

A study of renal function test, Liver function test, ECG Changes and their prognostic outcome in the patients of Japanese Encephalitis in Jharkhand.

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Abstract

Japanese Encephalitis (JE), a mosquito borne zoonotic disease, is a the leading cause of viral encephalitis in Asian countries. In INDIA, the states which has high number of cases are UTTAR PRADHESH>ASSAM>BIHAR>KARNATAKA...etc. It usually affect the low socio-economic people and rural areas. Japanese Encephalitis is a mosquito borne zoonotic flavivirus that infect a wide range of vertebrate species in an enzootic cycle primarily of large waterfowl birds and swine. JE infection in humans can manifest in a spectrum of disease from asymptomatic infection to a mildly febrile symptomatic illness to a life threatening disease affecting the central nervous system. Vector control and vaccination are our priority. This review highlights the role of renal function test, Liver function test and ECG changes in establishing prognosis of JE.

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I. Introduction

Japanese encephalitis is an acute vector borne, noncontagious, and zoonotic viral (flavivirus) infection of central nervous system. In 2007, maximum number (75%) of the JE cases of the country is contributed by Uttar Pradesh followed by Assam (10.40%), Bihar (8.31%), Karnataka (1.81%), Haryana and Tamil Nadu 0.75% each, only 2.98% cases are contributed by remaining six endemic states viz. Andhra Pradesh, Kerala, Maharashtra, Manipur, West Bengal and Nagaland.¹ The virus is particularly common in areas where irrigated rice fields attract the natural avian vertebrate hosts and provide abundant breeding sites for mosquitoes such as *Culex tritaeniorhynchus*, which transmit the virus into humans. Additional amplification by pigs, which suffer abortion, and horses, which develop encephalitis, may be significant as well.² Vaccination of these additional amplifying hosts may reduce the transmission of virus. The clinical features ranges from fever, headache, nausea, vomiting, seizures, aseptic meningitis and severe encephalitis. The main objective of the study were to find out the Renal-Liver-ECG changes in the patients of Japanese Encephalitis.

PATHOGEN

The family Flaviviridae contains only one genus, *Flavivirus*. They are smaller than alphaviruses, being 40nm in diameter. The name *Flavivirus* refers to the yellow fever virus (flavus in Latin means yellow).³ *Flavivirus sensu stricto* have single stranded positive sense RNA genomes (11KB) and form spherical enveloped particles 40-60 nm in diameter. Vectors are usually infected when they feed on viremic hosts; humans are accidental hosts who usually are infected by arthropod bites.⁴

EPIDEMIOLOGICAL PATTERN Indian setting

In India, Japanese Encephalitis was first recognized in 1955 when the virus was isolated from mosquitoes of the *Culex Vishnui* complex from Vellore during outbreak of encephalitis in Tamil Nadu. The virus continues to be active in Tamil Nadu and Andhra, causing illness mainly in children, indicating the endemic nature of the virus. Most of the cases occur between October and November. Japanese Encephalitis has become a major public health problem of national importance in India.⁵

DIAGNOSIS

1. The ideal method for laboratory confirmation is testing cerebrospinal fluid (CSF) or serum for JEV specific IgM antibody.
2. Plaque reduction neutralization test.
3. Virus Isolation.

4. Nucleic Acid amplification

VACCINE

The Russian were the first to practice vaccination against JE. In the United States Army and resulted in the vaccination of over 250000 persons on Okinawa in 1945 and 1946.⁶ There are two strain of vaccine- **(1)** formalin inactivated mouse brain vaccine using-**NAKAYAMA STRAIN**. It is given as two doses at two weeks apart which is followed by a booster 6-12 months .**(2)** Live Attenuated Vaccine developed in China from JE strain **SA-14-14-2**. It is given as two doses at 1 year apart.

Vaccines Licensed in India

1. Inactivated vero cell culture derived SA 14-14-2
2. Inactivated vero cell culture derived Kolar Strain, 821564XY, JE vaccine⁷

II. Material And Methods

STUDY POPULATION SOURCE OF DATA

The study was conducted on 18 consecutive patients admitted to Rajendra Institute of Medical Sciences,Ranchi during the study period.

INCLUSION CRITERIA

JE patients is diagnosed by : clinically
Blood Analysis
Biochemical methods
CSF Findings

EXCLUSION CRITERIA

Patients with :

1. Diabetes
2. Hypertension
3. Previous heart illness
4. Lung pathology
5. Sepsis
6. Autoimmune disease

INVESTIGATIONS

1. Complete blood count
2. Liver Function Test
3. Renal Function Test
4. CSF finding
5. ECG

DESIGN OF STUDY

Observational and hospital based Prospective Study.

PERIOD OF STUDY

One year and Two month Study(1st July 2018 to 1st September 2019)

COLLABORATING DEPARTMENTS

Department of microbiology
Department of pathology
Department of Biochemistry

CONSENT: Individual/care takers written and informed consent

ANALYSIS: Statistical Analysis was performed using appropriate tests as required according to data.

CONFLICT OF INTEREST : NIL

FINANCIAL SUPPORT : SELF

PARTICIPANT : 18 JAPANESE ENCEPHALITIS Patients admitted in Medicine ward at Rajendra Institute of Medical Sciences Ranchi

III. Observations And Results

SEX	NO. OF CASES	PERCENTAGE
MALE	17	94.44
FEMALE	1	5.55

TABLE 1: DISTRIBUTION OF AGE

ECG	NO. OF CASES	PERCENTAGE (%)
NORMAL	9	50
LAD	6	33.33
RAD	3	16.66

TABLE 2 : SEX DISTRIBUTION IN THE STUDY POPULATION

COMMENTS:

ABOUT 50% OF THE STUDY POPULATION WERE IN THE GROUP OF 21-40 YEARS. REST WERE BELOW FIFTY PERCENTAGE .ABOUT 22.22 %, 16.66% AND 11.11% WERE FROM 41-60 YEAR, <20 YEARS AND >61 YEARS OF AGE GROUP RESPECTIVELY.

COMMENTS: ABOUT 94.44% WERE MALE AND 5.55% WERE FEMALE

TABLE 3: ECG DISTRIBUTION IN THE STUDY POPULATION

AGE (YRS)	NO. OF CASES	PERCENTAGE (%)
<20	3	16.66
21-40	9	50
41-60	4	22.22
>61	2	11.11

COMMENTS: ABOUT 33.33% HAD LAD,16.66% HAD RAD AND 50% CASES HAD NORMAL ECG

TABLE 4 : SERUM CREATININE IN THE STUDY POPULATION

SERUM CREATININE(MG/DL)	NO. OF CASES	PERCENTAGE (%)
<1	9	50
1.1-2	4	22.22
>2.1	5	27.77

COMMENTS: ABOUT 50% OF CASES HAD <1 MG/DL SERUM CREATININE. ABOUT 27.77% OFCASES HAD SERUM CREATININE >2.1 MG/DL AND 22.22% OF CASES HAD SERUM CREATININE BETWEEN1.1-2 MG/DL[*normal male:0.6-1.2 mg/dl and female:0.5-0.9 mg/dl*]⁸

TABLE 5: TOTAL BILIRUBIN DISTRIBUTION IN THE STUDY POPULATION

TOTAL BILIRUBIN (MG/DL)	NO. OF CASES	PERCENTAGE (%)
0-1	11	61.11
1.1-2	6	33.33
>2.1	1	5.55

COMMENTS: ABOUT 61.11% WERE FROM 0-1 MG/DL OF TOTAL BILIRUBIN GROUP.ABOUT 33.33% WERE FROM 1.1-2 MG/DL OF TOTAL BILIRUBIN GROUP AND 5.55% WERE FROM >2.1 MG/DL TOTAL BILIRUBIN GROUP. [*normal total bilirubin: 0.3-1.3 mg/dl*]⁹

TABLE 6: OUTCOME DISTRIBUTION IN THE STUDY POPULATION

OUTCOME	NO. OF CASES	PERCENTAGE (%)
DISCHARGE	14	77.77
DEATH	4	22.22

COMMENTS: ABOUT 77.77% OF CASES WERE DISCHARGED AND 22.22% WERE DEAD

TABLE 7: DEATH VS RFT

SERUM CREATININE MG/DL	NO. OF DEAD CASES	PERCENTAGE (%)
0-1.9	1	25
>2	3	75

COMMENTS:ABOUT 75% OF DEAD HAD SERUM CREATININE- >2 MG/DL

TABLE 8: DEATH VS LFT

TOTAL BILIRUBIN MG/DL	NO. OF DEAD CASES	PERCENTAGE(%)
0-1	1	25
>1	3	75

COMMENTS:ABOUT 75% OF DEAD CASES HAD TOTAL BILIRUBIN > 1 MG/DL

TABLE 9: DEATH VS ECG

ECG	NO. OF DEAD CASES	PERCENTAGE(%)
NORMAL	0	0
LAD	4	100
RAD	0	0

COMMENTS: ABOUT 100% OF DEAD CASES HAD LAD AXIS IN ECG

IV. Discussion

In total of 18 JE patients, about 50% of the study population were in the group of 21-40 years. About 22.22% of the study population were in the group of 41-60 years and 16.66% in the <20years of age group. All 18 patients came with the complain of fever, 72.22% people were complaining of headache and 50% cases had altered sensorium. All 18 patients were tested positive for CSF JE IgM.

About 27.77% of cases had serum creatinine >2.1 mg/dl. About 22.22% cases came under 1.1-2 mg/dl of serum creatinine group. And about 50% of cases had serum creatinine <1 mg/dl. About 5.55% of cases had total bilirubin >2.1 mg/dl, about 33.33% of cases had total bilirubin between 1.1-2 mg/dl and 61.11% had total bilirubin <1 mg/dl. About 33.33% cases had LAD(Left Axis Deviation), 16.66% cases had RAD(Right Axis Deviation) and 50% cases were normal. Out of 18 JE patients, 14 patients were discharged and 4 were dead.

Out of 4 dead patients, 3 patients had serum creatinine >2 mg/dl, which was about 75% among dead.

Three dead patient had total bilirubin >1 mg/dl which was about 75% among dead. All 4 dead patients had Left Axis Deviation(LAD).

V. Conclusion

The incidences of JE has been increased in adults in recent years. Studies to assess the cause of epidemiological shift,control of amplifying host, awareness programmes, health education and more targeted use of JE vaccination are need of the hour to reduce mortality and morbidity of JE among adults.

According to data collected in our study, we further recommend more studies on these parameters for better prognosis and outcome in the patient of Japanese Encephalitis.

ABBREVIATION

1. LAD- LEFT AXIS DEVIATION
2. RAD- RIGHT AXIS DEVIATION
3. RFT- RENAL FUNCTION TEST
4. LFT- LIVER FUNCTION TEST
5. Hb-HAEMOGLOBIN
6. ECG- ELECTROCARDIOGRAPHY
7. JE- JAPANESE ENCEPHALITIS
8. CSF- CEREBROSPINAL FLUID

Bibliography

- [1]. Bina pani das. Mosquito vectors of japanese encephalitis from Northern India.2012-p(3-6)
- [2]. Harrison Internal Medicine 20th edition.p(1500)
- [3]. Ananthanarayan and Panikers Textbook of Microbiology 10th Edition.p-526
- [4]. Harrison Internal Medicine 20th edition.p(1490,1495)
- [5]. Ananthanarayan and Panikers Textbook of Microbiology 10th Edition.p-527
- [6]. John mackenzie , ADT Barrett,, V deubel. Japanese Encephalitis and West Nile Viruses p27
- [7]. Ananthanarayan and Panikers Textbook of Microbiology 10th Edition.p-528
- [8]. Harrison Internal Medicine 19th edition.p2759
- [9]. Harrison Internal Medicine 19th edition.p2758

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