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"Surge of Hepatitis E infection during summer months in an urban Municipal area of West Bengal."

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Abstract: *Viral hepatitis represents a major public health problem worldwide. The purpose of this observational study is to determine the epidemiologic pattern of Hepatitis E infection among patients attending a tertiary care hospital in north Kolkata and adjacent 24 Parganas, West Bengal, India. This study was performed from 1st January 2015 to 31st December 2016 with all clinically suspected jaundice patients attending this tertiary care centre, both outpatient and inpatient clinics fulfilling the inclusion criteria. Blood was collected aseptically from clinically suspected cases, serum was separated and analysed by Immunochromatographic test to detect HEV IgM. Out of 181 cases, 46/181(25.41%) were found to be reactive. A month-wise distribution chart for 2 years i.e.; 2015 and 2016 showed 22/46 (47.82%) and 24/46 (52.17%) seropositive cases respectively. A surge of blood samples from these clinically suspected hepatitis patients were seen mainly in the summer months of April, May and June. In this study, HEV IgM reactive cases showed a seasonal variation. In 2015, out of 22 reactive cases, maximum number of cases were seen in the months of April, May and June i.e.,5/22 (22.72%), 6/22 (27.27%) and 7/22 (31.81%) respectively. In 2016, a similar surge is also seen in the summer months of April, May and June, which are 6/24 (25.00%), 7/24 (29.16%) and 9/24 (37.50%) respectively. With respect to the age distribution, highest number of reactive cases was seen between 21-30 years 20/46 (43.47%). Among all reactive cases of HEV, males 28/46 (60.86%) predominate females 18/46 (39.13%); ($p<0.05$). Although acute hepatitis caused by HEV is a self-limiting disease, still its rise especially during summer months, is noteworthy. Preventive measures should be taken to restrict the infection.*

Keywords*: Hepatitis E virus, Immunochromatographic test, Surge*

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I. Introduction

Viral hepatitis represents a major health problem worldwide. A hepatotropic virus, now an established major etiological agent of enterically transmitted non-A, non-B hepatitis, previously classified in the *Caliciviridae* family is now reclassified as a new genus *Orthohepevirus* in the family Hepeviridae.(1)The incubation period being 4–5 weeks normally can become variable (2-10 weeks) mainly during outbreak,(2)with major route of transmission being faeco–oral, due to contamination of drinking water supplies. Anti-HEV antibody assays are widely available in European and Asian countries for the diagnosis. The first well-documented epidemic of hepatitis E infection in India was the epidemic of 1955–56 in New Delhi, affecting a total of 29,000 people which occurred due to faecal contamination of drinking water. A retrospective testing of the stored sera from the affected patients suggested that a novel infectious agent was responsible.(3)Since early 1990s, following the identification and sequencing of its etiological agent, the disease was known as hepatitis E and its agent as hepatitis E virus,(4)where the letter 'E' stands for 'enteric', 'epidemic', or 'endemic', all of which are features that adequately describe the epidemiology. Thus, this virus has become a major etiological agent of enterically transmitted non-A hepatitis in India.(5) The global burden of HEV infection is more due to sporadically transmitted hepatitis E cases than to cases due to epidemic hepatitis E. A global burden of disease study estimated that HEV genotypes 1 and 2 account for approximately 20.1 million HEV infections, 3.4 million symptomatic cases, 70000 deaths, and 3000 stillbirths due to complications of 3rd trimester HEV infection, annually.(6)

The purpose of this study is to determine the acute cases of hepatitis E infection among patients attending a tertiary care hospital in north Kolkata and adjacent 24 Parganas, West Bengal, India and to see the epidemiologic pattern of the same region.

II. Materials And Methods

The epidemiological data was collected from College of Medicine and Sagore Dutta Hospital, Kamarhati, Kolkata, West Bengal, India. This observational study was performed in the department of Microbiology, College of Medicine & Sagore Dutta Hospital, Kamarhati, Kolkata from 1st January 2015 to 31st December 2016 (2 years) with all clinically suspected patients attending this tertiary care both outpatient and inpatient clinics who presented with fever along with clinical features as mentioned under the inclusion criteria and unexplained short-term elevations of liver-enzyme levels. Blood was collected aseptically from suspected cases, serum was separated and analysed by Immunochromatographic method, to detect HEV IgM. Toxin and drug related causes of abnormal liver-function test results were ruled out by patient's history. Inclusion criteria were as follows:-
Mild Fever with other symptoms such as,

- Reduced appetite (anorexia)
- Nausea and vomiting, lasting for a few days
- Right upper abdominal pain, itching (without skin lesions)
- Jaundice (yellow discolouration of the skin and sclera of the eyes), with dark urine and pale stool; and slightly enlarged, tender liver (hepatomegaly).(7)

Known cases of seropositive hepatitis A, B and C viruses and known immunocompromised patients were excluded from the study.
Tests were done by rapid Immuno-chromatographic IgM antibody kit.
Statistical analysis was determined by parametric & non-parametric test(s). For comparison of means of two groups, student's test (sample size <30) or z test (sample size>30) and for ≥3 groups. Analysis of Variance or ANOVA will be done. Qualitative data analysis was done by Chi-square test. Null hypothesis was rejected when p value <0.05.
Results were presented as follows:
1. Qualitative data – Pie chart
2. Quantitative data – Bar graph
Standard statistical software packages like SPSS, SAS & R were utilized.
There was no ethical controversy and conflict of interest.

III. Results

Out of 181 clinically suspected cases, screened for Hepatitis E by rapid method, 46/181(25.41%) cases were found to be reactive with Hepatitis E IgM immuno-chromatographic kit. A month-wise distribution chart for 2 years i.e.; 2015 and 2016 showed 22/46 (47.82%) and 24/46 (52.17%) seropositive cases respectively. A surge of blood samples from these clinically suspected hepatitis patients were seen mainly in the summer months of April, May and June. In this study, HEV IgM reactive cases showed a prominent seasonal variation. In 2015, out of a total of 22/46(47.82%) reactive cases, maximum number of cases were seen in the months of April, May and June i.e.,5/22 (22.72%), 6/22 (27.27%) and 7/22 (31.81%) respectively. The rest being 1/22(4.54%) each in the months of March and November. In the year 2016, a similar surge is also seen in the same summer months of April, May and June which are 6/24 (25.00%), 7/24 (29.16%) and 9/24 (37.50%) respectively, out of a total of 24/46 (52.17%) cases. [Figure.1]

With respect to the age distribution, highest number of reactive cases was seen between 21-30 years 20/46 (43.47%). Second highest were among 31-40 years, 12/46 (26.08%), followed by 8/46 (17.39%) in the age group of 11-20 years. The rest of the age group i.e.; 41-50 and >50 years have only 4/46 (8.69%) and 2/46 (4.34%) cases respectively. Age group 0-10 years did not have any case. [Figure. 2]

Also among all reactive cases of HEV, males 28/46 (60.86%) were predominant than females 18/46 (39.13%). (p<0.05) [Figure. 3]

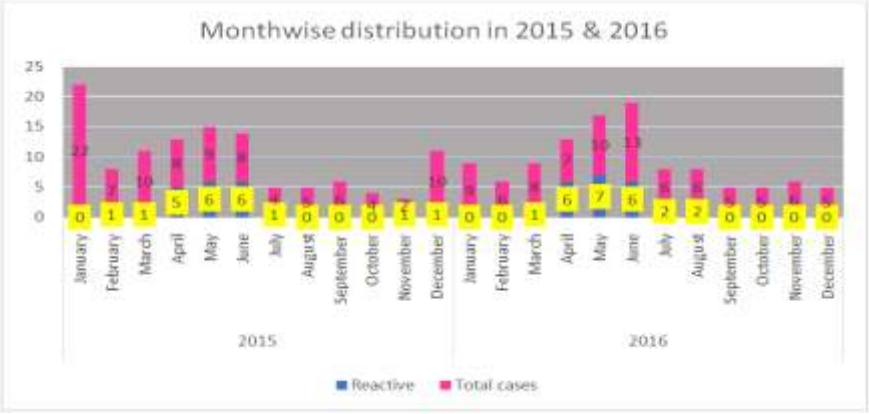

Figure: 1. Shows a month-wise distribution of HEV in a bar chart for the year 2015 and 2016

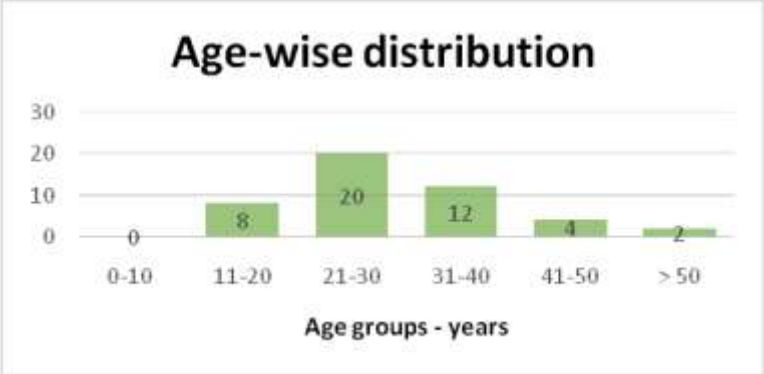

Figure: 2. Shows Age-wise distribution of HEV in a Bar graph

Figure: 3. Shows Pie chart with male female distribution

IV. Discussion

Acute Hepatitis caused by HEV is an emerging disease in urban and suburban areas of North Kolkata and adjacent 24 Parganas of West Bengal. In these two years of observational study, 2015 and 2016, we have found that out of 181 clinically suspected cases of hepatitis E, 46 (25.41%) turned out to be seropositive with HEV IgM immuno-chromatographic kit. This was similar to the previous studies by Negi et al.(8)

A seasonal pattern has also been observed in a month-wise distribution chart with a surge during summer months of April, May and June in both the above mentioned years which was also similar to previous studies by Fares A.(9) [Figure.1]

A bar graph showed a rise at 11-20 years, a peak at 21-30 years and a decline between 31-40 and 41-50 and >50 years showed a significant relation to others Negi SS et al(8) and Shrestha et al(10). [Figure. 2]

A pie chart showed sex ratio of males predominating females in this disease process similar to others.(8)(10) ($p<0.05$) [Figure. 3]

All the above observation justifies the fact that the people are more prone to HEV infection during summer months. This may be because of travelling to and from endemic areas, habit of swimming and washing in dirty contaminated ponds etc.; due to poor hygienic condition of food and drinking water and of course poor environmental sanitation. (9) Moreover during the summer months due to scorching heat, people working outside are used to take foods and drinks from the roadside vendors, such as lemon water with ice, lassi, kulfi, fruit salads, different fruit juices, ice cubes with attractive flavours and colours etc. Also, the various religious festivals and fairs are scheduled during summer months which are also the source of infection.

V. Conclusion

Thus to conclude, although acute hepatitis caused by HEV is a self-limiting disease, still its rise among male adults mainly during summer months, is noteworthy. Also, if the circulation of HEV continues, it may cause fulminant hepatitis amongst the third trimester pregnant mothers with a grave prognosis. Therefore to prevent this, ideal preventive measures are necessary for the welfare of the society. The measures to be taken are proper food handling practices; forestalling the use of commercial ice used for preservation of fish, meat and dead bodies. To prevent this, Kolkata Municipal Corporation has taken adequate steps to colour code the ice bars. Also, use of potable drinking water and domestic ice for making drinks will protect our society from such infection. The municipality and other social organizations should take initiative and strict vigilance among roadside vendors for proper handling of food and water and cleaning of the utensils. Public awareness and education regarding this disease should be displayed in posters, banners, leaflets and television.

Limitations of the study

PCR should be done for HEV genotypic identification. This will help to identify the predominant genotypes circulating in the geographical region for proper surveillance.

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