Original Research Article

Coinfection of hepatitis B and hepatitis C virus among chronic liver disease patients in a tertiary care centre

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Abstract

Background: Hepatitis B virus (HBV) and hepatitis C virus (HCV) are the most common cause of chronic liver disease (CLD) worldwide. Coinfection with both HBV and HCV can occur because of shared routes of infection. Therefore, this study was performed to investigate the seroprevalence of HBV and HCV dual infection among patients attending K R hospital, Mysore with underlying CLD manifestations. **Materials & Methods:** Serum samples from 80 clinically diagnosed chronic liver disease patients attending K R hospital, Mysorewas screened for the presence of hepatitis B surface antigen, Anti-HBc IgM, Anti-HBc Ig Gand anti-hepatitis C virus antibodies by ELISA. Serum samples from 15 healthy individuals were also screened. **Results:** Among 80 chronic liver disease patients, 67 (83.75%) were males and 13 (16.25%) were females. The maximum number of CLD patients was in the age group of 41 – 50 years (41.30%). Alcoholism (72.5%) was the most common risk factor & cirrhosis of liver was the most common clinical presentation (81.25%). 38 (47.5%) cases were HBV positive (positive for any one marker for HBV)**.** HBs Ag was positive in 22 cases, anti-HBc Ig Min 7 cases, anti-HBc Ig Gin 29 cases. 4 (5%) cases were positive for anti HCV. Three (3.75%) cases showed coinfection of HBV & HCV.**Conclusion:** To prevent the spread of HBV and HCV, people must be educated about these infections and their mode of transmission. All CLD patients should be tested for HBV and HCV to prevent the mortality and morbidity. HBV & HCV coinfection should not be excluded by negative HBsAg status alone.

Key words: Chronic liver disease, HBV, HCV, Dual infection, ELISA

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Introduction

Hepatitis B virus (HBV) and hepatitis C virus (HCV) are the most common causes of chronic liver disease (CLD) world wide [1]. Coinfection with both HBV and HCV can occur because of shared routes of infection [2-4]. Approximately 400 million people are reported to be infected with HBV worldwide [5] and the Center for Disease Control and Prevention estimates that approximately 170 million people are infected with HCV [6]. The exact number of patients infected with both HCV and HBV worldwide is unknown [7].

Majority of those withchronic HBV and/or HCV infection will develop complications i.e. 15%-40% may develop cirrhosis, liverfailure and or hepatocellular carcinoma (HCC) [8]. Coinfection of HBs Ag negative HBV (silent HBV) & HCV in CLD cases has also been reported [9]. Over the next 20 years, there will be an increase in the proportion of HBV/ HCV infected patients with cirrhosis from 16% to 32%, HCCby 81% and liver related deathsby 180% [10].

The clinical presentations and disease outcomes are usuallymore severe in patients with coinfection than in patients with single hepato tropic virus infection [11,12,13,14]. Hence identification of such patients and selection of the optimal antiviral therapy is a challenge for clinicians [15]. The prevalence of HBV and HCV co-infection in India has been reported to range from 3% to 56% [16,17,18].

The difference in the magnitude of co-infectioncould be due to difference inthe study population, geographical variation, and difference in methodology [19].

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Therefore, this study was performed to estimatethe seroprevalence of HBV and HCV dual infection amongpatients attending K R hospital, Mysorewith underlying CLD manifestations.

Materials & Methods

Study type & place: The prospective study was carried out in the Department Of Microbiology, Mysore Medical College and Research Institute, Mysore. Eighty patients with clinically suspected chronicliver disease, attending the outpatient department (OPD) oradmitted in the wards of K R hospital attached to Mysore Medical College & Research institute, Mysore during the year January 2012 to December 2012 were included in the study. 15 asymptomatic healthy individuals constituted the control group. Informed consent was obtained and caseswere interviewed to collect data on sociodemographic and risk factors using predesigned questionnaire.

Inclusion criteria

1. Alcoholic liver diseases.
2. All cases of chronic liver disease with raised AST and ALT levels.
3. History of exposure: heterosexual and homosexual.
4. History of blood transfusion and blood products.
5. History of intravenous drug abuse.

Exclusion criteria

1. All cases of acute hepatitis.
2. Patients other than Chronic Liver Disease

Sample Collection: Under aseptic precautions five millilitre of blood sample was collected**,** serum separated, aliquoted and stored at -20°C until testing done. HBs Ag (Erba Lisa Hepatitis B – ELISA) Anti-HBcIgM, (DRG® Anti-Hepatitis B Core Antigen IgM ELISA), Anti-HBc IgG (DRG® Anti-Hepatitis B Core Antigen IgG ELISA (EIA-3894) & Anti –HCV (Erba Lisa Hepatitis C - third generation ELISA) were detected by using commercially available kits.

Serum samples from 15 healthy individuals were also screened for the HBs Ag, anti HBcIg M, anti-HBc IgG and anti-HCV as per the methodology**.** Serum samples positive for any one marker (HBsAg, anti HBcIg M, anti-HBc IgG) was considered as HBV positive andpositive for anti HCV was considered as HCV positive [18].

Statistical analysis: All the statistical methods were carried out through the SPSS for Windows (version 16.0) and Minitab for windows (version 11.0). Pearson's Chi square test and student's t test was used to find significance of the results. The p value <0.05 is considered statistically significant.

Results

Table-1: Age and sex distribution of chronic liver disease cases screened.

Age group (years)	Number of patients (%)	Male	Female
		Number of patients (%)	Number of patients (%)
21 - 30	8 (10.00%)	8 (10%)	0 (0%)
31- 40	19 (23.80%)	16 (20%)	3 (3.75%)
41-50	33 (41.30%)	25 (31.25%)	8 (10%)
51-60	14 (17.50%)	14 (17.5%)	0 (0%)
61 and more	6 (7.50%)	4 (5%)	2 (2.5%)
Total	80 (100%)	67 (83.75%)	13 (16.25%)

P value - 0.310

Among 80 chronic liver disease patients, 67 (83.75%) were males and 13 (16.25%) were females. The maximum number of chronic liver disease patients were in the age group of 41 – 50 years (41.30%), followed by 31 – 40 years (23.80%), 51 – 60 years (17.50%), 21 – 30 years (10%) and > 60 years (7.50%).

Table-2: Chronic liver disease according to risk factors.

History	Chronic hepatitis	Cirrhosis of liver	Hepatocellular carcinoma	Total number (%)
Alcohol	11	47	Nil	58 (72.5%)
Sexual exposure	Nil	1	Nil	1 (1.25%)
Alcohol with sexual exposure	1	6	1	8 (10%)
H/O Jaundice	Nil	2	Nil	2 (2.5%)
Alcohol with h/o jaundice	Nil	5	Nil	5 (6.25%)
No risk factor	2	4	Nil	6 (7.5%)
Total	14	65	1	80 (100%)

P value- 0.041

Most common risk factor was alcoholism (72.5%) & cirrhosis of liver was the most common clinical presentation (81.25%).

Table-3: Association of HBV and HCV in CLD cases.

Total number of chronic liver disease patients screened	Number of HBV positive (%) (positive forany one marker for HBV)	Number of HCV positive (%) (positive for anti HCV)	Number of HBV and HCV positive(%)
80	38 (47.5%)	4 (5%)	3 (3.75%)

P value-0 .258

Among the 38 HBV positive cases 22 were Hbs Ag positive, 7 were anti Hbc IgM positive, 29 were anti HbcIg G positive.

Table-4: Clinical presentation of HBV and HCV co-infection cases

Disease	Number screened	Number positive (%)
Chronic hepatitis	14	Nil
Cirrhosis of liver	65	2 (66.7%)
Hepatocellular carcinoma	1	1 (33.3%)
Total	80	3 (100%)

Sexual exposure (100%) was the predominant mode of transmission in co-infection cases.
The mean AST and ALT levels were elevated compared to normal reference values.

All the 15 healthy controls studied, were negative for HBV and HCV.

Discussion

HBV and HCV infections are among the most prevalent infectious diseases in humans worldwide. Both infections are associated with a broad range of clinical presentations ranging from acute or fulminant hepatitis to chronic infection that may be clinically asymptomatic or may progress to chronic hepatitis and liver cirrhosis. Co-infection with the two viruses is not uncommon, especially among people at high risk for parenteral infection and in areas with a high prevalence of HBV infection [20]. Coinfection with evidence of chronic HBV and HCV seems to result in more severe liver disease than either infection alone, with an increase risk of liver cancer [21] and probably an increasedrisk of fulminant hepatitis when superinfection with HCV on the background of chronic HBV. In our study the detection of co-infection with both HBV and HCV in CLD patients was based on the presence of combination of HBs Ag, anti Hbc IgM, anti Hbc IgG, and anti-HCV Ab.

Age distribution of CLD patients in this study showed that 41.30% of CLD cases were in the age group of 41-50 yrs followed by 23.80% in the age group 31-40 yrs. This is comparable with a study done by Kooffrehet al where it was found that most CLD patients were in the third and fourth decades of life [22].

Among 80 chronic liver disease patients, 67 (83.75%) were males and 13 (16.25%) were females.The increase in the cases among males could be due to certain life style habitslike alcohol consumption and smoking. This might also be due to fact that males make more common visits to barbers and they are more probable to get wounded and share equipments. Moreover, men are more likely to have many sex partners and follow unprotected sex.

In the present study the most common risk factor was alcoholism (72.5%). A study conducted by Kooffreh et a showed that alcohol was the main etiologic agent in CLD cases and the risk of developing cirrhosis increaseswith the ingestion of >60–80 g/day of alcohol for 10 years in men, and >20 g/day in women [22].

38 (47.5%) cases were positive for HBV (positive for any one marker). HBs Ag was positive in 22 cases, anti-HBc IgM in 7 cases and anti-HBc IgG in 29 cases. 4 (5%) cases were positive for anti HCV. Three (3.75%) cases showed coinfection of HBV & HCV.

A study conducted by Chakravarti et al at New Delhi, showed that 80 (60.6%) cases were positive for HBV infection using all the three markers. HBs Ag was positive in 44 cases, anti-HBcIgM in13casesand anti-HBc IgG in 80 cases. Twenty-seven (79.41%) cases showed coinfection with HBV & HCV [18].

The prevalence of HBV and HCV dual infection in this study was low. Higher prevalence of coinfection were reported by other studies in patients on haemodialysis (3.5%), patients undergoing organ transplantation (8%), and injection drug users (42.5%) [21, 23, 24]. The difference in the magnitude of co-infection among these studies and our study could be due to difference in the study population, geographical variation, and difference in methodology. In this study, cases of HBV associated CLD were higher than HCV associated CLD. Similar pattern was reported in Ethiopia with 6.2% and 1.7% [25]. In a study by Tessema et al. the prevalence of HBV and HCV was 4.1% and 0.7%, respectively [26].

In Vietnam, the prevalence of CLD due to HBV and HCV was 47% and 23%, respectively [27]. Contrary to these reports, higher prevalence of HCV to HBV in Pakistan, 64.9% HCV versus 24.7% HBV [28] higher HCV prevalence of 73.5% was reported among patients with CLD in Egypt [29]. The higher prevalence in these studies could be due to geographical variation [30].

41 cases of CLD in the present study were cryptogenic (negative for both HCV and HBV). It has been shown that 7.3% cases of HBV were detected only on the basis of HBV DNA where all others markers for HBV were absent [31]. We might have missed few cases infected with either of these two viruses since we have not tested the presence of HCV RNA and HBV DNA. This can also be due to the presence of other hepatotropic viruses like hepatitis G virus (HGV) or transfusion trans-missible virus (TTV) or SEN viruses.

Conclusion

All CLD patients should be tested for HBV and HCV to prevent the mortality and morbidity. HBV being a vaccine preventable disease, it is possible to prevent the disease by proper measures of prevention and immunization and thereby preventing the morbidity and mortality caused by these diseases. Educating the community about the spread of the disease and appropriate preventive measures helps to prevent its spread in the community. Also, it is suggested that proper screening of all chronic liver disease patients should be done for HBV and HCV and its co-infection to know serostatus. Early detection of these diseases

will be helpful for proper treatment and preventing its progression to chronicity, there by morbidity and mortality can be reduced.

What new in this study: The patients were screened for HBs Ag along with anti-HBc IgM and anti-HBc IgG antibodies as markers of HBV. So sensitivity and specificity increased for detection of HBV. The patients were also screened for anti-HCV antibodies. Thus HBV & HCV coinfection should not be excluded by negative HBsAg status alone.

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