoniae* pneumonia. She was promptly initiated on appropriate antibiotics and provided intensive care support, including vasopressors and mechanical ventilation. The patient's condition improved over the next several days with targeted therapy and meticulous critical care management. Her platelet count and liver function gradually normalized, and she was weaned off mechanical ventilation. After a prolonged hospital stay, she was discharged in stable condition with follow-up recommendations.

## DISCUSSION

Sepsis, particularly in its severe form of septic shock, is a critical condition that demands early diagnosis due to its high mortality risk. This case report underscores the challenges associated with differentiating sepsis from dengue shock syndrome, particularly in regions where both conditions are prevalent. The shared clinical presentation of fever, thrombocytopenia, and hypotension

between these two conditions can lead to potential misdiagnosis. In this complex diagnostic landscape, the importance of a comprehensive evaluation cannot be overstated. It encompasses a meticulous clinical assessment, a detailed patient history, the appropriate selection of laboratory investigations, and consideration of endemic pathogens. Furthermore, in cases where patients exhibit clinical deterioration and present with atypical features, as was the case here, the need for re-evaluation and the broadening of the diagnostic approach are of paramount importance to ensure a timely and accurate diagnosis.

The correct identification of the etiological agent(s) in cases of sepsis or Dengue virus infection is indispensable for achieving favorable patient outcomes. Understanding the underlying mechanisms of these conditions is crucial not only to attain a correct diagnosis but also to identify effective treatment strategies. In this context, the case report raises several important points. Firstly, it highlights the inherent diagnostic challenges in regions where sepsis and DSS coexist. These challenges extend from the clinical setting to the laboratory, as the initial clinical presentation may not provide clear differentiating features. Fever, thrombocytopenia, and hypotension are common to both conditions, making it essential to maintain a high level of suspicion and consider a range of diagnostic possibilities. It is noteworthy that the patient's presentation in this case exhibited clinical deterioration, emphasizing the dynamic nature of such cases and the need for continuous assessment. Secondly, the case underscores the necessity for a comprehensive diagnostic evaluation. In this instance, blood cultures, serological tests, and radiological imaging played pivotal roles in unravelling the true etiology of the patient's condition. The positive blood culture for *Klebsiella pneumoniae* was instrumental in steering the diagnosis away from DSS towards sepsis. The case further underlines the importance of considering additional diagnostic modalities when faced with atypical clinical presentations, even in patients who reside in regions where dengue is endemic. Thiel et al provide valuable information on the early prediction of septic shock, emphasizing the significance of early identification and intervention in sepsis cases.<sup>4</sup> The study by Chandralekha, Gupta, and Trikha regarding the 2006 dengue outbreak in North India sheds light on the challenges faced in the intensive care unit admissions, highlighting the real-world impact of DSS.<sup>5</sup> Zhang et al clinical practice guidelines offer further guidance on the diagnosis and early identification of sepsis, crucial for improving patient outcomes.<sup>6</sup> Additionally, the systematic review by Potts and Rothman, focusing on clinical and laboratory features distinguishing dengue from other febrile illnesses. It underscores the complexities involved in distinguishing dengue from other febrile illnesses and highlights the need for comprehensive evaluation in regions with endemic dengue.<sup>7</sup> Table 1 provides a

summary of the key learning points derived from a case involving sepsis that mimicked Dengue Shock Syndrome, emphasizing the challenges in differentiation and the importance of a comprehensive diagnostic approach.

## CONCLUSION

Sepsis can closely mimic DSS, and this case underscores the importance of considering sepsis as a differential diagnosis, especially in regions with multiple endemic pathogens. Timely recognition, appropriate diagnostic testing, and prompt initiation of appropriate treatment are crucial in preventing delayed diagnosis and improving patient outcomes. This case highlights the need for a high index of suspicion and comprehensive evaluation in similar clinical scenarios.

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