

Spectrum Analysis of Cases of Japanese Encephalitis in Jharkhand, India

Dr Amar Verma¹, Dr Zeeshan Ahmed², Dr Shashank Shekhar³,
Dr Monazeer Ahsan⁴,

¹Deputy Director (Genetic Diseases & Research) and Associate Professor, Department of Pediatrics & Neonatology, RIMS, Ranchi

²Junior Resident, Department of Pediatrics, RIMS, Ranchi

³Junior Resident, Department of Pediatrics, RIMS, Ranchi

⁴Junior Resident, Department of Pediatrics, RIMS, Ranchi

Abstract: Japanese Encephalitis is increasingly becoming a major cause of viral encephalitis in many countries of Asia including India. Though initially thought to be sporadic, cases are found all year around in Jharkhand. There is no specific drug against the virus as of yet hence, without high level supportive care the mortality can be as high as 42% especially in children and elderly. This study encompasses 14 proven cases of Japanese Encephalitis admitted from September 2015 to October 2016 in Unit-II of Department of Paediatrics, RIMS, Ranchi. This is an observational study and throws light upon the presenting complaints, natural history, duration of stay, clinical outcome and presence of sequel in cases of JE in and around the state of Jharkhand, India. The results show that the cases were mostly clustered during the months of August and September. The mean age of presentation is 9.86 years. Most common presenting complaints were fever (100%) and abnormal body movement (85.7%). The mean duration of hospital stay was 16.14 days. With provision of high level tertiary care facility, only 1 death occurred (7.1%) and 4 patients (28.5%) did not suffer any sequel. Amongst those who had residual sequel the most common were speech disturbances (50%) and tremors (42.8%).

Keywords: Acute Encephalitic Syndrome, Japanese Encephalitis, spectrum analysis

I. Introduction

Japanese Encephalitis virus is a member of group B Arbovirus (Flavivirus) related to Dengue, Yellow Fever and West Nile viruses.^{2,7} The chief vector of the virus is *Culex tritaeniorhynchus*. In India members of the closely related *Culex vishnui* group are the chief vectors.¹ The virus exists in a transmission cycle between mosquitoes, pigs and/or water birds (enzootic cycle).² Pigs are the amplifying hosts while humans once infected cannot infect feeding mosquitoes.² The disease is mostly found in rural and peri-urban settings where humans live in close proximity with vertebrate hosts.² In most temperate regions of Asia, Japanese Encephalitis is transmitted mainly during warm season but in the tropics and subtropics, transmission occurs all year round but mostly during rainy season and pre-harvest period in rice-cultivating regions.²

The case: infection ratio has been variably estimated at 1:25 to 1:1000.¹ Most infections are asymptomatic or non-specific with encephalitis estimated to occur in only 1 in 300 infections.³ The presenting features are mostly abrupt onset of fever, headache, respiratory symptoms, abdominal pain, vomiting, altered mental states and convulsions especially in children.³ To confirm Japanese Encephalitis virus infection and to rule out other causes of encephalitis requires a laboratory testing of serum or preferentially cerebrospinal fluid.²

Treatment is mostly supportive including control of seizures and access to high level support is important in survival of severe cases.¹ Case fatality rates for Japanese Encephalitis are 24-42% and are highest in children 5-9 years of age or adults >65 years age.¹

If the active stage is survived, 25-50% will have neurological sequelae mostly paralysis, ataxia, Parkinsonism, mental deterioration, psychiatric disorders and speech difficulties.³

II. Materials and Methods

All the patients who were suspected to have Acute Encephalitic Syndrome (AES) were investigated for IgM antibodies for JE in their CSF. Under full aseptic and antiseptic conditions, lumbar puncture was done and 0.5 ml of CSF was collected and sent for serology testing for JE.

Those patients who had positive serology against JE were included in the study. The present study was done to know the clinical course, natural history, immediate outcome and sequel of Japanese Encephalitis patients admitted in the Unit-II of Department of Paediatrics, RIMS, Ranchi. These cases will then be followed up at 6 months for any residual sequelae.

This is a 1 year prospective observational study in which 14 cases of Japanese Encephalitis admitted during September 2015 to October 2016 in the Unit-II of Department of Paediatrics, RIMS, Ranchi were included.

III. Inclusion Criteria

All patients who were clinically suspected & tested positive in the serological tests of CSF for Japanese Encephalitis were included in the study.

IV. Method of Collection of Data

At admission parents/guardians were informed about the study and written informed consents were taken. A detailed history was obtained with special focus on any domesticated animals and proximity to rice farms.

All the cases underwent necessary investigations:-

1. Complete blood count
2. Peripheral blood smear examination
3. Blood smear for malarial parasite- thick and thin
4. R/E of cerebrospinal fluid
5. CSF for Japanese Encephalitis virus IgM serology

The next step was to tabulate all the Japanese Encephalitis cases and to compare their presenting complaints, examination details, investigations reports, treatment given, outcome and immediate sequelae.

V. Results

All the cases studied throughout the year presented in the month of August and September. Among the 14 patients studied, 9 were males (64.3%) and 5 were females (35.7%). The mean age of cases was 9.86 year (boys-9.78 years, girls-10 years). [Table-2, Figure-1]. The patients presented with varied chief complaints the frequency of which the most common were fever (100%), abnormal body movement (85.7%), altered sensorium (64.3%), Vomiting (42.8%) and headache (28.6%). Other less common presenting complaints included pain abdomen (14.2%), Not passing stools (7.1%), pain during urination (7.1%), right sided weakness (7.1%), and loss of appetite (7.1%) [Table-3, Figure-2]

The mean duration of hospital stay was 16.14 days (males-15.67 days, females-17 days). 4 of the patients (28.5%) did not have any sequelae. Amongst the ones which had sequelae the most common was speech problems (50%), followed by tremors (42.8%), dystonia (14.2%), emotional lability (14.2%), and right sided weakness (7.1%). [Table-4, Figure-3]. There occurred only 1 death among the 14 cases (7.1%).

VI. Conclusion

Most of the cases presented during the months of August and September which coincides with the rice harvest season of the regional area when there is a sudden surge in the number of infecting mosquitoes of *Culex* spp. Kakoti et al found out that the most common presenting features of JE in children were fever (100%), altered sensorium (83.58%), seizures (80.08%), headache (41.79%) and vomiting (29.85%) which are consistent with our results.

The fraction of deaths amongst the cases were higher in other previous studies by Basumatary et al (15.5%), Baruah HC et al (20.5%) and Kakoti G et al (14.7%) as compared to 7.1% in our study.

Other studies show that the most common sequel of JE were parkinsonian features (45.45% by Basumatary et al, 10% by Baruah et al) which is consistent with our study where the 2 most common sequel at discharge were speech problems (50%) and tremors (42.8%). Previous studies and texts suggest that convulsions in Japanese Encephalitis are most common in children and here too we find that the most common presenting complaints were fever and abnormal body movements.

The treatment of JE is mainly supportive and here in the study we provided high quality tertiary care to the patients and the outcome was that only 1 of the patients died and as many as 4 of them did not have any residual sequelae. Amongst the ones which had sequelae of JE infection the most common was speech disturbances and tremors.

References

- [1] Scott B Halstead...*Japanese Encephalitis*. Kleigman RM, Behrman RE, Stanton BF, Schor NF, Geme III JW, Nelson Textbook of Pediatrics, 20th Edition, Elsevier, 2016: 1627.
- [2] Media Centre, *Japanese Encephalitis*. Factsheet No. 386, December 2015 [http://www.who.int/mediacentre/factsheets/fs386/en/]
- [3] Young PR, Lisa F P NG, Hall RA, Smith DW, Johansen CA *Arbovirus Infections*. Farrar J, Hotez PJ, Junghans T, Kang G, Lalloo D, White N. *Mansons Tropical Diseases*, 23rd Edition, Elsevier, 2014: 129-161
- [4] Basumatary LJ, Raja D, Bhuyan D, Das M, Goswami M, Kayal AK, Clinical and radiological spectrum of Japanese Encephalitis, *Journal of Neurological Sciences-Elsevier*, 2013 Feb 15: 325(1-2), 15-21
- [5] Kakoti G, Dutta P, Ram Das B, Borah J, Mahanta J, Clinical profile and outcome of Japanese Encephalitis in children admitted with Acute encephalitic syndrome, *BioMed Research International*, 2013: 2013, 152656

- [6] Baruah HC, Biswas D, Patgiri D, Mahanta J, Clinical outcome and neurological sequelae in serologically confirmed cases of Japanese Encephalitis patients in Assam, India, *Indian Pediatrics*, 2002, Dec; 39(12), 1143-8
- [7] Chourjit KSH, Gupte S, *Pediatric Viral Infections*. Gupte S, The Short Textbook of Pediatrics, 11th Edition, Jaypee Brothers Medical Publishers (P) Ltd, 2009: 247-269

Table-1

Patient No	Age(years)	Sex	Date of Admission	Date of Discharge/Death	Duration of Stay(Days)	Presenting Complain	Outcome/Sequel At Discharge
1	12	Male	20/09/2015	18/10/2015	28	Fever, abnormal body Movements, altered sensorium	Speech problems, emotional lability
2	15	Male	23/09/2015	13/10/2015	20	Fever, abnormal body movement, altered sensorium	Speech problems, tremor
3	5	Male	26/09/2015	20/10/2015	24	Fever, abnormal body movement, altered sensorium	Speech problems, tremors, dystonia
4	10	Female	16/09/2015	10/10/2015	14	Headache, abnormal body movement, altered sensorium	No sequelae
5	7	Male	10/09/2015	25/09/2015	15	Fever, abnormal body movement, altered sensorium	No sequelae
6	8	Male	10/09/2016	20/09/2016	8	Fever, abnormal body movement, not passing stool	Speech problems, tremors, dystonia
7	13	Male	27/08/2016	18/09/2016	13	Pain abdomen, fever, vomiting, altered sensorium	Speech problems, tremors
8	10	Female	10/09/2016	29/09/2016	19	Fever, headache, pain abdomen, altered sensorium, vomiting, abnormal body movement	Speech problems, emotional lability, tremors
9	3	Male	11/09/2016	19/09/2016	8	Fever, pain during urination, abnormal body movement	No sequel
10	15	Male	18/09/2016	24/09/2016	15	Fever, vomiting, abnormal body movement	No sequel
11	10	Male	20/09/2016	28/09/2016	10	Fever, right sided weakness, abnormal body movement, vomiting	Tremors, right sided weakness
12	10	Female	20/10/2016	27/10/2016	10	Fever, Abnormal body movement, headache	Death
13	14	Female	17/10/2016	7/11/2016	20	Fever, vomiting, loss of appetite, altered sensorium	Speech problems, tremors, dystonia
14	6	Female	06/10/2016	28/10/2016	22	Fever, headache, vomiting, altered sensorium, abnormal body movement	speech problems
Mean Value	9.86 years M=9.78 yrs F=10 yrs				16.14 days M=15.67 days F=17 days		

Table-2

Sl No	Gender	Frequency(out of 14)	Percentage
1	Male	9	64.3%
2	Female	5	35.7%

Table-3

SL NO	Presenting Complaint	Frequency (out of 14)	Percentage
1	Fever	14	100%
2	Abnormal body movement	12	85.7%
3	Altered sensorium	9	64.3%
4	Vomiting	6	42.8%
5	Headache	4	28.6%
6	Pain abdomen	2	14.2%
7	Not passing stool	1	7.1%
8	Pain during micturition	1	7.1%
9	Loss of appetite	1	7.1%
10	Right sided weakness	1	7.1%

Table-4

SL NO	Outcome/Sequel at discharge	Frequency (out of 14)	Percentage
1	No sequel	4	28.5%
2	Speech problems	7	50%
3	Emotional lability	2	14.2%
4	Tremors	6	42.8%
5	Dystonia	2	14.2%
6	Right sided weakness	1	7.1%
7	Death	1	7.1%

Figure -1

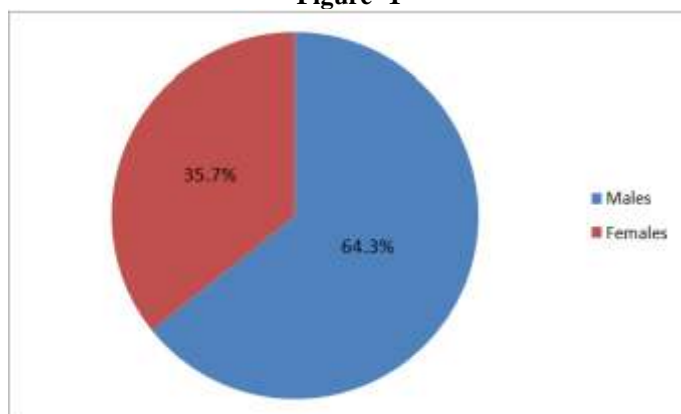


Figure-2

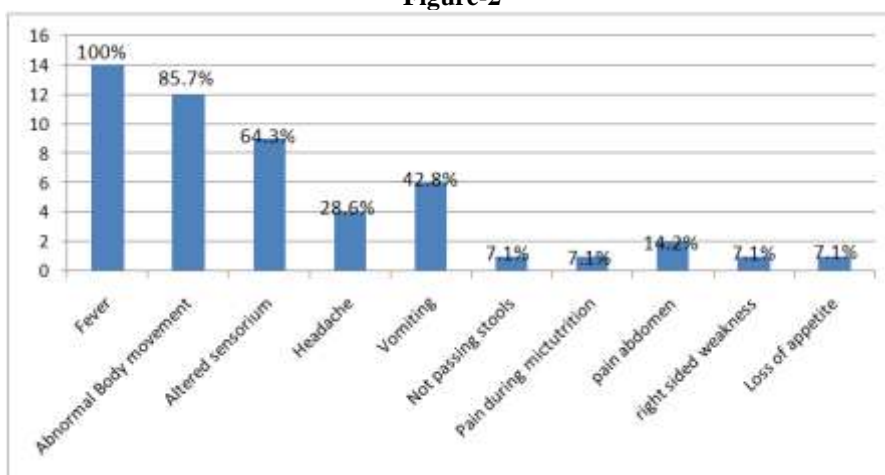


Figure-3

