



A Serological Study of Blood Borne Viral Hepatitis Cases Attending IIMS & R, Lucknow

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Abstract

Context: Acute viral hepatitis (AVH) is a major public health problem and is an important cause of morbidity and mortality.

Aim: To study the prevalence of viral Hepatitis B and Hepatitis C cases in patients attending IIMS&R, Lucknow, U.P.

Material &Method: Blood samples and clinical information was collected from cases of over a 6 month period (1st January 2015 to 30th June 2015). Samples were tested for Hepatitis B surface antigen, anti-HCV total antibodies.

Statistical Analysis Used: Fisher's exact test was used and a $P < 0.05$ was considered to be statistically significant.

Results: The prevalence rate was found to be 4.5% in HBV and 2.5% for HCV. Out of 1434 patients 66 were Hepatitis B positive and 35 were Hepatitis C virus. 57.6% of the patients of Hepatitis B and 31.4% of hepatitis C were males. On comparing both HBV and HCV positive viral infections, statistically significant values ($p \leq 0.05$) were found in males. About three fourth (76.9%) of the patients of hepatitis B and 62.9% of HCV were found to be literate and belonged to lower and middle socio-economic status having poor hygiene. Statistically significant values were observed in low socio-economic status ($p \leq 0.003$), literacy level ($p \leq 0.01$), serum bilirubin ($p = 0.005$) and alkaline phosphate ($p = 0.002$) between Hepatitis B and C patients was observed. The results of ELISA test were 100% while for Rapid card test it was 95% only.

Conclusion: Preventive measures should include health education regarding parenteral transmission of infection stringent blood banking laws need to be introduced and use of disposable syringes/needles should be made mandatory. Reuse of needles, shaving kits and razor blades should be discouraged. Universal immunization of all infants is desirable to decrease the carrier pool and it is inferred from the present study that Hepatitis B immunization should begin at birth to have greater impact.

Keywords: Viral hepatitis, hepatitis B, hepatitis C, Enzyme linked immunoassay

INTRODUCTION

Viral hepatitis is still one of the most common causes of acute and chronic liver disease worldwide. Viral hepatitis is a subject of profound concern and results in about 10,000 new papers each year, from molecular structure to newest treatments. Major new advances have been made in knowledge of these diseases. Acute viral hepatitis is a major public health issue in the developing nations that have inadequate sanitary conditions. Five hepatotropic viruses A to E are now recognized and all are important public health issues, although more so in some countries than others. Three additional viruses, Hepatitis G, TT virus, and SEN-V have been discovered recently, but have to be proved to be hepatotropic and pathogenic to liver¹.

Hepatitis B virus (HBV) is the most important causative agent of blood borne hepatitis in humans. Hepatitis D Virus (HDV) infection occurs either as a coinfection or superinfection in HBV carriers. Hepatitis- B infection is the major health problem all over the world. The disease is highly variable. The acute Hepatitis-B virus (HBV) infection may be mild, self limiting or it can cause fatal fulminant or sub fulminant hepatic failure in a small percentage of infected persons. The more serious consequences of chronic carrier state are progression to chronic liver disease namely chronic hepatitis, cirrhosis of liver and hepatocellular carcinoma. There are presently about 350 million chronic carriers of HBV in the world population.

Hepatitis C virus (HCV) is the major cause of transfusion non-A, non-B hepatitis and continues to be a major cause of human liver disease throughout the world². Hepatitis C virus (HCV) is a parenterally transmitted virus that is responsible for 170 million cases of chronic hepatitis in the world. About 75-80% of those persons infected with HCV tend to become chronic carriers and the majority of these patients are asymptomatic³. The noted increase in prevalence over time, as well as the high prevalence among patients may suggest that there is a need to have up to date data of

HBV and HCV infection The information is also important in relation to the adoption of recommendations made by WHO on screening of patients especially pregnant women and offering the at-birth-dose of HBV vaccine to prevent perinatal transmission for those mothers who test positive.

The study was undertaken to determine the prevalence and risk factors of HBV and HCV in patients visiting hospital of Integral Institute Of Medical Science and Research, Lucknow.

MATERIALS AND METHODS

STUDY AREA

The study was conducted in Integral Institute of Medical Sciences and Research from the patients attending the hospital located at Dasauli, Kursi road, Lucknow.

SOURCE OF DATA

It was a prospective study of 1434 clinically suspected cases of blood borne viral hepatitis referred from the Department of Medicine to the Department of Microbiology for viral markers investigation.

METHODS

HEPATITIS DETECTION PROCEDURES

The cases were screened for the hepatotropic viral markers, Hepatitis B & C by Rapid ELISA test. Indeterminate cases by rapid test was confirmed by ELISA method. HEPACARD" is a rapid diagnostic method for the detection of hepatitis B virus (J. Mitra & Co. Ltd) is a one step immunoassay based on antigen capture 'sandwich' principle. The method uses monoclonal antibodies conjugated to colloidal gold and polyclonal antibodies immobilized on a nitrocellulose strip in a thin line. ERBA LISA HEPATITIS B is a solid phase immunoassay for the qualitative detection of HBsAg in human serum and plasma. The 4th Generation HCV TRI-DOT is a rapid diagnostic method for the detection of hepatitis C virus and has been developed and designed with increased sensitivity for core and NS3 antibodies using a

unique combination of modified HCV antigens. The 3rd generation HCV MICROLISA is an in vitro qualitative enzyme linked immunosorbent assay for the detection of antibodies against HCV (anti-HCVs) in human serum or plasma.

RESULTS

The study was done in Integral Institute of Medical Science and research to study the serological prevalence of Hepatitis B and Hepatitis C. The study was conducted in 1434 patients and was studied according to their age and sex relations, literacy, socioeconomic factors, risk factors and on the basis of symptoms present. Out

of 1434 patients 66 were Hepatitis B positive and 35 Hepatitis C virus. In the present study, about three fourth (76.9%) of the patients of hepatitis B were found to be literate and belong to lower socio-economic status having poor hygiene whereas in our study the prevalence of HCV in illiterates was found to be 62.9% and belonged to middle socio-economic status, 45.7% of hepatitis C belonged to middle socio-economic status. The risk factors were present in all the patients of Hepatitis B & Hepatitis C. Anorexia, nausea, fatigue and vomiting were present in majority of the patients of Hepatitis B and C.

Table-1: Distribution of Hepatitis B and C patients

| | Hepatitis B positive | Hepatitis C positive | Total |
|--------------|----------------------|----------------------|------------|
| | N(%) | N(%) | N(%) |
| In patients | 40(60.6) | 27(77.1) | 67(67.0) |
| Out patients | 26(39.4) | 8(22.9) | 34(33.0) |
| Total | 66(100.0) | 35(100.0) | 101(100.0) |

Table-2: Age and sex distribution of Hepatitis B and C patients

| Age groups (years) | Total | Male | | P value | Female | | P value |
|--------------------|-------|----------------------|----------------------|--------------|----------------------|----------------------|---------|
| | | Hepatitis B positive | Hepatitis C Positive | | Hepatitis B positive | Hepatitis C positive | |
| | | N% | N% | | N% | N% | |
| <10 | 11 | 3(7.9) | 2(18.2) | N.A | 3(10.7) | 3(12.5) | N.A |
| 10-20 | 22 | 12(31.6) | 3(27.3) | N.A | 4(14.3) | 3(12.5) | N.A |
| 20-30 | 25 | 11(28.9) | 1(9.1) | N.A | 7(25.0) | 6(25.0) | 0.78 |
| 30-40 | 18 | 4(10.5) | 3(27.3) | N.A | 5(17.9) | 6(25.0) | 0.76 |
| 40-50 | 15 | 3(7.9) | 1(9.1) | N.A | 7(25.0) | 4(16.7) | N.A |
| >50 | 10 | 5(13.2) | 1(9.1) | N.A | 2(7.1) | 2(8.3) | N.A |
| Total | 101 | 38(100.0) | 11(100.0) | 0.00 (sign.) | 28(100.0) | 24(100.0) | 0.57 |

| | HEPATITIS B POSITIVE | HEPATITIS C POSITIVE |
|---------|----------------------|----------------------|
| Mean±SD | 39.29±16.41 | 45.91±16.06 |

Table-3: Sex distribution of Hepatitis B and C patients

| Sex | | Hepatitis B (n=66) | Hepatitis C (n=35) | P value |
|--------|-------|--------------------|--------------------|---------|
| | Total | N(%) | N(%) | |
| Male | 49 | 38(57.6) | 11(31.4) | 0.00* |
| Female | 52 | 28(42.4) | 24(68.6) | 0.57 |

Table-4: Distribution of Hepatitis B and C patients according to education

| Education level | Total | Hepatitis B N(%) | Hepatitis C N(%) | P value |
|-----------------------------|-------|------------------|------------------|---------|
| Illiterate | 29 | 16(24.2) | 13(37.1) | 0.57 |
| Primary | 24 | 18(27.3) | 6(17.1) | 0.01 * |
| High school to Intermediate | 24 | 17(25.8) | 7(20.0) | 0.04 * |
| Graduate + | 24 | 15(22.7) | 9(25.7) | 0.22 |

Table-5: Distribution of Hepatitis B and C patients according to Socio Economic Status (SEO)

| SES | Total | Hepatitis B N(%) | Hepatitis C N(%) | P value |
|--------|-------|------------------|------------------|---------|
| High | 32 | 20(30.4) | 12(34.3) | 0.15 |
| Medium | 39 | 23(34.8) | 16(45.7) | 0.26 |
| Low | 30 | 23(34.8) | 7(20.0) | 0.003 |

Table-6: Distribution of Hepatitis B and C patients according to risk factors

| Presence of risk factors | Total | Hepatitis B N(%) | Hepatitis C N(%) | p- value |
|-----------------------------------|-------|------------------|------------------|----------|
| Unsterilized Needle use | 29 | 20(30.3) | 9(25.7) | 0.04* |
| Drinking/smoking/ Drug abuse | 23 | 15(22.7) | 8(22.9) | 0.99 |
| Dental procedures | 9 | 5(7.6) | 4(11.4) | 0.66 |
| Blood donation | 2 | 1(1.5) | 1(2.9) | 0.45 |
| Contact with hepatitis case | 1 | 1(1.5) | 0(0.0) | 0.97 |
| Contact with multiple sex workers | 2 | 2(3.0) | 0(0.0) | 0.93 |
| Minor surgery | 6 | 5(7.6) | 1(2.9) | 0.47 |
| Major surgery | 3 | 2(3.0) | 1(2.9) | 0.67 |
| Infected spouse | 3 | 2(3.0) | 1(2.9) | 0.76 |
| Blood Transfusion | 3 | 1(1.5) | 2(5.7) | 0.01* |
| Unknown | 50 | 32(48.5) | 18(51.4) | 0.04* |

Table-7: Distribution of Hepatitis B and C patients according to symptoms

| Presence of symptoms | | Hepatitis B (n=66) | Hepatitis C (n=35) | p-value |
|-----------------------------|-------|--------------------|--------------------|---------|
| | Total | N(%) | N(%) | |
| Anorexia | 90 | 59(89.4) | 31(88.6) | 0.72 |
| Nausea | 86 | 57(86.4) | 29(82.9) | 0.57 |
| Fatigue | 93 | 62(93.9) | 31(88.6) | 0.20 |
| Vomiting | 82 | 53(80.3) | 29(82.9) | 0.87 |
| Fever | 80 | 50(75.8) | 30(85.7) | 0.29 |
| Headache | 81 | 52(78.8) | 29(82.9) | 0.72 |
| Arthralgia | 75 | 47(71.2) | 28(80.0) | 0.39 |
| Myalgia | 58 | 32(48.5) | 26(74.3) | 0.01* |
| Chronic diarrhea | 34 | 14(21.2) | 20(57.1) | 0.001* |
| Loss of weight | 56 | 32(48.5) | 24(68.6) | 0.06 |
| Pruritis | 62 | 40(60.6) | 22(62.9) | 0.89 |
| Pain in right hypochondrium | 39 | 21(31.8) | 18(51.4) | 0.06 |
| Swelling in abdomen | 63 | 34(51.5) | 29(82.9) | 0.003* |

Chi-square test, *Significant

Table-8: Comparison of Liver Function Tests

| LFT PARAMETERS | Hepatitis B (n=66) | Hepatitis C (n=35) | p-value [†] |
|-------------------------|--------------------|--------------------|----------------------|
| Mean Serum bilirubin | 1.36±0.72 | 1.81±0.77 | 0.005* |
| Mean ALT | 189.93±69.51 | 164.00±55.44 | 0.06 |
| Mean AST | 182.34±72.13 | 158.77±61.61 | 0.10 |
| Mean Alkaline phosphate | 216.35±70.12 | 176.08±39.75 | 0.002* |

DISCUSSION

Hepatitis B virus (HBV) and hepatitis C virus (HCV) are the most common causes of chronic liver disease (CLD) worldwide, and can lead to cirrhosis and hepatocellular carcinoma HCC.⁴ Several studies on AVH are available from India and abroad that have reported varying prevalence of hepatotropic viruses- HBV (7.3-42%), and HCV (1.16-10.6%)⁵. In a study, done by Jain *et al.*,⁶ 2013 in Lucknow, the prevalence was identified to be the HBV (16.10% cases) and HCV (11.98%). In the present study the prevalence rate was found to be 4.5% in HBV and 2.5% for HCV. A low prevalence of HCV infection (4%) was seen in Aligarh and its surrounding region. Prevalence levels similar to ours (2.5%) have been reported from South India by Sumarthy *et al.*,⁷ 1993. On the contrary, a very high prevalence (37.5%) of HCV has been reported from Delhi by Singh *et al.*,⁸ 1991. The male female ratio for HBV was 1.5:1 whereas in HCV infection male female ratio of 1:2 was found and on comparing both HBV and HCV positive viral infections statistically significant values were found in males $p \leq 0.00$. In the present study, about three fourth (76.9%) of the patients of hepatitis B were found to be literate and belong to lower socio-economic status having poor hygiene. On contrary an increased prevalence in illiterates was reported by Uppal *et al.*, 2009,⁹ from Delhi. In our study the prevalence of HCV in literates was found to be 62.9% and belonged to middle socio-economic status, similar to findings by Wang *et al.*,¹⁰ 2002 from Taiwan. Statistically significant values were observed in low socio-economic status ($p \leq 0.003$) and literacy ($p \leq 0.01$) while comparing HBV and HCV positive patients. The risk factors associated with HBV infection were unsterilized needle use (30.3%) dental manipulations (7.6%), surgical operations (3.0%), previous blood transfusion (1.5%), HBV infection in the family (1.5%) whereas in HCV positive patients unsterilized needle use (25.7%), smoking & drinking (22.9%), major surgery

(2.9%), and blood transfusion (5.7%) were the main possible risk factors. None of the patients gave the familial history nor a history of sex with multiple partners. On comparing the risk factors statistically significant values were observed in unsterilized needle use ($p \leq 0.04$) and for blood transfusion ($p \leq 0.01$) factors. Similarly no history for possible route of transmission could be elucidated in 52% cases in HBV & HCV cases. Majority (52%) of the cases with HBV & HCV were unknown about their mode of acquiring infection and significant values ($p \leq 0.04$) were observed on comparing both viral infections. Similar observations were seen in a study done in Delhi by Thakur *et al.*,¹¹ 1999. In our study the main clinical manifestations for HBV positive patients were fatigue (93.9%) & anorexia (88.6%) and in one third of the patients with vomiting (80.3%), fever (75.8%) and headache (78.8%). However in HCV positive patients fatigability (88.6%), anorexia (88.6%), fever (85.7%), nausea (82.9%), vomiting (82.9%) were the main clinical manifestations. Statistically significant difference was found in clinical manifestations of myalgia (p -value < 0.01) abdominal pain (p -value < 0.003) and chronic diarrhoea (p -value < 0.001). Similar findings were observed by Morsy *et al.*,¹² 2015 Egypt. The result of AST value in Hepatitis B was found to be in the range of 182.32 ± 72.03 and ALT value was observed as 189.93 ± 69.55 . The AST value in Hepatitis C was found to be 158.77 ± 61.61 and ALT value was observed as 164.00 ± 55.44 . Sumarthy *et al.*,⁷ 1993 Madurai studied that Mean AST and ALT levels in Hepatitis B cases were almost twice those in Hepatitis C cases. There was significant difference in serum bilirubin ($p = 0.005$) and alkaline phosphate ($p = 0.002$) between Hepatitis B and C patients. A large majority (42.57%) of the patients with Hepatitis B & Hepatitis C were young (20-40 years) and had normal ALT (47.5%), similar findings were observed in a study done by Khokhar *et al.*,¹³ 2004 from Pakistan

In our study it was observed that the results of ELISA test was 100% while for Rapid card test it was 95%, Torane *et al.*,¹⁴ 2007 from Mumbai also reported that the rapid tests were inferior

compared to ELISA. No case of HBV and HCV co-infection was found in our study however HBV and HCV co-infection was reported by Jain *et al.*,⁶ 2013 in Lucknow.

Table 9: Prevalence of hepatitis viruses compared with that of other studies

| Authors | Year of study | Place of study | Total samples | HBV(% positive) | HCV(% positive) | Comments |
|---------------|---------------|----------------|---------------|-----------------|-----------------|------------------------------|
| Tandon et al | 1984 | New Delhi | 100 | 42 | | Adults |
| | | | 78 | 9 | | Children |
| Kaur et al | 2002 | New Delhi | 177 | 19.8 | 3.4 | Adults |
| | | | 129 | 8.6 | 3.1 | Children |
| Poddar et al | 2002 | Chandigarh | 172 | 7.6 | 1.16 | Children (<14 years) |
| Hussain et al | 2006 | New Delhi | 1932 | 16.61 | 2.02 | Adults |
| Kumar et al | 2007 | Chandigarh | 685 | 7.3 | 2.8 | Individuals aged 10-70 years |
| Irshad et al | 2010 | New Delhi | 74 | 12.3 | 10.6 | Adults |
| Jain et al | 2012 | Lucknow | 124 | 23.38 | 12.90 | Adults |
| | | | 143 | 9.79 | 11.18 | Children |
| | Present study | Lucknow | 1434 | 4.5 | 2.5 | Individuals aged 5-70 years |

CONCLUSION

Hepatitis B and C viruses infection are one of the commonest cause of blood borne hepatitis worldwide. Hepatitis is an emerging infection in India whose long term implications will be felt in the decades to come. The prevalence rate of HBV infection and HCV infection in India is within the range of 3% & 1-1.5% respectively. In our study the prevalence rate of HBV infection and HCV infection was found to be 4.6% and for HCV 2.5%. Majority of infected patients (52%) remained asymptomatic during the course of disease and long term complications of the disease are hepatic disorders and hepatocellular carcinoma. Thus initial screening becomes very important for the early recognition of the disease and to prevent its spread & complications. The preventive measures include health education regarding parenteral transmission of infection stringent blood banking laws need to be introduced and use of disposable syringes/needles

should be made mandatory. Reuse of needles, shaving kits and razor blades should be discouraged. All this is not possible without increased public awareness of the magnitude and implications of this chronic infection and its mode of spread. Health authorities have to include hepatitis B and C on their radar as a disease, which can result in significant morbidity and mortality in the years to come. To confirm the findings of our study a larger population study is needed.

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