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Prevalence of Hepatitis Delta Virus Among Acute And Chronic Hepatitis B Carriers In Tertiary Care Centre

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Abstract

Background: Infection due to hepatitis D virus (HDV) is usually seen in the individuals exposed to infected blood and blood products of previously infected hepatitis B Virus (HBV) patients. A search through available literature has revealed an acute scarcity of information regarding prevalence of HDV in developing countries like India. The present study was conducted with an aim to determine prevalence of HDV in hepatitis B carriers **Materials and Methods:** Acute and chronic Hepatitis B carriers and patients those who agreed to give informed consent were included in the study. The serum was used for detection IgM Antibody and Total (IgM & IgG) antibody. Additionally, serum samples were also tested for Liver function tests and HBV DNA viral load. **Results:** A total of 40 (31.7%) were positive for HDV antibody by HDV total ELISA whereas 25 (19.8%) samples were positive for Hepatitis D IgM antibody. There was no statistical significance of any other symptoms except jaundice in HDV positive patients. Parameters of liver function test was significantly raised in patients positive for total Hepatitis D and IgM antibody compared to those who were negative. HBV DNA viral load was significantly low in HDV positive patients. **Conclusion:** The prevalence of Hepatitis delta virus was found to be 31.7%. Recommended treatment for Hepatitis D is now available as Pegylated Interferon Alpha[22], though regular screening for Hepatitis delta virus infection must be actively done in HBV infected patients for better management and prognosis.

Keywords: Hepatitis D virus, hepatitis viruses, HBV,HDV

Introduction

Although, in the era of modern medicine, an elaborate health-care system has developed a bulwark against hitherto of various known and unknown pathogens, infectious diseases still remains one of the important causes of morbidity and mortality globally.

Among various infectious diseases, viral hepatitis is a major public health concern as it infects millions of people annually. At times, infections subsequently progresses to hepatocellular carcinoma, liver cirrhosis and fatalities among significant proportion of patients.[1]

As per the World Health Organization (WHO), approximately 1.4 million deaths occur due to viral hepatitis. About 90% of these fatalities are attributed to hepatitis B virus (HBV) and hepatitis C virus (HCV), whilst the remaining 10% of fatalities are due to other hepatitis viruses.[2]

Infection due to hepatitis D virus (HDV) is usually seen in the individuals exposed to infected blood and blood products of previously infected HBV patients.[1] Approximately 18 million people are infected with HDV across the world.[3] HDV was first described by Italian Virologist, Mario Rizzetto in 1977 as a nuclear antigen in patients infected with HBV having severe liver disease.[4]

Infections with HBV are often more devastating when it occurs as a co-infection with HDV HBV and HDV co-infection can lead to liver cirrhosis, hepatocellular carcinoma and even liver failure.[5] A search through available literature has revealed an acute scarcity of information regarding prevalence of HDV in developing countries like India.[5] Therefore the present study was conducted in a tertiary care teaching with an aim to determine prevalence of HDV in hepatitis B carriers and study risk factors associated with HDV.

Aims and Objective

Determine prevalence of HDV in hepatitis B carriers and study risk factors associated with HDV

Material and methods.

The present descriptive cross-sectional, prospective study was conducted in the Department of Microbiology of tertiary care academic hospital of Mumbai for a period of one year and sixmonths (May 2018- November 2019). The protocol of the study was approved by Institutional Ethics Committee.

Acute and chronic Hepatitis B carriers and patients those who agreed to give informed consent were included in the study. Five mL of blood sample from these patients was collected in plain vacutainer following all aseptic precautions. All vacutainers were duly labelled. After collection blood samples were allowed to clot for two hours at room temperature and sample centrifugation done for 20 minutes at 1000rpm and serum separated. Serum samples were stored in aliquot at -20ºc for later use.

The serum were used for detection IgM Antibody (HDV-IgM-Ab) and Total (IgM & IgG) antibody. Human Hepatitis Delta Virus IgM Antibody (HDV-IgM-Ab) ELISA Kit was used for detection of IgM antibody whereas Human Hepatitis Delta Virus Total Antibody (HDV Total-Ab) ELISA Kit was used for detection of total (IgM and IgG) antibodies. The manufacturer's instructions were followed while performing the tests.

Additionally, serum samples were also tested for Liver function tests and HBV DNA viral load. HBV DNA viral load were determined by using COBAS TAQ real time PCR and the data was analyzed.

A detailed history including symptoms like fever, jaundice, gastrointestinal bleed, encephalopathy; risk factors like tattooing, needle stick injury, sexual practices and past operative procedures was duly recorded and analysed.

The data was analysed using Statistical Package for Social Sciences (SPSS) version 25th Software. Values of qualitative and quantitative data were expressed as a frequency along with percentage and mean ± standard deviation (SD).

Association between two variables was assessed by using Fisher exact test. A value of '*P*' less than 0.05 was taken as significant. Pictorial presentations of key findings were done using appropriate statistical graph. Descriptive statistics was used for summarising demographic and clinical features of the patients..

Results.

One hundred twenty six patients who were HBsAg positive and fulfilled the inclusion criteria were included in the study. Out of these 126, patients 79 (62.7%) were male and 47 (37.3%) were female.

The age wise distribution of Hepatitis B positive patients is shown in **figure 1**. The hepatitis B infection was significantly high in age group 21 to 40 years (Fisher exact test $P<0.05$). Median age of the participants in the study was 32.5year.

Although past history of surgery (25.3%) and alcohol consumption (23%) were major risk factors observed in hepatitis B patients. There were no significant association found between these risk factors and hepatitis B infection (Fisher exact test > 0.05)(Table 1)

Out of 126 hepatitis B Positive patients included in study, a total of 40 (31.7%) were positive for HDV antibody by HDV total ELISA.All Hepatitis B positive samples were also tested for Hepatitis D IgM ELISA. Out of 126 samples, 25 (19.8%) samples were positive for Hepatitis D IgM antibody (acute hepatitis D). All samples which were positive for HDV IgM antibody were also positive for HDV total antibody.

Signs and symptoms noted in patients with Hepatitis D viral infections are shown in table 3. 40% of the patients positive for HDV IgM antibody (acute hepatitis D) presented with Jaundice and 28% of the patients presented with ascites. 50% of the patients positive for HDV total antibody presented with

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ascites and 37.5% of the patients presented with jaundice. However, there was no statistical significance of any other symptoms except jaundice (Fisher exact test, P value 0.00001*).

The liver function tests (LFT) were performed for hepatitis B positive patients, positive for total Hepatitis D and IgM antibody (Table 4). The parameters of LFT was significantly raised in patients positive for total Hepatitis D and IgM antibody compared to those who were negative.

HBV DNA viral load analysis was done for all one hundred and twenty- six samples which were HBsAg positive. 80% of the patients positive for HDV IgM antibody (acute hepatitis D) had HBV DNA viral load < 2000 IU/mL whereas 75% of the patients positive for HDV total antibody had HBV DNA viral load < 2000 IU/mL. HBV DNA viral load was significantly low in HDV positive patients (Fisher exact test *P* value 0.0001).

Figure 1: Age wise distribution of Hepatitis B positive patients

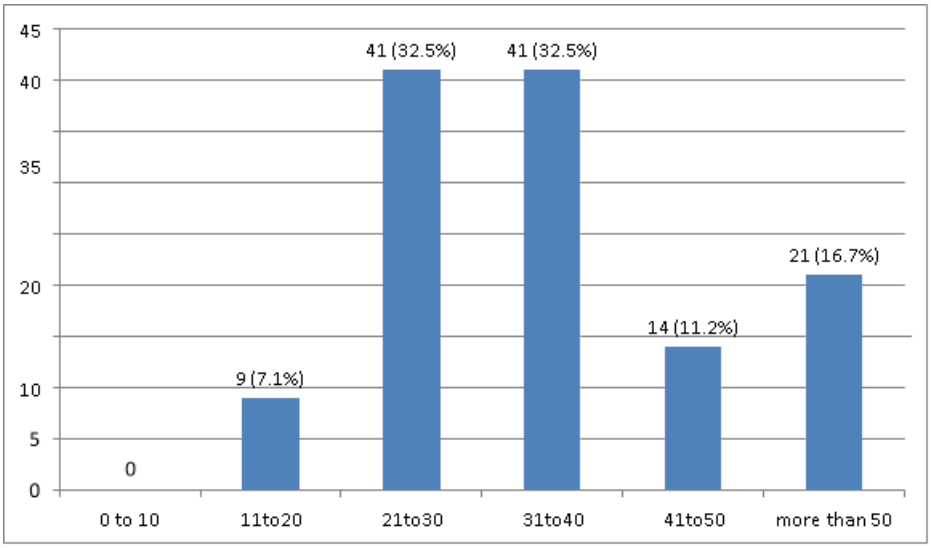

Figure 2: Gender wise distribution of patients positive for Hepatitis D

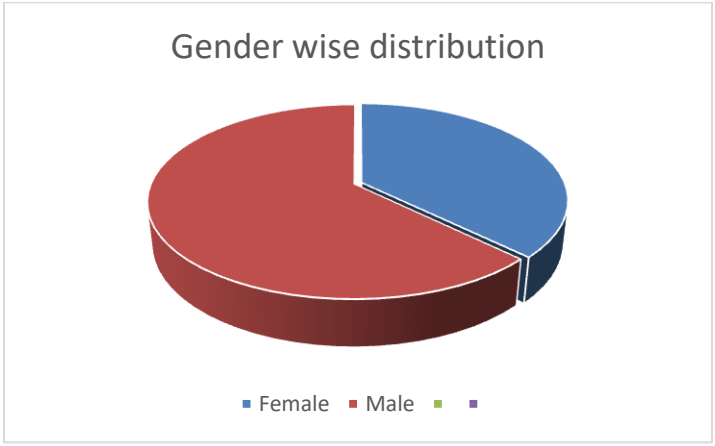

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Table 1: Risk factors observed in Hepatitis B positive patients

Risk factor	No. of patients (%)
Tattooing	23 (18.2%)
Alcohol consumption	29 (23%)
Body piercing	14 (11.2%)
Needle prick	12 (9.5%)
Past surgical history	32 (25.3%)
High risk sexual practices	02 (1.6%)
Blood transfusion	14 (11.2%)

Table 2: Age wise distribution of patients positive for Hepatitis D antibody.

Age group in years	No. of patients (%)	*P* value
11-20	03 (7.5%)	Fisher exact test, 0.9
21-30	20 (50%)	
31-40	12 (30%)	
41-50	02 (5%)	
More than 50	03 (7.5%)	
Total	40	

Table 3: Signs and symptoms noted in patients with Hepatitis D viral infection.

Sign/symptom	HDV IgM antibody (Acute hepatitis D) (n=25)	HDV IgM and IgG (Total antibody) (n=40)
Fever	05 (20%)	00
Jaundice	10 (40%)	15 (37.5%)
Loss of appetite	03 (12%)	00 (0%)
Ascites	07 (28%)	20 (50%)
Nausea/Vomiting	03 (12%)	00
Asymptomatic	01 (4%)	05 (12.5%)
Gastro-intestinal bleed	01 (4%)	00

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Table 4: Liver function test in hepatitis B positive patients.

LFT	HDV IgM antibody[Acute hepatitis D] (n=25)	HDV IgM &HDV IgG [HDV total antibody] (n=40)	Hepatitis D Negative (n=61)	**Fisher exact test, *P* value.**
SGOT/AST (>35IU/mL)	23 (92%)	32 (80%)	25 (19.8%)	0.0005*
SGPT/ALT (>56IU/mL)	23 (92%)	32 (80%)	25 (19.8%)	0.0005*
Bilirubin (>1mg/mL)	20 (80%)	30 (75%)	16(12.6%)	0.0219*
BUN (>20)	20 (80%)	25 (62.5%)	18 (14.2%)	0.0014*

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