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CO-INFECTION OF DENGUE AND JAPANESE ENCEPHALITIS: A RARE CASE REPORT

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ABSTRACT

Dengue and Japanese encephalitis are vector borne disorders, caused by Dengue virus (DENV) and Japanese encephalitis virus (JEV) are two important pathogenic viruses that can cause severe encephalitis. This Arboviruses spread by mosquitoes are important Causes of mortality and morbidity in India. Very few cases of their co-infection have been reported in endemic countries. This study addresses the complexity of diagnosing and managing coinfections of dengue (DENV) and Japanese encephalitis virus (JEV) in endemic regions like India. The research emphasizes the importance of a multidisciplinary approach involving comprehensive laboratory investigations, neuroimaging and close clinical monitoring due to overlapping clinical manifestations and serological cross-reactivity between the two viruses. The case of a 30-year-old man presenting with fever, hematuria, and a history of dengue and Chikungunya was reported. After investigations it was confirmed coinfection with DENV and JEV. Major outcomes include insights into the challenges of diagnosing and managing these coinfections and the urgent need for further research to elucidate pathogenesis, optimize therapeutic strategies and enhance preventive measures. Management involved a combination of antiviral medications, antibiotics, and supportive care to address the complex clinical presentation. Further research is essential to bridge gaps in understanding and combating these neglected tropical diseases.

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INTRODUCTION

Neglected Tropical diseases (NTD) are the different groups of communicable diseases in tropical and sub-tropical regions were billions of people affected in worldwide [1]. Population who lives in poor sanitary places are majorly affected by close contacting with infected vectors and domestic animals. Arboviruses such as dengue, Zika, and Chikungunya have been recently included in the list of NTDs by the World Health Organization [2]. The Japanese encephalitis is confined to mostly in Southeast Asia and Western Pacific regions which include approximately 24 countries [3]. DENV and JEV belongs to the Flaviviridae family, which consists of more than 70 viruses, comprising of single-stranded positive-sense RNA genome protected by envelope protein [4]. Viruses from this family belong to the genus Flavivirus, which are transmitted by mosquitoes or ticks and are characterized as arthropod-borne infections. The transmission cycle of Flavivirus involves animals including human which are considered to be the dead-end hosts [5]. Human infection of flavivirus may cause severe clinical manifestations and can be broadly subdivided into two groups as neurological diseases caused by Japanese encephalitis virus (JEV), West Nile virus, and Zika virus (ZIKV) and hemorrhagic diseases caused by dengue virus (DENV), ZIKV and yellow fever virus (YFV) [7]. More than half of the global population is now at the risk of getting flavivirus infections where the majority of areas are endemic for more than one flaviviruses which results in the phenomenon of co-infection [8].

Intermittently, DENV has been reported to cause encephalitis, and JEV infection may cause extraneural hemorrhage [9]. The incubation period of JE between 4-14 days. In children, gastrointestinal pain and vomiting may be the dominant initial symptoms. Severe disease is characterized by rapid onset of high fever, headache, neck stiffness, disorientation, coma, seizures, spastic paralysis and ultimately death. The diagnosis of Japanese encephalitis is considered confirmed if IgM antibody against Japanese encephalitis virus is detected in serum and/or cerebrospinal fluid. Other confirmatory tests include a four-fold difference in IgG antibody titre in paired sera, virus isolation from brain tissue, antigen detection by immunofluorescence method, and nucleic acid detection by polymerase chain reaction[10]. The pathogenesis of JEV infection includes after peripheral inoculation with JEV, a round of replication occurs in the local lymph nodes [11] and virus can be found peripherally in monocytes and some T cells [12]. The initial replication is then followed by viraemia and the spread of infection to the CNS. JEV replicates well in monocytes and dendritic cell lineages. JEV infects cells of the macrophage and dendritic cell lineage in the skin with an analogous fashion to dengue virus with the infected cells then carried to local lymph nodes, from where viraemia and then CNS infection can occur, if replication is sufficient. Many effective vaccines are currently available to prevent Japanese encephalitis. As the multi-viral infection is generally manifested with high fever, vomiting, convulsion, abnormal movement disorders and change in mental status7-9 . Herein, we present an unusual case of a patient with multiviral co-infection associated with inconsistent body movement and unconsciousness. The overlapping clinical symptoms, serological cross-reactivity, and potential for severe neurological complications underscore the necessity for comprehensive research to improve diagnostic accuracy, treatment strategies, and preventive measures, ultimately aiming to reduce morbidity and mortality associated with these coinfections.

Case report:

A 30 year old male patient resident of Secunderabad, presented with chief complaints of high grade fever of 102◦F, associated with chills for last 2 days, Hematuria since 1 day. There is no history of rash, bleeding from any site, cough. No history of any limb weakness or any cranial nerve deficit. The patient had an history of Dengue (Igm +ve), Chikungunya (+ve), altered sensorium, seizures with past medical history of Inj - lorazepam- 2mg Iv SoS. Physical examination of patient was cooperate, incoherent, neck rigidity, Blood pressure -120/80mmHg, PR- 96 b/min, SPO2- 96 decrease in radial artery (RA), CVS -S1S2 (+ve), RS- BAE (+ve), No pallor icterus, bilateral pupils were normally reacting with light, Normal Tone. Their was no evidence of any Weakness and deep tendon reflexes were elicited normally. Laboratory findings of CBP and CUE are shown in the table 1 describes the increase in WBC count, decreased platelet count and abnormal serum creatitine values. The following were the diagnostic test done such as CRP- Positive, HBsAG- negative, Malaria- PF/PV negative, Dengue- NS1 negative, IGM- equivocal, widal test positive, CT-scan brain and spinal cord normal. CSF fluid analysis – proteins (87.5 mg/dl), sugar (44 mg/dl), In culture sensitive test-organism isolated was Pseudomonas aeruginosa isolated in culture 10^5 units cells unit/ml, ultrasound scan of Abdomen shows cystitis, Spot PCR done, MRI- T2 reports showed hyperintense. Patient was diagnosed as Altered sensorium 2^o to JE Dengue Igm (+ve), complicated UTI with cystitis with Acute kidney injury in sepsis. Drugs given were Inj Acyclovir- 500mg IV TID, Inj piptaz- 2.25 gm IV TID, Inj Rantac- 50mg IV BD, Inj levipril- 500mg IV BD, IVF fluids, Inj Thiamine -100 mg IV OD, Inj Dexamethasone -6mg Iv TID, Inj paracetamol- 1gm IV TID. Patient recoverd after 2 weeks along with his general condition, his mental status had significantlly improved, he was discharged with the advice of follow up after 1 month.

Table1: Hematology and Urine examination reports.

Days	Day 1	Day2	Day3	Day4
WBC	14.73	12.01	17.43	20.84
HGB	15.1	14.1	14.2	10.7
PLT	116000	79000	128000	82000
RBC	5.09	4.71	4.83	3.66
Sr creatinine	7.8	3.14	1.8	0.85

DISCUSSION

In our patient the peripheral blood examination revealed features of severe dengue infection whereas cerebrospinal fluid and magnetic resonance imaging data suggest diagnosis of Japanese encephalitis. The diagnosis of Japanese encephalitis is confirmed by presence of virus specific IgM antibodies in serum. Virus can also be identified by polymerase chain reaction. A serological cross-reaction between DENV and JEV has been shown in studies to occur in up to 38.5 % patients. However, studies showing co-detection of disease specific IgM in the CSF are few and reveal a variable incidence from 8 to 50 %. [12 13 14]. Cross-reactivity has been found to be associated with both immune-protection and an aggravated form of a viral disease (dengue or Japanese encephalitis).[15] The research purpose and objective are justified by the pressing need to tackle the complexity of diagnosing and managing coinfections of dengue and Japanese encephalitis, especially in endemic regions like India.

CONCLUSION

The case presented underscores the complexity and challenges in diagnosing and managing coinfections of dengue and Japanese encephalitis, particularly in endemic regions like India. The overlapping clinical manifestations, serological cross-reactivity, and potential for severe neurological complications highlight the importance of a multidisciplinary approach involving comprehensive laboratory investigations, neuroimaging, and close clinical monitoring. Further research is warranted to elucidate the pathogenesis, optimize therapeutic strategies, and enhance preventive measures against these co-infections, addressing a critical gap in understanding and combating these tropically neglected diseases.

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Conflict of Interests:

The authors declare no conflict of interest.

ABBREVATION:

DENV- Dengue virus ,
JE- Japenese Encephalitis,
CSF- Cerebrospinal fluid,
CRP- C- Reactive Protein,
CBP- Complete blood picture.

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