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HEPATITIS B AND C : SEROPREVALENCE, COINFECTION, RISK FACTORS AND PREVENTION : A GLOBAL HEALTH CONCERN

Microbiology

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ABSTRACT

BACKGROUND/OBJECTIVES: Chronic hepatitis B (HBV) and C virus (HCV) infections represent serious global and public health problem. An estimate of 400 million persons are carriers of HBV worldwide, 75% of whom reside in Asia and the western pacific. Likewise, HCV infection is estimated at approximately 170 million people globally.Hepatitis B virus was first isolated in 1963and hepatitis C virus (HCV) was identified in 1989. The present study was carried out to estimate the seroprevalence, co-infection,analysis of associated risk factors and prevention of Hepatitis B & Hepatitis C virus infection in ChattrapatiShivajiSubharti Hospital, Meerut.

METHODS: This was a prospective study which includedserum samples collected over a period of 1 year from patients attending OPDs and admitted in various in-patient units (wards and ICUs) whichwere subjected to detection of HBsAg and Anti-HCV Ab using rapidimmunochromatographic tests and Enzyme Linked Immunosorbent Assay (ELISA).

RESULTS: Out of total 11,311 samples,367 (3.24%) were positive for HBsAg and 612 (5.14%) were positive for Anti HCV Ab. Maximum cases of hepatitis B (85.02%) and Hepatitis C(87.91%) virus infection were diagnosed among IPD patients.Co-infection was seen in 25 (2.55%)cases.In maximum cases of Co-infection the risk factor associated was Blood or blood product transfusion(32%).

CONCLUSION: Since HBV and HCV infections have high mortality, population at risk should be screened to know the burden of hepatitis virus infections nationwide to make the plans and policies for disease prevention. The prevention of HCV and HBV infection can be achieved by screening of blood and blood products, vaccinaton against Hepatitis B and creating awareness about risk factors.

KEYWORDS

Seroprevalence, Hepatitis B, Hepatitis C, Global burden

1. INTRODUCTION:

Chronic hepatitis B (HBV) and C virus (HCV) infections represent significant public health issues globally. An estimate of 400 million persons are carriers of HBV worldwide, 75% of whom reside in Asia and the western pacific. Likewise, HCV infection is estimated at approximately 170 million people globally.[1]Hepatitis B virus was first isolated in 1963and hepatitis C virus (HCV) was identified in 1989.[2]Hepatitis B virus (HBV) is an enveloped, hepadnavirus with partially double stranded DNA. Hepatitis C virus (HCV) is RNA, single stranded, enveloped flavivirus that causes liver disease.[3]Approximately one million people die with chronic HBV and HCV infections annually with mostly end-stage liver diseases, namely, decompensated cirrhosis, liver failure, and hepatocellular carcinoma (HCC).[4]WHO's Draft Global Health Sector Strategy on Viral Hepatitis gives the much needed roadmap and targets to combat hepatitis. It provides realistic targets and action plans to eliminate hepatitis by 2030.[5]

Hence, the authors carried out the present study to determine the seroprevalence, co-infection,analysis of associated risk factors and prevention of Hepatitis B & Hepatitis C virus infection highlighting the importance of screening the population for these infections so that they can be appropriately treated on time, decreasing their global burden.

2.METHODS:

2.1Study setting

This prospective study was conducted in the Clinical Microbiology Laboratory, Post Graduate Department of Microbiology and associatedChattrapatiShivajiSubharti Hospital, Meerut.

2.2Study group and study period

The study included all blood samples received for detection of Anti-HCV Antibodies and HBsAg from patients attending various Out Patient Departments and admitted in different in patient units (wards and ICUs) to determine Occurrence of Hepatitis B & Hepatitis C virus infection for a period of one year (December 2016 to November 2017).

2.3Specimem

5 ml venous blood sample was collected from all the patients for testing. It was allowed to clot and then centrifuged for serum separation.

2.4 Serology

A.Detection of HCV antibodies

Detection of Anti-HCV antibodies was done using Rapid immunochromatographictest (HCV Tri Dot) and ELISA (Erba Lisa® HCV Zen3 (V2), TRANSASIA BIO-MEDICAL LTD).

B.Detection of HBsAg

Detection of HBsAg was done using Rapid immunochromatographic test (HEPACARD and ELISA (Erba Lisa® HCV Zen3 (V2), TRANSASIA BIO-MEDICAL LTD).

2.5Ethics

Ethical approval was obtained from the Institutional Ethics Committee before conducting the study.

3. RESULTS:

A total of 11,311 samples were received for diagnosis of Hepatitis B and C virus infection. The seropositivity of HBsAg and HCV was found to be 3.24% (367/11311) and 5.41% (612/11311) respectively in our hospital.[Fig.1]The authors report that hepatitis B(70.02%) and hepatitis C(54.41%) virus infection was common in males as compared to females .Maximum cases of hepatitis B (23.98%). and hepatitis C (21.24%) virus infection were seen in the age group of 21-30 years.In the present study, maximum cases of hepatitis B virus infection were diagnosed among IPD patients (85.02%).Out of these majority cases were from medicine ward (25.96%) followed by ICUs (4.49%), Surgery ward(16.98%), Paediatrics (1.60%), ENT (4.49%), Obstetrics and Gynaecology(8.02%), Orthopaedics (7.38%), Eye Ward (10.57%), Respiratory medicine (3.20%), CCU (1.28%) and

Dermatology Ward (0.96%). HBV positive cases inOPD were 14.98%. [Table1]

Similarly, it was observed that maximum cases of hepatitis C virus infection were diagnosed among IPD patients (87.91%). Out of these maximum cases were from ICU (22.86%) followed by Medicine Ward (21.52%), Surgery (16.92%), Obstetrics and Gynaecology (11.89%), Eye Ward (10.59%), Orthopaedics (8.18%), Respiratory medicine (3.90%), ENT (1.86%), Coronary care unit (*0.92*), Dermatology (0.56%), Burn(0.38%), Paediatrics (0.18%), Psychiatry ward (0.18%). HCV positive cases inOPD were 12.09%.[Table 2]

The authors report 2.55% (25/979) co-infection of Hepatitis B and C virus.[Fig 2]Out of these cases with co-infection, the risk factors associated were Blood or blood product transfusion(32%) followed by I/V drug use(24%) NSI in health care workers (20%), Multiplesexual partners (8%), Organ transplant(4%), Tattoo(4%), Nose or ear piercing (4%), and Hemodialysis (4%).[Table 3]

4. DISCUSSION:

Viral hepatitis is cause for major health care burden in India and is now equated as a threat comparable to the "big three" communicable disease- HIV/AIDS, malaria and tuberculosis. Around 400 million people all over world suffer from chronic hepatitis and the Asia-Pacific region constitute the epicentre of this epidemic.

A total of 11,311 samples were received for diagnosis of Hepatitis B and C virus infection. The seropositivity of HBsAg was found to be 3.24% (367/11311) in our hospital.Drositis*et al.*[3] reported the seropositivityofHBsAg to be 3.3% which is similar to our study whileLodha*et al.*[6](2001) reported it to be 2% which is lower than our study. However, Batham*et al.*[7] reported a high prevelance (15.9%) which shows a wide variation from our study.Our study shows much less prevalence than this finding. This indicates a decreasing trend of hepatitis B which may be because of adoption of universal immunization against hepatitis in newborns and improved living standards.The seroprevalence of HBV & HCV has a considerable geographical variation which may be explained by different distributions and different contributions of risk factors in different study regions.

In authors report that hepatitis B virus infection was common in males(70.02%) as compared to females (29.97%) . Dutta *et al.*[8] observed a similar finding with HBV positivity of 35.3% and 19.3% in males and females,respectively. No plausible explanation has been given for the higher prevalence in males in the general population.

The seropositivityof Anti HCV Ab was found to be 5.41% (612/11311) in our hospital. Kaur R *et al.*[9](2012) in their study observed the prevalance rate of 1.4% in Punjab (1.4%).Thisprevelance is lower than our study. Bhattacharya S *et al.*[10] in a hospital based study observed the seroprevalence of HCV to be 4.8% which is similar to our finding. Other studies fromMauritius, Ethopia and Pakistan have reported a seroprevalence of HCV as 5.9%, 6% and 9%respectively.[11, 12,13] Theyshow a higher prevalence as compared to our study.All the samples were run by ELISA also. The results of immune chromatography and ELISA were found to be concordant.

In the present study, hepatitis C virus infection was more common among males(54.41%)than females (44.60%) as seen in Hepatitis B virus infection.

Maximum cases of hepatitis B (23.98%). and hepatitis C (21.24%) virus infection were seen in the age group of 21-30 years.Trupti B *et al.*[14]observed the similar finding.No plausible explanation has been given for the higher prevalence in males in the general population.

No effect of seasonal variation was observed in the distribution of positive samples in our study.

The authors report that maximum cases of hepatitis B virus infection were diagnosed among IPD patients (85.02%).Out of these, maximum cases were from medicine ward (25.96%). Also, maximum cases of hepatitis C virus infection were diagnosed among IPD patients (87.91%). Out of these, maximum cases were from ICU (22.86%).Due to lack of similar finding, comparison of our data could not be done with other studies.

The authors report 2.55%(25/979) co-infection of Hepatitis B and C virus, while Desikan*et al.*[15] reported co-infection in 1.89% cases.Co-infectionhas been associated with clinically more severe liver disease than that of chronic hepatitis with HCV& HBV infection alone.It is strongly associated with HCC than either infection alone, suggesting a synergistic effect between the two viruses in the carcinogenic process of HCC.

On looking at thedistribution of cases with co-infection, it was seen that these cases were predominantly admitted in the hospital 23 (92%)On Analysis of associated risk factors in co-infected patientsit was seen that blood or blood product transfusion was the predominant risk factor associated (32%) in our patients followed by I/V drug use (24%).However, in 20% cases the associated risk factor was NSI in health care workers.Strict monitoring for HBV & HCV should be done in blood banks.[Table 3]. This finding emphasises need of education of masses regarding modes of transmission hepatitis B virus and its prevention.This is a matter to worry and the HIC team needs to increase awareness regarding NSI/SI and its management.

5. CONCLUSION:

As HBV and HCV infections have high mortality, population at risk should be screened to know the burden of hepatitis virus infections nationwide to make the plans and policies for disease prevention.

Viral hepatitis imposes a major healthcare burden in the Indian subcontinent. HBVand HCV infection can cause chronic hepatitis, which can leadto ensuing complications like development of cirrhosis of liverand HCC.So, disease management and prevention is necessary following a multipronged approach of activescreening, adequate treatment, universal vaccination againstHBV and educational counselling can help decrease theburden of liver diseases associated with HBV and HCV infection in India.As there is no vaccine available for HCV, the prevention of HCV infection can be achieved by screening of blood and blood products, avoiding sharing of needles or injecting equipment. Effectiveness of treatment depends on genotype, so further genotype studies are necessary for proper treatment of the diagnosed patients.

The study throws light on the dynamics of viral transmission in the community in this part of the country and provides a good reference for future studies because of the large number of cases investigated.

6. Limitations

i. Occult and cured infections could not be diagnosed because other serological markers like anti hepatitis B core antibody were not tested.
ii. Genotyping could not be done due to limited resources.

Competing interests

The authors declare that they have no competing interests.

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Table-1: Distribution of HBsAg positive cases in IPD (n=312)

Ward	Number	Percentage (%)
Medicine Ward	81	25.96
ICU	61	19.56
Surgery	53	16.98
Eye Ward	33	10.57
Obstetrics and Gynaecology	25	8.02
Orthopaedics	23	7.38
ENT	14	4.49
Respiratory medicine	10	3.20
Pediatrics	5	1.60
Coronary care unit (CCU)	4	1.28
Dermatology	3	0.96
TOTAL	312	100

Table-2:Distribution of HCV positive cases in IPD (n=538)

Ward	Number	Percentage (%)
ICU	123	22.86
Medicine Ward	116	21.52

Surgery	91	16.92
Obstetrics and Gynaecology	64	11.89
Eye Ward	57	10.59
Orthopaedics	44	8.18
Respiratory medicine	21	3.90
ENT	10	1.86
Coronary care unit (CCU)	5	0.92
Dermatology	3	0.56
Burn Ward	2	0.38
Pediatrics	1	0.18
Psychiatric Ward	1	0.18
TOTAL	538	100

Table 3: Analysis of associated risk factorsin co-infected patients

Factors	No	Percentage (%)
Blood or blood product transfusion	8	32
I/V drug use	6	24
NSI in health care workers	5	20
Multiple sexual partners	2	8
Organ transplant	1	4
Nose or ear piercing	1	4
Tattoo	1	4
Hemodialysis	1	4
Total	25	100

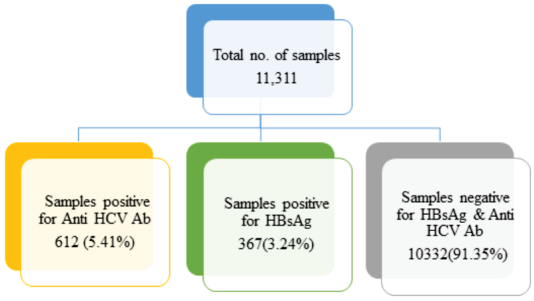

Fig- 1:Distribution of total samples studied (n=11,311)

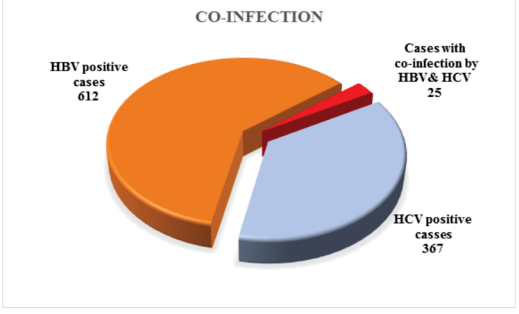

Fig 2: Distribution of cases of co-infection among the HBV & HCV positive cases

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