

Zika Virus–Associated Septic Shock in an Older Thai Patient: A Case Report and Literature Review

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Abstract:

Zika virus (ZIKV) infection is generally a mild and self-limiting illness that most commonly presents with fever, rash, and arthralgia. Severe manifestations leading to significant morbidity or mortality are rare and generally occur in older adults with underlying comorbidities. Herein, we report the case of an 87-year-old man who presented with fever, confusion, hypotension, and dyspnea consistent with acute respiratory failure and septic shock. Chest radiography revealed pulmonary edema, while echocardiography revealed mildly impaired left ventricular systolic function. Increased cardiac biomarkers and a negative coronary angiogram suggested myocarditis. Molecular testing of the serum, cerebrospinal fluid, and endomyocardial tissue confirmed ZIKV infection. The patient was managed with intensive supportive care, including fluid resuscitation, vasopressors, and symptomatic treatment. His condition gradually improved following the resolution of septic shock and cardiac abnormalities. This case highlights the potential for severe ZIKV infection in older adults with comorbidities, underscoring the importance of considering ZIKV in the differential diagnosis of patients with fever, rashes, and septic shock in endemic regions. Early recognition and supportive management play critical roles in improving outcomes in severe ZIKV cases.

Keywords: arbovirus infections, viral septic shock, Zika virus

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Introduction

Zika virus (ZIKV) is a mosquito-borne Flavivirus primarily transmitted by mosquitoes of the genus *Aedes*, most notably *Aedes aegypti*. First identified in Uganda in 1947, ZIKV gained global attention in 2015–2016 following outbreaks in the Pacific region and the Americas, where its association with severe neurological complications, such as Guillain-Barré syndrome and congenital Zika syndrome, was established^{1,2}.

ZIKV is considered endemic in Southeast Asia, with sporadic outbreaks reported over the years³. In Thailand, serological studies have suggested the circulation of the virus as early as 1954, although concerns regarding cross-reactivity with other flaviviruses limits the specificity of these findings. Molecular confirmation of ZIKV infection has been reported since 2012, with surveillance data showing ongoing transmission and cases nationwide^{4–6}. Outbreak investigations, including those involving international travelers returning from Thailand, have established further endemic transmission⁶. However, severe ZIKV disease requiring intensive care remains rare, particularly in otherwise healthy individuals. Herein, we describe a severe case of ZIKV infection in Thailand, discussing the patient's clinical manifestations and management challenges, as well as the public health significance of this case.

Case report

An 87-year-old man with a history of gastrointestinal stromal tumor resection, hypertension, dyslipidemia, and benign prostatic hyperplasia presented with a four-day history of fever, myalgia, malaise, and watery diarrhea. He had recently traveled from Nakorn Si Thammarat to visit his daughter in Hat Yai for 3 days, where he reported floodwater exposure. The patient was subsequently transferred to a local hospital. On admission, he was febrile (39.4 °C), with thrombocytopenia but no bleeding manifestations. Empirical ceftriaxone and doxycycline were initiated; however, the

patient remained febrile for 3 days of hospitalization, although diarrhea resolved after 2 days. One day prior to admission, conjunctival injection in the right eye and bilateral knee swelling were observed. Within 24 hour (h), the patient developed progressive dyspnea with rapid and shallow respiration. He subsequently became hypotensive, requiring intravenous fluid and vasopressor support. The antimicrobial therapy was escalated to meropenem. The patient was subsequently transferred to the critical care unit of Songklanagarind Hospital, where endotracheal intubation was conducted.

Upon admission, the patient exhibited hyperkinetic, non-rhythmic, asynchronous, and jerky movements of the distal upper and lower extremities, inducible by tactile stimulation, and consistent with multifocal myoclonus. Vital signs revealed a temperature of 39.2 °C, blood pressure of 116/89 mmHg while receiving norepinephrine at 0.2 µg/kg/min, heart rate of 116 beats per minute, and oxygen saturation of 96% on FiO₂ 0.4, with a PF ratio of 210. Physical examination revealed bilateral conjunctival infection, with right subconjunctival hemorrhage, diffuse erythroderma, and bilateral knee effusions with positive ballotement (Figure 1).

Laboratory studies demonstrated leukocytosis (16,060/mm³; 92% neutrophils, 4% bands, 3% lymphocytes), anemia (hemoglobin 10.4 g/dL), and thrombocytopenia (38,000/mm³). Renal function was impaired (blood urea nitrogen 29.9 mg/dL; creatinine 1.87 mg/dL), and liver enzymes were elevated (aspartate aminotransferase, 232 U/L, alanine aminotransferase 65 U/L, alkaline phosphatase 51 U/L), with normal bilirubin. HIV serology was nonreactive. Chest radiography revealed borderline cardiomegaly with pulmonary venous congestion. The initial cardiac troponin I level was markedly elevated at 943.1 ng/L (reference ≤34.2 ng/L) and increased to 1,012.3 ng/L after 3 h. Brain magnetic resonance imaging revealed old lacunar infarcts in the left centrum semiovale and bilateral corona

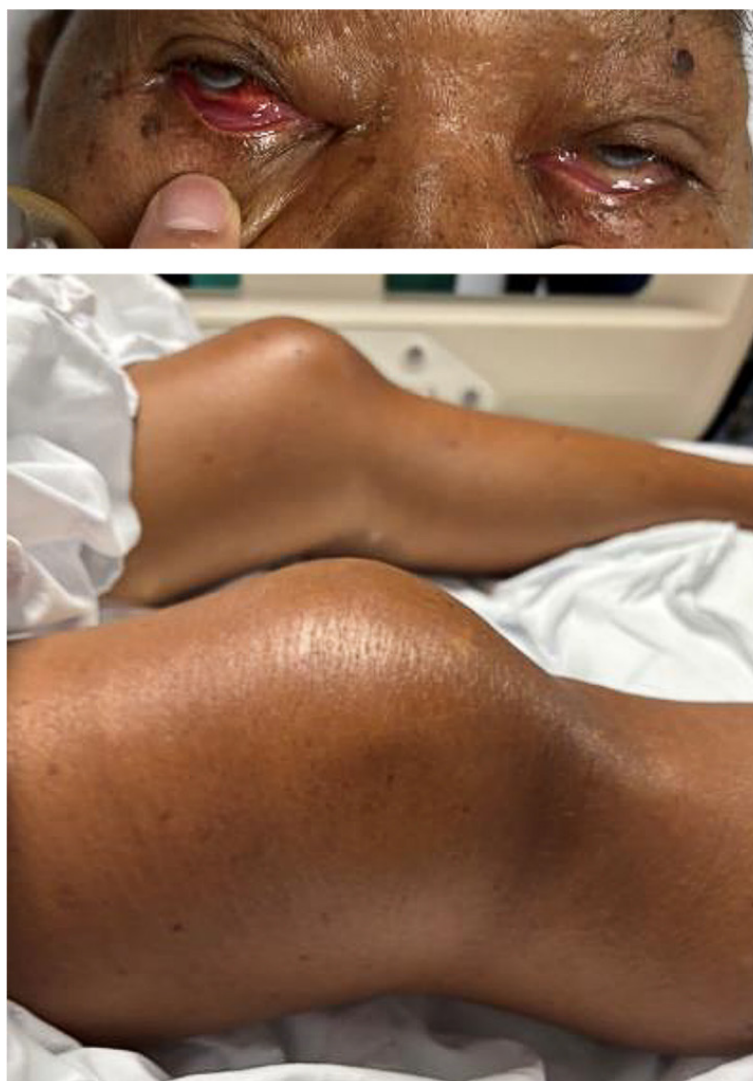


Figure 1 Images of the patient's bilateral conjunctivitis and knee swelling

radiata, which were unchanged from previous imaging. Cerebrospinal fluid (CSF) analysis showed an opening pressure of 25 cmH₂O (closing pressure, 15 cmH₂O), 1 white blood cell/mm³ (1 polymorphonuclear cell), with normal glucose and protein levels. CSF and blood cultures showed no growth, and serological tests for dengue virus, chikungunya virus, scrub typhus, murine typhus, and leptospirosis were negative. Polymerase chain reactions of blood and CSF specimens confirmed ZIKV infection, with

sequence alignment identifying the Asian lineage; therefore, no further CSF bacterial or viral studies were performed.

The patient required hemodynamic support in the medical intensive care unit for 3 days. Vasopressors were discontinued on day 2, and extubation was performed. Transthoracic echocardiography revealed mildly reduced left ventricular systolic function, without regional wall motion abnormalities or significant valvular disease. Given the marked elevation of troponin I levels, coronary angiography

was performed, which revealed no obstructive coronary artery disease, consistent with nonischemic cardiomyopathy. Concurrent endomyocardial biopsy revealed benign myocardial tissue, with congestion and focal areas suspicious for contraction-band necrosis, without definitive histopathological evidence of myocarditis. However, ZIKV RNA was detected in the myocardial tissue.

Discussion

Herein, we report the first documented case of severe ZIKV infection in Thailand. Historically, ZIKV has generally been considered a benign and self-limiting febrile illness; however, research conducted on large outbreaks in the Pacific Islands and Americas (2013–2016) revealed an association with Guillain-Barré syndrome and congenital Zika syndrome, with occasionally severe systemic disease observed in adults^{1,2}.

In Thailand, ZIKV co-circulates with dengue (DENV) and Japanese encephalitis virus (JEV). Although DENV is well studied, the extent of ZIKV exposure remains poorly defined. A serosurvey of long-term expatriates in urban Thailand revealed low ZIKV seropositivity (2.8%) compared to DENV (30.7%) and JEV (18.9%), suggesting relatively limited prior exposure⁷. However, the interpretation of ZIKV serology is confounded by cross-reactivity with other flaviviruses.

Evidence of ZIKV infection in local wildlife indicates the possibility of sylvatic transmission. In one study, 18% of wild stump-tailed macaques in Kaeng Krachan National Park tested positive for ZIKV-neutralizing antibodies, whereas other species were negative, indicating localized circulation⁸. A larger cross-sectional survey (2019–2022) conducted across Thailand and Cambodia found low seroprevalence in macaques (8% plaque reduction neutralization test

Table 1 Overview of previously reported cases of severe Zika virus infection

Case	Sex/Age	Predisposing factor	Key findings	Treatment	Outcome/reference
1	M/61	Hypertension	Vomiting, diarrhea, arthritis, coagulopathy, shock	Ciprofloxacin, CVVH, steroid	Died after 31 h ¹¹
2	M/64	DM, epilepsy, obesity	Fever, cough, diarrhea, mechanical ventilation, shock	Meropenem, prednisone	Died after 3 d ¹¹
3	M/59	COPD	Fever, arthralgia, vomiting, cardiorespiratory arrest	Amoxicillin/clavulanate	Died ¹¹
4	F/2	Acute leukemia (ALL)	Dehydration, hepatomegaly, thrombocytopenia, DIC, shock	Not mentioned	Died in 24 h ¹²
5	F/30	Acute leukemia (AML)	Exanthema, cytopenia, hemorrhage, sepsis, respiratory failure	Not mentioned	Died in 10 d ¹²
6	M/61	Hypertension	Myalgia, hemorrhage, respiratory distress, ACS, shock	Not mentioned	Died in 24 h ¹²
7	F/72	DM	Abdominal pain, thrombocytopenia, respiratory failure, shock	Not mentioned	Died in 24 h ¹²
8	M/36	Alcohol abuse, lupus, prednisolone 50 mg/d	Fever, malaise, diarrhea, respiratory distress	Not mentioned	Died after few h ¹³
9	F/16	None	Fever, rash, bleeding, multiorgan failure	Not mentioned	Died after 25 d ¹³
10	F/20	None	Fever, cough, dyspnea, oral hemorrhage	Not mentioned	Died after 13 d ¹³

ACS=acute coronary syndrome; ALL=acute lymphoblastic leukemia, AML=acute myeloid leukemia, BPH=benign prostatic hyperplasia, COPD=chronic obstructive pulmonary disease, CVVH=continuous veno-venous hemofiltration, DIC=disseminated intravascular coagulation, DM=diabetes mellitus

[PRNT]₅₀, 0% PRNT₉₀), but high seropositivity in humans (70% PRNT₅₀, 24.7% PRNT₉₀), indicating that macaques are unlikely to serve as reservoirs and that human-to-animal spillback may instead have occurred⁹.

Severe ZIKV infections are rare worldwide. A 2020 systematic review of 73 studies reported a mortality rate of 0.4%, which increased to 3% among patients with Guillain-Barré syndrome requiring intensive care unit hospitalization¹⁰. A review of previously published fatal cases (Table 1) revealed that younger patients commonly had unrecognized malignancies (e.g., acute leukemia), while older patients had chronic comorbidities, such as hypertension or diabetes, indicating that age is an independent risk factor for poor outcomes^{11–13}.

The patient in the present case was an 87-year-old man with well-controlled comorbidities who developed septic shock with evidence of myocarditis and encephalitis. Despite severe multisystem involvement, prompt supportive therapy allowed a full recovery; this is in contrast with most reported cases in older adults that resulted in fatality within a few days. This emphasizes that early recognition and aggressive management can be lifesaving, even in older patients with comorbidities.

The mechanisms underlying severe ZIKV infections remain unclear. Proposed contributors include direct viral cytotoxicity to neural and myocardial tissues, dysregulated host immune activation, and endothelial dysfunction, leading to capillary leakage and circulatory collapse¹⁴. These processes align with the concept of viral sepsis, a life-threatening organ dysfunction caused by dysregulation of the immune response to viral infection without bacterial co-infection¹⁵. High viral loads in fatal cases further support the role of the viral burden in disease severity.

This case report highlights several key clinical findings. First, this case suggests that clinicians in endemic regions should maintain suspicion of ZIKV in patients

presenting with febrile illness and multiorgan dysfunction, even without a rash or travel history, particularly during rainy seasons when *Aedes* mosquito activity peaks. Second, severe ZIKV infection should be considered in older or immunocompetent individuals with acute neurological or cardiac involvement. Finally, survival is possible with timely intensive care and hemodynamic support, despite the absence of specific antiviral therapy.

Because ZIKV continues to circulate endemically in Southeast Asia, awareness of its full clinical spectrum is essential. Future studies should be conducted to investigate the host susceptibility, predictors of severe disease, and potential targeted therapies. This case underscores that even mild arboviral infections can lead to viral sepsis and multiorgan dysfunction in vulnerable hosts, warranting continued vigilance and recognition among clinicians in tropical medicine.

Conclusion

This case represents the first documented instance of Zika virus-associated septic shock in Thailand. This case illustrates that even in older individuals with mild, well-controlled comorbidities, life-threatening complications, including encephalitis, myocarditis, and multiorgan dysfunction, may develop. Thus, although most cases of ZIKV infection are self-limiting, clinicians should be vigilant for atypical and severe presentations.

Early recognition, a high index of clinical suspicion, and prompt supportive management are critical and may be lifesaving, even in the absence of specific antiviral treatment. This case underscores the expanding clinical spectrum of ZIKV and highlights the importance of considering ZIKV as a potential etiology in critically ill patients with compatible epidemiological exposures, irrespective of age or immune status.

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Conflict of interest

The authors declare that they have no conflicts of interest related to this work.

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