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Prevalence of hepatitis b and hepatitis d co-infection in blood donors and hospital patients in east district of Sikkim

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ABSTRACT

Background: Hepatitis Delta virus (HDV) is a small RNA virus responsible for causing both acute and chronic liver disease in persons infected with Hepatitis B. Chronic HDV infection worsens the preexisting HBV-related liver damage. Several reports mention that Hepatitis B and D frequently occur together and is called co-infection. However, no major study has been done on Hepatitis D in this region. Routine screening is not done for detection of Hepatitis D. Therefore there is insufficient data on its incidence or prevalence in this part of India.

Objective: The present study was conducted to determine the prevalence of Hepatitis B and D coinfection in blood donors and hospital patients in East District of Sikkim.

Material and Methods: The one year study was carried out in Central Referral Hospital, Tadong and STNM Hospital (Sir Thutop Namgyal Memorial Hospital), Gangtok in the East district of Sikkim. A total of 64 serum samples positive for Hepatitis B were collected, analysed and screened for the presence of anti-HDV IgG antibody using Enzyme Linked Immunosorbent Assay [Human hepatitis D virus (HDV) antibody (IgG) ELISA Kit].

Results: Out of 64 samples positive for HBsAg that were analysed one sample (1.6%) was positive for Hepatitis B and Hepatitis D co-infection.

Conclusion: Though the incidence of Hepatitis B & D coinfection is low but routine screening of blood donors for Hepatitis D should be done due to substantial risk of severe chronic liver diseases.

1. Introduction

Hepatitis Delta Virus (HDV) is a small satellite RNA virus classified within delta viruses. In 1977, HDV was first repoted by Dr. Marcus Rizzetto in individuals infected with HBV.[1] Hepatitis B virus (HBV) is a global health problem with 248 to 292 million people chronically infected worldwide.[2,3] Although, the exact prevalence of HDV infection cannot be predicted due to absence of standard screening procedures and inaccessibility in some resources limited countries but in a recent analysis, 13% to 14% which corresponds to 62 to 72 million people were found to be infected with HDV worldwide.[4] According to World Health Organisation (WHO) 5% of HBsAg carriers worldwide are infected with HDV.[5] HDV is a single stranded defective RNA virus which needs Hepatitis B virus (HBV) for completion of its replication cycle inside the host cells. Hepatitis B virus provides HDV with its surface antigen (HBsAg), which HDV needs for transmission between hosts. Though HDV is considered to be imperfect and requires HBV to be human pathogen, HDV is considered to be most severe and rapidly progressive form of chronic hepatitis.[4] Infection with HDV and HBV viruses can occur in two ways: it can happen simultaneously, co-

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infection or HDV can infect people after initial HBV infection, super-infection.[6] HDV infection is associated with higher rates of fulminant hepatitis in acute cases and cirrhosis and hepatocellular carcinoma in chronic infections than HBV alone and persisting HDV replication is considered the most important predictor of mortality.[7] The transmission routes of HDV are similar to those of HBV and researchers have shown that very little inoculums are sufficient for transmission.[8] These routes include blood transfusion, intravenous drug abuse, sexual contact and nosocomial infection. Anti-delta antibodies appear in the serum during infection and can be detected by enzyme-linked immunosorbent assay(ELISA).[4] Different studies have shown that the geographic distribution of HDV infection is heterogenous and that comprehensive surveys in HBV infected patients should be conducted to determine the risk factors and prevalence of infection.[6]

2. Aims and Objectives

East district has a population of 2,83,583 (India Census, 2011) and approximately on an average 2013 blood donors donate blood annually. However, no major study has been done on Hepatitis D in this region. Routine screening is not done for it. Therefore there is insufficient data on its incidence or prevalence in this part. It is very important for health providers and policy makers to recognize the risk of dual infection with HBV and HDV and design effective preventive program.

The study was carried out in east district of Sikkim with the following objectives:

1. Detection of donors and hospital patients seropositive for Hepatitis B surface antigen (HBsAg)
2. Segregation of sera and cells that were positive for HBsAg.
3. Detection of anti- Hepatitis D virus antibody (Anti-HDV) in sera by ELISA.

3. Material and Methods

The present study was designed for duration of one year from February 2021 to February 2022. The study was done in collaboration with Central Referral Hospital, Tadong and STNM Hospital (Sir Thutop Namgyal Memorial Hospital), Gangtok in the East district of Sikkim. A total of 64 samples positive for HBsAg in the routine blood donors reporting to the blood bank and the hospital admitted patients were collected in clot vial. Informed consent was obtained from both the donors and hospital patients who were Hepatitis B positive. The samples were centrifuged for 5 mins at 3000 rpm and the serum was collected. The serum samples were screened for the presence of anti-HDV IgG antibody using Enzyme Linked Immunosorbent Assay [CAT NO CSB-E04809h Human hepatitis D virus (HDV) antibody (IgG) ELISA Kit]. The cut off value as per CUSABIO user manual guide calculation was 0.1417. The datas were entered and analysed using SPSS version 2.0. Institutional Ethical clearance was taken from the Institute for the study.

4. Results

A total of 64 samples positive for HBsAg were analysed with a M:F ratio of 1.46. The Hepatitis B positive samples were predominant in the 20-40 years age (57.8%). [Table 1; Figure 1 a] The adolescent and the adult population were most vulnerable. Majority of the patients were Hindu and were from the Nepali community (40.6%), as they form the predominant population in East Sikkim.[Table 2; Figure 1 (b)&c] Only one female patient (1.6%) out of 64 was positive for Hepatitis B and Hepatitis D co-infection.[Table 2; d] The female patient had a history of high risk behavior. Treatment has been initiated and the patient is under follow up.

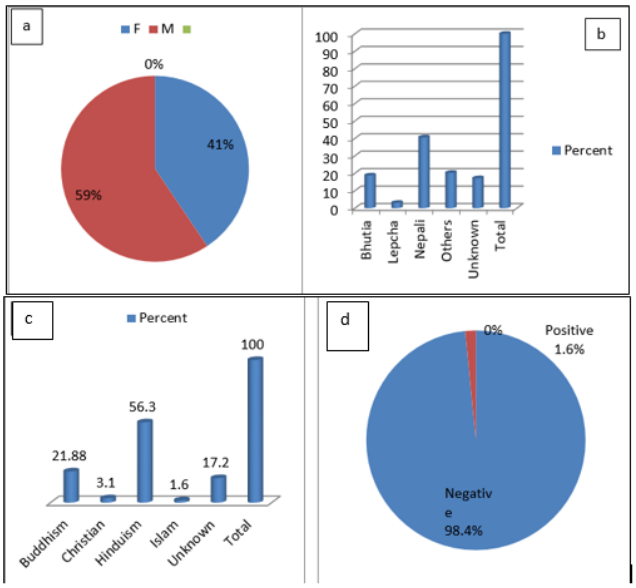

Figure 1: a: Gender wise distribution; **b:** Ethnicity wise distribution; **c:** Religion wise distribution; **d:** Positive result for Anti - HDV Frequency

5. Discussion

HDV is dependent on HBV and the epidemiology of HDV is similar to HBV with exceptions. The prevalence of HBV has declined globally due to vaccination and increasing awareness. It is estimated that about 5% of HBsAg carriers worldwide are infected with HDV.[5] In our study, positive rate for Hepatitis B & D coinfection was 1.6%. This is a first case study reported from Sikkim on HBV and HDV coinfection. Our results are higher than the postulated global prevalence of 0.82%.[9] Though several studies have been done in India to estimate the prevalence of HDV infection but there are no data on national survey. In Northern India,

Table 1: Age group (years) and gender wise ditribution

	M	F	0 to 10	11 to 20	21 to 30	31 to 40	41 to 50	≥ 51
Frequency	38	26	0	4	19	18	07	16
Percent (%)	59.4	40.6	0	6.25	29.68	28.12	10.9	25
Total				64				

Table 2: Summary chart

(a). Ethnicity wise distribution

Frequency	Frequency	Percent
Bhutia	12	18.8
Lepcha	2	3.1
Nepali	26	40.6
Others	13	20.3
Unknown	11	17.2
Total	64	100.0

(b). Religion wise distribution

Frequency	Frequency	Percent
Buddhism	14	21.88
Christian	2	3.1
Hinduism	36	56.3
Islam	1	1.6
Unknown	11	17.2
Total	64	100.0

(c). Positive result for Anti - HDV

Frequency	Frequency	Percent
Negative	63	98.4
Positive	1	1.6
Total	64	100.0

the prevalence of hepatitis D in HBsAg-positive individuals from New Delhi was reported to be 10.6% in 2005.[10] In Kolkata, the prevalence was found to be 3.3% in 1998.[11] In Mumbai, according to a study done in 1992, the HDV prevalence was 37.46% in HBsAg-positive patients.[12] In Southern India, low HDV prevalence in patients undergoing hemodialysis was reported in a study published in 1991.[13] However, our results are lower than the above studies. In a study done by Attaran MS et al in Iran 2% of them were positive for anti-HDV.[14] In a study by Ajayi BB et al in nort-east Nigeria in 2019, the prevalence of HDV co-infection was 3.3 %.[4] Similarly, a study was done by Nahed IM Gomaa, et al in Ismailia, Egypt anti-HDV antibodies were detected in 8 (4.7%) individuals aged from 29-43 years.[15] In South Asia, most of the countries are poor, densely populated and lack good health infrastructure, conditions that are favorable for the spread of hepatitis B and other related infections.[16] A recently conducted study showed a very high HDV prevalence of 58.6% in HBsAg-positive patients who visited liver clinics in Karachi and Jacobabad.[17] A study done by Luna Adhikari et al in 2010, showed the seropositivity of HBsAg to be 0.78[18]

6. Conclusion

This is the first study on the prevalence of Hepatitis B and D coinfection in blood donors and hospital patients in East District of Sikkim. A larger epidemiological study needs to be performed to know the true prevalence rates of these infections in Sikkim and North-eastern part of India. Population is at risk of acquiring these infections and therefore necessary steps must be taken to prevent the transmission of these viruses. Safe blood transfusion is a pre-requisite for the individual and the community as well. Mass screening, routine HBV immunization and awareness regarding the spread of the infection must be created in the community. Hence, it is very important for health providers and policy makers to recognize the risk of dual infection with HBV and HDV and design effective preventive program.

7. Source of Funding

None.

8. Conflict of Interest

None.

References

1. Rizzetto M, Canese MG, Aricò S, Crivelli O, Trepo C, Bonino F, et al. Immunofluorescence detection of new antigen-antibody system (delta/anti-delta) associated to hepatitis B virus in liver and in serum

of HBsAg carriers. *Gut*. 1977;18(12):977–1003.
2. Schweitzer A, Horn J, Mikolajczyk RT, Krause G, Ott JJ. Estimations of worldwide prevalence of chronic hepatitis B virus infection: A systematic review of data published between. *Lancet*. 1965;386(10003):1546–55.
3. Polaris Observatory Collaborators, Global prevalence, treatment, and prevention of hepatitis B virus infection in 2016: a modelling study. *Lancet Gastroenterol Hepatol*. 2018;3(6):383–403.
4. Ajayi BB, Latbone S, Igwegbe IU, Kida IM, Goni BW, Samuel OO, et al. Serological detection of hepatitis B and D virus co-infection among patients attending a tertiary health facility at Maiduguri, Nigeria. *Egypt J Intern Med*. 2021;33(5). doi:10.1186/s43162-021-00036-1.
5. World Health Organisation. Global Hepatitis Report 2017. World Health Organisation; 2017.
6. Tahaei S, Tahaei E, Mohebbi SR, Azimzadeh P, Behelgardi A, Sanati A, et al. Prevalence of hepatitis D virus in hepatitis B virus infected patients referred to Taleghani hospital, Tehran, Iran. *Gastroenterol Hepatol Bed Bench*. 2014;7(3):144–50.
7. Papatheodoridis G. European Association For The Study Of The Liver. EASL clinical practice guidelines: Management of chronic hepatitis B virus infection. *J Hepatol*. 2012;57(1):167–85.
8. Ponzetto A, Hoyer B, Popper H, Wngle R, Purcell R, Gerin J, et al. Titration of the infectivity of Hepatitis D virus in chimpanzees. *J Infect Dis*. 1987;155(1):72–8.
9. Stockdale AJ, Kreuels B, Henrion MRY, Giorgi E, Kyomuhangi I, Geretti AM, et al. Hepatitis D prevalence: problems with extrapolation to global population estimates. *Gut*. 2020;69(2):396–7.
10. Chakraborty P, Kailash U, Jain A, Goyal R, Gupta RK, Das BC, et al. Seroprevalence of hepatitis D virus in patients with hepatitis B virus-related liver diseases. *Indian J Med Res*. 2005;122(3):254–7.
11. Bhattacharyya S, Dalal BS, Lahiri A. Hepatitis D infectivity profile among hepatitis B infected hospitalised patients in Calcutta. *Indian J Public Health*. 1998;42(4):108–12.
12. Banker DD, Desai P, Brawner TA, Decker RH. Hepatitis delta virus infection in Bombay. *Trans R Soc Trop Med Hyg*. 1992;86(4):424–5.
13. Thomas PP, Samuel BU, Jacob CK, John TJ, Shastry JC. Low prevalence of hepatitis D (delta) virus infection in a nephrology unit in south India. *Trans R Soc Trop Med Hyg*. 1991;85(5):652–3.
14. Attaran MS, Sharifi Z, Hosseini SM, Samei S, Ataee Z. Prevalence of hepatitis B and hepatitis D coinfection in asymptomatic blood donors in Iran. *APMIS*. 2014;122(3):243–7.
15. Nahed IM, Metwally LA, Nemr N, Younis S. Seroprevalence of HDV infection in HBsAg positive population in Ismailia, Egypt. *Egypt J Immunol*. 2013;20(1):23–8.
16. Abbas Z. Hepatitis D: Scenario in the Asia-Pacific region. *World J Gastroenterol*. 2010;16(5):554–62.
17. Mumtaz K, Hamid SS, Adil S, Afaq A, Islam M, Abid S, et al. Epidemiology and clinical pattern of hepatitis delta virus infection in Pakistan. *J Gastroenterol Hepatol*. 2005;20(10):1503–7.
18. Adhikari L, Bhatta D. Infectious disease markers in blood donors at central referral hospital. *Asian J Transfusion Med*. 2010;4(1):41–2.

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