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EPIDEMIOLOGICAL INSIGHTS AND PREVALENCE OF HEPATITIS VIRUSES IN PATIENTS ATTENDING A TERTIARY CARE SETTING

Medical Microbiology

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ABSTRACT

Hepatitis, an inflammation of the liver, is caused by various infectious viruses and non-infectious agents, leading to significant health issues, some of which can be fatal. This study investigates the prevalence and epidemiological profile of hepatitis A, B, C, D, and E viruses in patients attending a tertiary care center. A comprehensive understanding of these viruses epidemiology is essential for effective public health interventions and improved clinical outcomes. Blood samples were collected from 150 patients with suspected acute viral hepatitis (AVH) The serum was tested for anti-HAV immunoglobulin M (IgM) ELISA, HBsAg (Hepacard), anti-HCV antibodies, and anti-HEV IgM ELISA using commercial kits following the manufacturer's instructions. Out of 150 suspected AVH cases, 26 were positive for one or more hepatitis markers: anti-HAV IgM, anti-HEV IgM, anti-HCV antibodies, or HBsAg. The overall prevalence of hepatitis viruses was 17.33%.HEV is a significant cause of AVH alongside HAV. Increased awareness, screening, and vaccination are crucial to reduce the hepatitis burden

KEYWORDS

Acute Viral Hepatitis , Hepatitis A, Hepatitis B

INTRODUCTION

Hepatitis viruses, including types A, B, C, D, and E, exhibit diverse transmission routes and clinical outcomes. Hepatitis A and E are primarily transmitted via the fecal-oral route, causing acute, self-limiting hepatitis. Hepatitis B and C are transmitted through percutaneous, sexual, and vertical routes, leading to chronic infections with potentially severe complications[1]. According to the World Health Organization (WHO), an estimated 354 million people worldwide live with hepatitis B or C, with a substantial gap in testing and treatment accessibility[2]. Hepatitis E virus (HEV) causes approximately 3.3 million symptomatic cases and 44,000 deaths annually, accounting for 3.3% of viral hepatitis mortality. Hepatitis D virus (HDV) affects nearly 5% of individuals with chronic hepatitis B virus (HBV) infection[3,4].

In India, hepatitis A virus (HAV) is responsible for 10-30% of acute hepatitis cases and 5-15% of acute liver failure cases. HEV accounts for 10-40% of acute hepatitis cases and 15-45% of acute liver failure cases. Hepatitis B surface antigen (HBsAg) positivity in the general population ranges from 1.1% to 12.2%, with an average prevalence of 3-4%[5]. Anti-hepatitis C virus (HCV) antibody prevalence in the general population is estimated between 0.09% and 15%[6]. HDV prevalence ranges from 0% to 62.5%[7].

HEV is a non-enveloped, single-stranded RNA virus of the Hepeviridae family, with four major genotypes affecting humans and animals. Genotypes 1 and 2 infect humans, while genotypes 3 and 4 primarily infect animals but can also cause human infections[8]. HEV typically results in self-limiting illness with an incubation period of 2-10 weeks. Symptoms include mild fever, anorexia, nausea, vomiting, abdominal pain, rash, jaundice, dark urine, pale stools, and hepatomegaly. Rarely, acute hepatitis E can progress to fulminant hepatitis, leading to acute liver failure[8].

Understanding the epidemiological profile of these hepatitis viruses is crucial for developing targeted public health strategies and improving patient outcomes. This study aims to elucidate the prevalence and clinical features of hepatitis viruses in patients attending a tertiary care center in India, providing valuable insights for healthcare providers and policymakers.

MATERIAL AND METHODS

This cross-sectional study was conducted from 2020 to 2021 at a tertiary care center. The institutional ethical clearance was obtained prior to conducting the study. Blood samples were collected from 150 patients with suspected acute viral hepatitis (AVH). An AVH case was defined based on the WHO criteria: an acute illness with discrete onset of symptoms (e.g., fever, headache, malaise, anorexia, nausea, vomiting, diarrhea, abdominal pain, dark urine), jaundice or elevated total bilirubin levels (≥ 3.0 mg/dL), and elevated serum alanine aminotransferase (ALT) levels (>200 IU/L), with the absence of a more likely diagnosis.

Laboratory Analysis

Blood samples were collected in yellow or red vacutainers, centrifuged at 3000 rpm for 5 minutes to obtain serum, and stored at -20°C until testing. The serum was tested for anti-HAV immunoglobulin M (IgM) ELISA, HBsAg (Hepacard), anti-HCV antibodies, and anti-HEV IgM ELISA using commercial kits following the manufacturer's instructions. Known positive and negative samples were included to reduce false positives, and results were calculated per the kit protocol. Epidemiological data on HEV were collected via a structured questionnaire.

The prevalence of hepatitis viruses was calculated as the proportion of positive cases among the suspected AVH cases. Gender and age-wise distributions were analyzed, and clinical features of HEV cases were documented. Statistical analysis was performed using standard software tools, ensuring accurate and reliable data interpretation.

RESULTS

Prevalence of Hepatitis Viruses :Out of 150 suspected AVH cases, 26 were positive for one or more hepatitis markers: anti-HAV IgM, anti-HEV IgM, anti-HCV antibodies, or HBsAg. The overall prevalence of hepatitis viruses was 17.33%.

Table 1: Prevalence of Hepatitis Viruses

Virus	Positive Cases	Prevalence (%)
HAV	11/150	7.33
HEV	9/150	6.00
HAV+HEV	2/150	1.33
HBV	3/150	2.00
HCV	1/150	0.67

HAV was the most prevalent, followed by HEV. The least common was HCV. The high prevalence of HAV and HEV underscores the need for improved sanitation and vaccination programs.

Gender and Age Distribution

Table 2: Gender-wise Prevalence of AVH Cases

Gender	Positive Cases	Prevalence (%)
Males	14/26	53.84
Females	12/26	46.15

Table 3: Age-wise Distribution of Hepatitis Cases

Age Group	HAV	HEV	HAV+HEV	HBV	HCV	Total	Prevalence (%)
1-10	1	1	2	0	0	4	15.38
11-20	1	1	0	0	0	2	7.70
21-30	5	1	0	0	0	6	23.08
31-40	0	3	0	2	0	5	19.23
41-50	1	2	0	1	1	5	19.23
51-60	2	1	0	0	0	3	11.54
61-70	1	0	0	0	0	1	3.85

Table 4: Clinical Features in AVH Cases

Clinical Feature	No. of Cases	Prevalence(%)
Jaundice	11/11	100
Fever	9/11	81.82
Abdominal Pain/Distension	10/11	90.91
Diarrhea	4/11	36.36
Vomiting	3/11	27.27
Generalized Weakness	1/11	9.09
Hepatomegaly	3/11	27.27
Dark Urine	4/11	36.36
Splenomegaly	1/11	9.09
Pedal Edema	1/11	9.09

Epidemiological Factors

Table 5: Epidemiological Factors in AVH Cases

Factor	No. of Cases	Prevalence (%)
Source of Drinking Water (Tap)	11/11	100
Toilets at Home	11/11	100
History of Eating Undercooked Meat/Pork	NIL	0
History of Blood Transfusion	1/11	9.09
History of Organ Transplant	NIL	0
History of Travel	2/11	18.18
Low Socio-Economic Status	11/11	100
Primary Education	11/11	100
Immunodeficiency	NIL	0
Similar Case in House/Locality	NIL	0
Mother to Child Transmission	NIL	0

DISCUSSION

HAV was the most common cause of AVH in this study (7.33%), followed by HEV (6%), HBV (3%), HAV+HEV co-infection (1.33%), and HCV (0.6%). These findings align with previous studies by Jain P et al., Singh J et al., and Behera et al [9-11]. Co-infections, particularly HAV and HEV, were notable in this study, consistent with findings by Pradip B Barde et al., who reported HEV and HBV co-infections as the most common (1.31%), followed by HAV and HEV (0.42%).

Age-wise, the most susceptible group was 21-30 years, corroborating Pradip B Barde et al.'s identification of the 26-45 year group[12]. Males had a higher prevalence (53.84%) compared to females (46.15%).

Clinical features in HEV cases included jaundice (100%), abdominal pain (90.91%), fever (81.82%), dark urine and diarrhea (36.36%), hepatomegaly and vomiting (27.27%), generalized weakness, splenomegaly, and pedal edema (9.09%). These findings are consistent with studies by Saeedi et al[13].

Epidemiological factors emphasized the role of low socio-economic status and inadequate sanitation in HEV transmission. All HEV-positive cases reported using tap water and having toilets at home, highlighting the need for improved water quality and sanitation measures to prevent outbreaks.

CONCLUSION

HEV is a significant cause of AVH alongside HAV. Increased awareness, screening, and vaccination are crucial to reduce the hepatitis burden. Larger studies, including diverse populations such as pregnant women, immunocompromised individuals, animal handlers, and blood donors, are needed for a comprehensive understanding of hepatitis epidemiology. Testing both blood and fecal samples can enhance detection accuracy. Developing effective vaccines and educating the public are vital steps towards controlling hepatitis transmission

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