HDV and HBV Epidemiology in the University of Utah Healthcare System (2000-2021)

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Introduction

Hepatitis D virus (HDV) is a satellite RNA virus that utilizes hepatitis B virus (HBV), a double-stranded DNA virus, for packaging and transmission. HDV infection can be accomplished through either HBV co-infection or superinfection of a chronic HBV carrier.

Complications associated with chronic HBV and HDV infections include impaired liver function, liver decompensation and increased risk of death. Chronic infection of HDV induces more severe liver damage than HBV infection alone and has been shown to lead to earlier hepatic decompensation and an increased risk of hepatocellular carcinoma[1].

A retrospective study was conducted to examine the epidemiology of HDV and HBV cases over a 22-year period (2000-2021) in the University of Utah healthcare system. Analysis of demographics, odds ratios, and trends in yearly incidence were performed.

Methods

This study was conducted using patient health information obtained from the University of Utah healthcare data system. The dataset consisted of over 185,000 individuals who had received diagnoses or diagnostic tests for HDV or HBV over the 22-year period. Demographic data for each of the patients (age, gender, race/ethnicity, etc.) was also included. HBV-positive and HDV-positive patient cohorts were determined using the following criteria:

HBV Cohort	HDV Cohort
HBSAg+ patients	HDV Ab+ patients
Patients with ≥ 2 HBV ICD-9/ICD-10 HBV Codes	Patients with ≥ 2 HDV ICD-9/ICD-10 HDV Codes
Patients with 1 ICD-9/ICD-10 HBV code and 1 positive HBV DNA or HBeAg test	Patients with 1 ICD-9/ICD-10 HDV code and 1 positive HDV RNA or HDAg test

Results

Table 1. HBV and HDV Demographics in the Utah Cohort

Demographics	HBV (n = 1962)	HDV (n = 62)
Sex		
Male	1079 (55%)	29 (47%)
Female	883 (45%)	33 (53%)
Age (M ± SD)	43.2 ± 14.9	41.3 ± 12.9
Age Group		
18 - 39	946 (48%)	29 (47%)
40 - 59	723 (37%)	27 (44%)
60+	293 (15%)	6 (9%)
Race		
Asian	423 (22%)	24 (39%)
Black or African American	223 (11%)	8 (13%)
Hispanic / Latino	128 (7%)	2 (3%)
Native Hawaiian and Pacific Islander	124 (6%)	2 (3%)
White or Caucasian	736 (37%)	20 (32%)
Other	194 (10%)	3 (5%)
Unknown	134 (7%)	3 (5%)

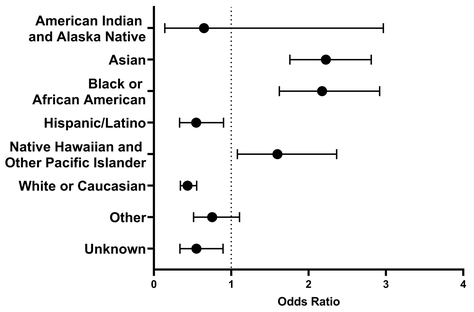

Figure 1. Odds Ratos for HDV Testing by patients' race. Odds ratios with error bars crossing dashed line are not signficant. Error bars indicate 95% confidence interval.

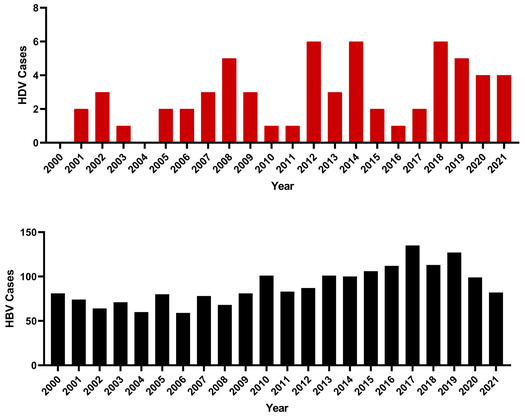

Figure 2. Yearly incidence of HDV and HBV (2000-2021). Yearly incidence was reported according to pre-determined cohort criteria outlined in "Methods".

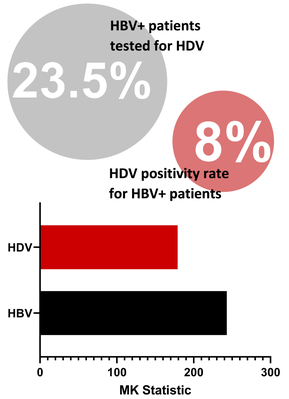

Figure 3. Mann-Kendall Trend Analysis over 22-year period (2000-2021). Trend analysis shows an overall increase in both yearly HDV and HBV cases during the evaluated time period.

Conclusion

A total of 1962 HBV and 62 HDV diagnoses occurred over the 22-year period in the University of Utah healthcare system. Average age at diagnosis was 43.2 ± 14.9 for HBV-positive patients and 41.3 ± 12.9 for HDV-positive patients.

Analysis of HDV testing data showed an elevated odds ratio for testing of Asian, Black or African American, and Native Hawaiian and other Pacific Islander patients. Odds ratios were also examined for HDV positivity according to patients' race and age, yet no statistical significance was observed.

HBV-positive patients are frequently undertested for HDV with a previously observed testing rate of 8% nationwide[2]. In this Utah cohort, 23.5% of all HBV+ patients were tested for HDV with an observed positivity rate of 8%.

Data for this study came solely from the University of Utah Health system and did not include other hospital and healthcare networks. This presented issues in being able to extrapolate the findings of this study to the greater Utah population, however, it does present important trends in HBV and HDV epidemiology.

Going forward, the University of Utah Healthcare dataset will be further analyzed and compared against other healthcare systems within in the state.

References & Acknowledgements

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2. Kushner, T., Serper, M., & Kaplan, D. E. (2015). Delta hepatitis within the Veterans Affairs medical system in the United States: Prevalence, risk factors, and outcomes. Journal of hepatology, 63(3), 586–592. https://doi.org/10.1016/j.jhep.2015.04.025

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