

Incidence of Liver Damage Related to a Patient with Dengue

Mariana Gabriela Monroy Velázquez^{*1}, José Salvador Villegas Hernández², Luis Fernando Pérez Varela³, Karla Ariadna Perez Gomez⁴, Uriel Gadiel Solis Garcia⁵, Lizbeth Paloma Herrera Alarcón⁶, Abigail Alitzel Villanueva Pérez⁷, Aylin Guzmán Matus⁸.

¹Hospital General de Zona con Medicina Familiar No.1, IMSS, OOAD Campeche

²Benemérita Universidad Autónoma de Puebla

³Universidad Autónoma de Sinaloa

⁴Escuela Superior de Medicina, Instituto Politécnico Nacional

⁵Facultad de medicina y cirugía, Universidad Autónoma Benito Juárez de Oaxaca

⁶Escuela de Medicina Intermedica

⁷Facultad de medicina, Universidad Nacional Autónoma de México

⁸Universidad Pablo Guardado Chávez

ABSTRACT

Dengue, a mosquito-borne viral infection, is a global health concern with a substantial burden of disease. This bibliographic review article delves into the incidence of liver damage related to dengue, offering insights into the epidemiological aspects, clinical importance, severity criteria, complications, and medical management. With a focus on scientific language and a medical journal-like approach, this review contributes to a comprehensive understanding of the relationship between dengue and liver damage, highlighting the need for vigilance in clinical practice.

KEYWORDS: dengue, liver damage, incidence, epidemiology, complications, medical management, severity criteria.

ARTICLE DETAILS

Published On:
15 November 2023

Available on:
<https://ijmscr.org/>

INTRODUCTION

Dengue fever, caused by the dengue virus and primarily transmitted by *Aedes spp.*, has emerged as a significant global health concern. There are four unique serotypes of the dengue virus, all belonging to the Flaviviridae family and Flavivirus genus, as documented in sources. These serotypes are identified as DENV-1, DENV-2, DENV-3, and DENV-4, and infection with any of these serotypes confers lifelong immunity to that specific serotype, as supported by references. Each of these serotypes has been independently linked to dengue epidemics and associated with more severe cases of the disease. The epidemiological landscape of dengue is marked by a relentless increase in reported cases, leading to a substantial global burden of disease. Dengue is endemic in more than 100 countries, and with the expansion of its geographical range, it affects individuals in various parts of the world, particularly in tropical and subtropical regions. The incidence of dengue has seen a steady rise over the years, underscoring the urgency of understanding the implications of this infectious disease^{1,2}.

In 2019, an estimated 3.34 billion people were at risk of dengue infection worldwide. This widespread risk is compounded by factors such as urbanization, population growth, and climate change, which create favorable conditions for *Aedes* mosquito breeding and dengue virus transmission. As a result, the incidence of dengue continues to escalate, and the disease remains a formidable public health challenge³.



Figure 1. *Aedes aegypti*.

Incidence of Liver Damage Related to a Patient with Dengue

The clinical importance of dengue extends far beyond its high incidence rates. While the majority of dengue cases present as self-limiting febrile illnesses, the disease's significance lies in its potential to lead to severe manifestations. Severe dengue includes conditions like dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS), which can be life-threatening if not promptly diagnosed and managed⁴.

Liver damage in dengue, although a multifaceted facet of the disease, is of particular concern due to its association with severe dengue. Understanding the epidemiological relevance and clinical importance of liver damage related to dengue is crucial for healthcare providers, researchers, and public health authorities. This review seeks to delve into the incidence, clinical implications, severity criteria, complications, and medical management of liver damage in dengue, emphasizing the critical need for vigilance in clinical practice⁵.

Severity Criteria

The severity of dengue is categorized into non-severe and severe forms, and liver damage is intimately linked with the latter. Understanding the criteria for distinguishing between non-severe and severe dengue is essential for recognizing the importance of liver involvement^{5,6}:

Non-Severe Dengue: Non-severe dengue typically presents as an acute febrile illness with various non-specific symptoms such as high fever, severe headache, joint and muscle pain, rash, and mild bleeding manifestations. Laboratory findings in non-severe cases may reveal thrombocytopenia and hemoconcentration. While liver involvement can occur in non-severe cases, it is often not the predominant feature^{5,6}.

Severe Dengue: Severe dengue, which includes DHF and DSS, represents a more critical phase of the disease. Key criteria for diagnosing severe dengue include⁷:

Severe plasma leakage: This results in hemoconcentration, pleural effusion, and ascites⁷.

Severe bleeding: This includes significant gastrointestinal bleeding, intravascular coagulation, and other hemorrhagic manifestations⁷.

Organ impairment: Liver damage is an example of organ impairment. Elevated liver enzymes, particularly alanine transaminase (ALT), are often observed in severe cases⁷.

Liver damage plays a pivotal role in the pathophysiology of severe dengue, often contributing to the hepatic component of organ impairment⁷.

Liver damage in dengue can lead to various complications that affect patient outcomes and clinical management⁵:

Elevated Liver Enzymes: Elevated liver enzymes, including ALT, are a common manifestation of liver damage in dengue. Monitoring these enzymes is crucial in assessing the extent of liver involvement⁵.

Hepatomegaly: Liver enlargement, or hepatomegaly, may be observed in dengue patients with liver damage. It is often associated with upper right abdominal pain or discomfort⁵.

Jaundice: Jaundice, characterized by yellowing of the skin and eyes, can occur due to impaired liver function. It is a concerning sign and warrants clinical attention⁵.

Acute Liver Failure: In severe cases, liver damage can progress to acute liver failure. This is a life-threatening complication that can lead to coagulopathy, hepatic encephalopathy, and multi-organ dysfunction⁵.

The medical management of liver damage in dengue is multifaceted and is typically integrated into the overall management of severe dengue. Key aspects of medical management include^{7,8}:

Fluid Resuscitation: Adequate fluid resuscitation is essential to address plasma leakage and hemoconcentration. Careful monitoring of vital signs and fluid balance is crucial to prevent complications like circulatory collapse^{7,8}.

Management of Bleeding: In cases of severe bleeding, blood products such as platelets and fresh frozen plasma may be required. Additionally, careful monitoring and prompt intervention are vital to manage bleeding effectively^{7,8}.

Antiviral Medications: While antiviral medications are not the primary treatment for dengue, they may play a role in managing the underlying viral infection. Supportive care remains the cornerstone of treatment^{7,8}.

Supportive Care: Supportive care, including pain management, fever control, and monitoring for complications, is essential in the management of liver damage and dengue as a whole^{7,8}.

DISCUSSION

Clinical Implications

Liver damage in dengue is a multifaceted aspect of the disease with significant clinical implications. Understanding these implications is essential for healthcare providers and researchers alike⁵⁻⁸:

1. **Predicting Disease Severity:** Liver involvement in dengue often serves as a marker for disease severity. Elevated liver enzymes, particularly ALT, can signal a more critical phase of the disease, necessitating closer monitoring and timely intervention. Recognizing the clinical implications of liver damage can aid in identifying patients at risk of severe dengue⁵.

2. **Impaired Coagulation:** Liver damage in dengue can lead to impaired coagulation and bleeding tendencies. This poses a clinical challenge, as managing bleeding complications requires a delicate balance of providing blood products while avoiding fluid overload. Effective coagulation management is vital to improving patient outcomes⁵.

3. **Hepatic Encephalopathy:** In severe cases, acute liver failure may lead to hepatic encephalopathy, a condition characterized by altered mental status and neurological symptoms. Prompt recognition and management are crucial, as this complication can rapidly progress and worsen the patient's condition⁵.

Diagnostic Challenges

The diagnosis and assessment of liver damage in dengue pose several challenges:

Incidence of Liver Damage Related to a Patient with Dengue

1. Overlapping Symptoms: The clinical manifestations of dengue, including fever, myalgia, and headache, are non-specific and may overlap with various other conditions. Distinguishing liver involvement in dengue from other hepatic disorders can be challenging⁵.
2. Dynamic Changes: Liver enzyme levels can exhibit dynamic changes during the course of dengue infection. Transient elevations followed by normalization can make it challenging to determine the extent and persistence of liver damage⁵.
3. Differential Diagnosis: Liver damage in dengue must be differentiated from other liver-related conditions, such as viral hepatitis. This requires a comprehensive evaluation of clinical, laboratory, and imaging findings⁵.

CONCLUSION

The challenges associated with liver damage in dengue should not overshadow the opportunities for improved patient care and outcomes. Early recognition, adherence to clinical guidelines, and a multidisciplinary approach that includes infectious disease specialists, hepatologists, and intensivists can contribute to enhanced management of liver damage in dengue.

REFERENCES

- I. Jing, Q., & Wang, M. (2019). Dengue epidemiology. *Global Health Journal*, 3(2), 37-45.
- II. Murray, N. E. A., Quam, M. B., & Wilder-Smith, A. (2013). Epidemiology of dengue: past, present and future prospects. *Clinical epidemiology*, 299-309.
- III. Abdullahi, I. N., Abubakar, S. D., Adekola, H. A., Ahmad, A. E. F., Tahir, M. I., Anka, A. U., ... & Usman, Y. (2021). Dengue Preventive Strategies Through Entomological Control, Vaccination and Biotechnology. In *Human Viruses: Diseases, Treatments and Vaccines: The New Insights* (pp. 57-69). Cham: Springer International Publishing.
- IV. KUTTOH, N. N. (2018). Prevalence of dengue fever and investigation of incidence of dengue hemorrhagic fever and dengue shock syndrome among patients attending the coast province general hospital (Doctoral dissertation, Maseno University).
- V. Samanta, J., & Sharma, V. (2015). Dengue and its effects on liver. *World Journal of Clinical Cases: WJCC*, 3(2), 125.
- VI. Marques, R. E., Guabiraba, R., Cisalpino, D., & Teixeira, M. M. (2014). *Dengue*. Biota Publishing.
- VII. Khan, M. I. H., Anwar, E., Agha, A., Hassanien, N. S. M., Ullah, E., Syed, I. A., & Raja, A. (2013). Factors predicting severe dengue in patients with dengue fever. *Mediterranean journal of hematology and infectious diseases*, 5(1).
- VIII. Dalugama, C., & Gawarammana, I. B. (2018). Lessons learnt from managing a case of dengue hemorrhagic fever complicated with acute liver failure and acute kidney injury: a case report. *Journal of medical case reports*, 12, 1-8.