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Original Research Article

Burden of Hepatitis A Virus (HAV) and Hepatitis E Virus (HEV) Infection in the Patients Presenting with Acute Viral Hepatitis Attending A Tertiary Care Hospital, Jaipur, Rajasthan

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Abstract

Introduction: Hepatitis A virus (HAV) and Hepatitis E virus (HEV) are enterically transmitted infections resulting from fecal contamination of drinking water and are of great public health importance in developing countries like India. Exposure rates over a period of time are different in different parts of the country and in different socio-economic groups.

Aim of the study

1. This study was aimed to estimate burden of HAV and HEV infections at a tertiary care hospital, Jaipur, Rajasthan.
2. To determine the age specific prevalence rates of HAV and HEV.
3. To estimate change in the epidemiological pattern of these infections.

Material and Methods: This study was conducted on blood samples of 4525 suspected acute viral hepatitis patients in the clinical microbiology section of central laboratory of S. M. S. Hospital, Jaipur over a period of 2 years from January 2018 to December 2019.

All the serum samples were screened for IgM Antibody to HAV and HEV using IgM capture ELISA Kits (RecombiLISA HAV IgM ELISA test, CTK Biotech and RecombiLISA HEV IgM ELISA test, CTKBiotech). Descriptive data were analysed with Microsoft Excel version 2016.

Results: In this 2 year retrospective study a total 2290 & 2235(4525) serum samples were analyzed for IgM antibodies HAV and HEV respectively**.** 461 patients of jaundice were diagnosed with HAV and HEV infection by demonstrating the IgM antibodies by capture ELISA. HAV and HEV IgM antibody were positive in 299 (13.05%) & 162(7.25%) serum samples respectively. HAV and HEV were more common in males than in females. Infection was more commonly seen between age group 11 -20 years with HAV and 21 -30 years with HEV. All liver enzymes were raised in both infection. No significant seasonal trend was seen.

Conclusion: Prevalence of HAV is much higher than that of HEV, screening for early diagnosis of HEV is of immense importance in pregnant women. These data will be essential for planning of future vaccination strategies and for better sanitation programme to improve general health of community.

Keywords: Hepatitis A virus, Hepatitis E virus, acute viral hepatitis, Hepatic enzymes.

Introduction

Hepatitis A virus and Hepatitis E virus cause self-limiting infections that are transmitted by consumption of contaminated water and food.[1] HAV and HEV are endemic and great public health problem in developing countries like India where there is poor hygiene and sanitation. Main age of HAV infection is from childhood to adulthood in different parts of the world[2]. HAV infection occur in 1.4 million new cases per year worldwide[3]. HEV is mainly transmitted by feco-oral route. Worldwide, infection of HEV occur in 20 million population annually. Globally Hepatitis E virus infection led to 3,000 stillbirth, 44,000 deaths and 3.3 million symptomatic cases in year 2015.[4] Exposure rates are different in different part of the country & different socio –economic groups of HAV and HEV[5]. Since local pattern and burden of disease plays important role in disease prevention and control in the population, hence this study was conducted to study local pattern at a tertiary care center, S.M.S. hospital Jaipur, Rajasthan.

Aim and Objectives

1. This study was aimed to estimate burden of HAV and HEV at tertiary care hospital, Jaipur, Rajasthan.

2. To determine the age specific prevalence rates of HAV and HEV.

3. To estimate seasonal change in the epidemiological pattern of these infections.

Material and Methods

This study was conducted on blood samples of 4525 outdoor and indoor suspected patients during 2 year period from January 2018 to December 2019. The samples were processed in Central laboratory, Department of Microbiology, S.M.S. Medical College, Jaipur, Rajasthan by using IgM capture ELISA kits (CTK Biotech). All the tests were performed in accordance with manufactures instructions. Interpretations of ELISA test was done according to kit insert.

Exclusion criteria

1. Hepatitis B and Hepatitis C.
2. Non-infective cases of jaundice (physiological, hereditary & acquired hemolytic anemia, blood transfusion reactionary anemia, obstructive jaundice, Alcoholics, drug & toxin reactions and malignancies.
3. Non- hepatotropic viral etiological jaundice.
4. Non-viral etiological jaundice.
5. Neonatal jaundice.

Collection and Serological Tests:

5-8 ml of venous blood samples of patients of acute hepatitis were collected with sterile and aseptic precautions in plain vials. It was allowed to clot and samples were centrifuged at 3000 RPM for 10 minutes. Serum was separated and processed & analyzed for IgM Antibody to HAV and HEV by using IgM capture ELISA Kits (CTK Biotech) in accordance with the manufacturer's instructions. Descriptive data were analysed with Microsoft Excel version 2016.

Results

In this 2 year retrospective study a total 2290 & 2235(4525) serum samples were analyzed for IgM antibodies for HAV and HEV respectively**.**

461 patients of jaundice and hepatitis were diagnosed with HAV and HEV infection by demonstrating the lgM antibodies by capture ELISA.

In our study out of 2290 & 2235 serum samples tested , 299(13.05%) & 162(7.25%) serum samples were positive for HAV and HEV IgM antibodies respectively(Table-1&2). Prevalence of HAV was 206 (68.89%) in males & 93 (31.10%) in females and Prevalence of HEV was 122(74.84%) in males & 40 (24.69%) in females(Table-3). Main age

group affected were 11 -20 years, 124 cases(41.47%) and 21-30 years, 63 cases(38.88%) for HAV & HEV infections respectively (Table -4). The total serum bilirubin (normal range: 0.2-1.2 mg/dl), SGOT (normal range: 10-40 U/L) and SGPT (normal range: 7-56 U/L) levels were raised in 87.29%, 84.94% and 82.94% cases in HAV and in 90.12%, 89.50% & 81.48% cases in HEV positive patients respectively(Table 5). No significant Seasonal variation was observed although maximum number of cases of HAV infection were seen in June (15.81% cases) & Sept-Oct (16.84% cases) (Table1).

Table 1: Year-wise distribution of hepatitis A virus

Year 2018 & 2019				
Sr. No.	Month	Total Sample	Positive	%
1	Jan.	162	17	10.49
2	Feb.	141	17	12.05
3	Mar	162	16	9.8
4	Apr	173	23	13.25
5	May	178	24	13.48
6	Jun	215	34	15.81
7	Jul	209	22	10.52
8	Aug	218	28	12.84
9	Sep	217	36	16.58
10	Oct	226	38	16.81
11	Nov	196	25	12.75
12	Dec	193	19	9.84
Total		2290	299	13.05

Table 2: Year-wise distribution of hepatitis E virus

Year 2018 & 2019				
Sr. No.	Month	Total Sample	Positive	%
1	Jan.	158	2	1.2
2	Feb.	142	21	14.7
3	Mar	148	15	10.1
4	Apr	155	27	17.4
5	May	162	0	0
6	Jun	201	16	7.9
7	Jul	199	21	10.55
8	Aug	191	17	8.9
9	Sep	203	0	0
10	Oct	204	9	4.4
11	Nov	286	17	9.13
12	Dec	186	17	9.13
Total		2235	162	7.5 %

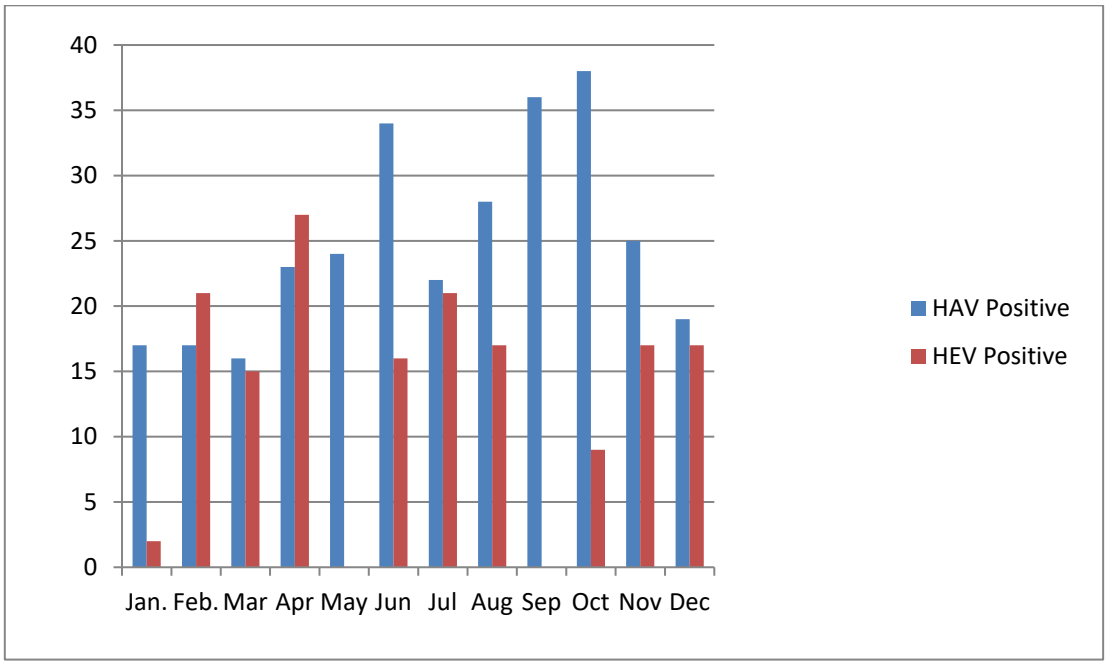

Figure 1: Seasonal distribution of HAV & HEV

Table 3: SEX-wise distribution of HAV & HEV

Sex	**HAV**		**HEV**	
	POSITIVE CASES	PERCENTAGE (%)	POSITIVE CASES	PERCENTAGE (%)
Male	206	**68.89%**	122	**75.30%**
Female	93	**31.10%**	40	**24.69%**
Total	299		162	

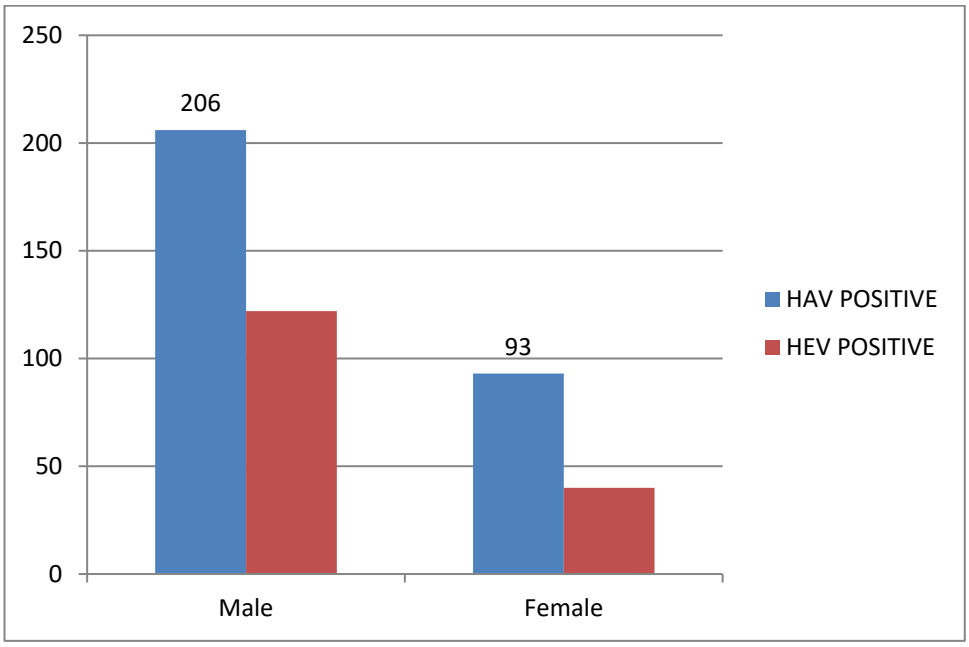

Figure 2 : SEX-wise distribution of HAV & HEV

Table 4: Age-wise distribution of HAV & HEV

AGE WISE HAV AND HEV POSITIVITY DATA 2018+2019			
S.NO.	AGE RANGE	HAV	HEV
1	0-10	91(30.43%)	2(1.23%)
2	11-20	124(41.47%)	33(20,37%)
3	21-30	55(18.39%)	63(38.88%)
4	31-40	11(3.67%)	34(20.98%)
5	41-50	7(2.34%)	20(12.34%)
6	51-60	1(.334%)	7(4.32%)
7	61-70	4(1.33%)	2(1.23%)
8	71-80	6(2.00%)	1(.617%)
TOTAL		299	162

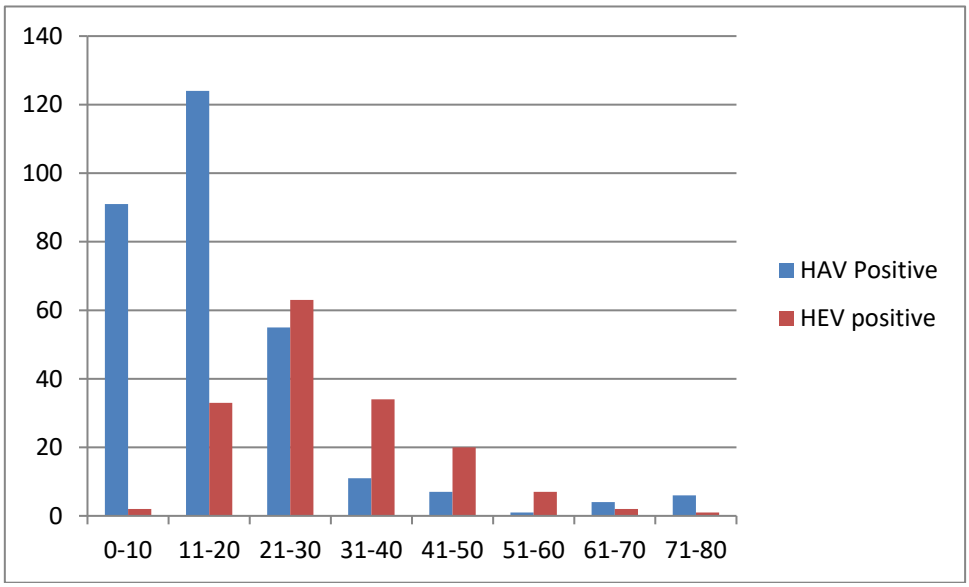

Figure 3 : Age-wise distribution of HAV & HEV

Table 5 : Liver function tests in patients with acute viral hepatitis

Test	2018				2019				TOTAL			
Biochemical parameter	HAV(N=138)		HEV(N=76)		HAV(N=161)		HEV(N=86)		HAV(N=299)		HEV(N=161)	
	NO. of pt.	%	NO. of pt.	%	NO. of pt.	%	NO. of pt.	%	NO. of pt.	%	NO. of pt.	%
Raised Total bilirubin	127	92.02	69	90.78	134	83.22	77	89.53	261	87.29	146	90
Raised SGOT	117	84.78	64	84.21	137	85	81	94.18	254	84.94	145	90
Raised SGPT	116	84.05	63	82.89	132	81.98	69	80.23	248	82.94	132	81

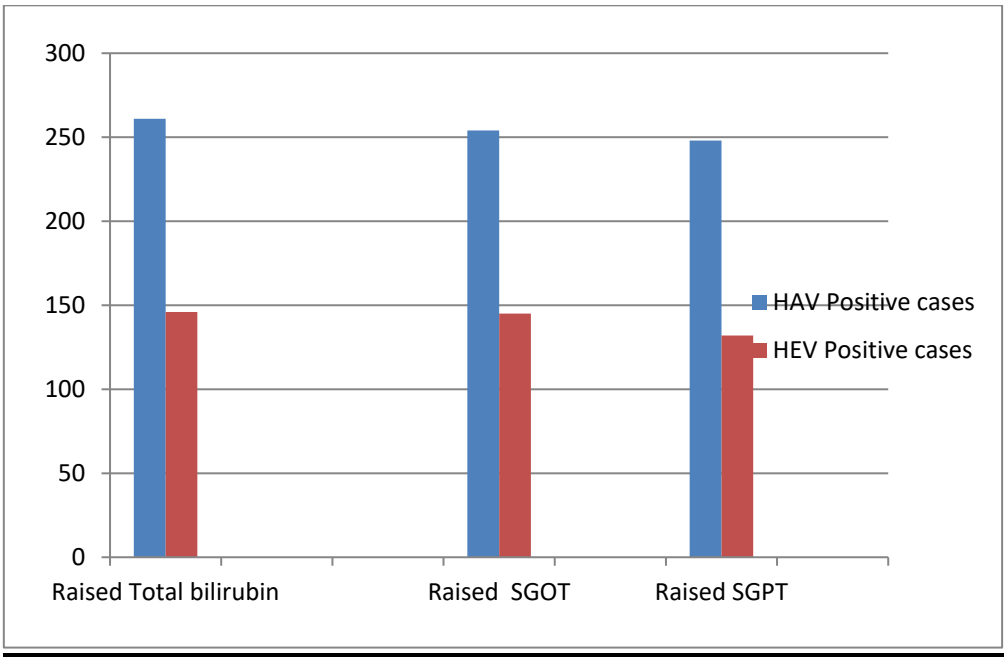

Figure 4 : Liver function tests in patients with acute viral hepatitis

Discussion

In present study, total 4525 number of blood samples were collected from cases of acute viral hepatitis. Out of which 2290 samples were collected for HAV IgM antibody test and 2235 were collected for HEV IgM antibody test.

In our study 299 (13.05%) blood samples were positive for HAV IgM antibody test and 162 (7.25%) blood samples were positive for HEV IgM antibody test respectively, which is similar to other studies [7, 8]. In our study prevalence was more common in males 206 (68.0%), 122 (75.30%) as compared to females 93 (31.10%), 40(24.69%) for HAV & HEV IgM antibody respectively. This study correlates with other studies,[9, 10] this is because of more outdoor activities of males.

Prevalence of both HAV & HEV were more in age group (11 yrs. to 20 yrs.) and (21 yrs. to 30 yrs.) respectively .Which is Similar to other studies [6, 9, 11, 12].

Infection with HAV & HEV both were seen throughout the year. No significant seasonal trend was observed. Although HAV infection was 15.81% during June and 16.84% during rainy seasonal (sept.& oct.) [6,12] . No such seasonal variation seen with HEV infections.

In our study co-infection with HAV & HEV IgM antibody was seen in 1 case (0.21%) comparable with other studies. [7]

In our study serum bilirubin, SGOT and SGPT were raised in both HAV & HEV infection significantly in positive cases. HAV & HEV viruses being hepatotropic viruses, replicates in the liver and as a consequence of the immune response to these viral antigen in the liver & associated inflammatory infiltrates results in hepatitis & raised liver enzymes, this finding is Similar to other studies.[12]

Conclusion:

Though the prevalence of HAV is much higher than that of HEV, For early diagnosis of HEV, screening is of immense importance in pregnant women. Fulminant hepatitis is more common in pregnancy and it induces mortality rate of 20% and cause premature births. These data will be essential for planning of future vaccination strategies and for better sanitation program for improving general health of community

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