



Hepatitis B Virus Coinfection Among American Patients With Chronic Hepatitis C Virus Infection:

A Prospective Analysis of Prevalence and Viral Interactions

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BACKGROUND & AIMS

- Hepatitis B virus (HBV) and hepatitis C virus (HCV) are the most common causes of chronic liver disease worldwide
- HBV and HCV coinfection is common due to shared routes of transmission
- Coinfected patients tend to have a more severe clinical course with respect to liver disease and complications of cirrhosis, including the development of hepatocellular carcinoma
- Although several studies from Europe and Asia have evaluated the prevalence of HBV-HCV coinfection and interactions between these viruses, little is known about HBV-HCV coinfection in the U.S.
- The aims of this study were:
 - To determine the prevalence of HBV infection among a cohort of Americans with chronic HCV infection
 - To evaluate viral interactions in patients coinfecting with HBV and HCV

METHODS

- We prospectively identified 1,257 patients with chronic HCV infection (HCV PCR positive) who were seen in outpatient primary care, GI, and ID clinics at the VA New York Harbor Healthcare System and Bellevue Hospital Center in New York City
- Each patient was interviewed by a research coordinator to obtain demographic and clinical data
- All subjects had HBV testing (HBsAg, HBsAb, and HBcAb)
- Patients with positive HBsAg test had HBeAg, HBeAb, and HBV DNA testing
- 684 of the 1,257 subjects had a liver biopsy performed
 - Fibrosis was scored on a scale of 0 – 4 using the Scheuer staging system
 - Steatosis was graded from 0 – 3 using the Brunt system: 0 (none), 1 (<33%), 2 (33% - 66%), and 3 (>66%)

RESULTS

Baseline Characteristics of the 1,257 Patients with Chronic HCV Infection

| | |
|--|--------------------|
| Age, years* | 53.4 ± 10.1 |
| Male | 1,173 (93.3%) |
| Race/ethnicity | |
| White, non-Hispanic | 324 (25.8%) |
| Black, non-Hispanic | 513 (40.8%) |
| Hispanic or Latino | 278 (22.1%) |
| Asian | 50 (4.0%) |
| Other | 92 (7.3%) |
| Current alcohol use | 157 (12.5%) |
| Injection drug use | 836 (66.5%) |
| Transfusion prior to 1992 | 217 (17.3%) |
| Number of lifetime sexual partners | |
| 0 – 5 | 331 (26.3%) |
| 6 – 10 | 272 (21.6%) |
| 11 – 25 | 72 (5.7%) |
| 26 – 50 | 225 (17.9%) |
| >50 | 357 (28.4%) |
| Sex with same sex partner | 63 (5.0%) |
| HCV RNA (x 10 ⁶ copies/ml)† | 4.3 (1.1 – 5.0) |
| HCV genotype | |
| 1 | 989 (78.7%) |
| 2 | 122 (9.7%) |
| 3 | 109 (8.7%) |
| Other or mixed | 37 (2.9%) |
| ALT level, U/L† | 51.0 (32.0 – 87.0) |

*Data expressed as mean ± SD; †Data expressed as median (25th – 75th percentile)

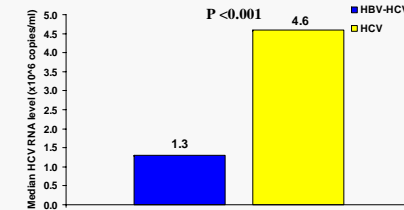
- 5.7% (95% CI, 4.4% - 7.0%) were coinfecting with HBV (HBsAg positive)

Proportion Coinfected with HBV According to Patient Characteristics

| | Number of Subjects Tested | Proportion of Subjects Coinfected with HBV | P-value |
|------------------------------------|---------------------------|--|---------|
| Age (years) | | | <0.001 |
| <40 | 41 | 22.0% | |
| 40-49 | 419 | 4.8% | |
| 50-59 | 533 | 4.1% | |
| 60-69 | 170 | 5.3% | |
| ≥70 | 94 | 13.8% | |
| Gender | | | 0.12 |
| Female | 84 | 2.4% | |
| Male | 1,173 | 6.1% | |
| Race/ethnicity | | | <0.001 |
| White, non-Hispanic | 324 | 3.1% | |
| Black, non-Hispanic | 513 | 6.2% | |
| Hispanic or Latino | 278 | 3.2% | |
| Asian | 50 | 34.0% | |
| Other | 92 | 5.4% | |
| Current alcohol use | | | 0.68 |
| No | 1,100 | 5.9% | |
| Yes | 157 | 5.1% | |
| Injection drug use | | | <0.001 |
| No | 421 | 1.2% | |
| Yes | 836 | 8.1% | |
| Transfusion prior to 1992 | | | 0.25 |
| No | 1,040 | 6.2% | |
| Yes | 217 | 4.1% | |
| Number of lifetime sexual partners | | | <0.001 |
| 0 – 5 | 331 | 0.9% | |
| 6 – 10 | 272 | 1.5% | |
| 11 – 25 | 72 | 5.6% | |
| 26 – 50 | 225 | 10.2% | |
| >50 | 357 | 10.9% | |
| Sex with same sex partner | | | 0.20 |
| No | 1,194 | 5.6% | |
| Yes | 63 | 9.5% | |

- Of the 72 HBsAg positive patients, 53 (73.6%) were HBeAg positive and 67 (93.1%) had detectable HBV DNA
- All 5 HBV coinfecting patients who had undetectable HBV DNA levels had very high HCV RNA levels (≥ 5 x 10⁶ copies/mL)

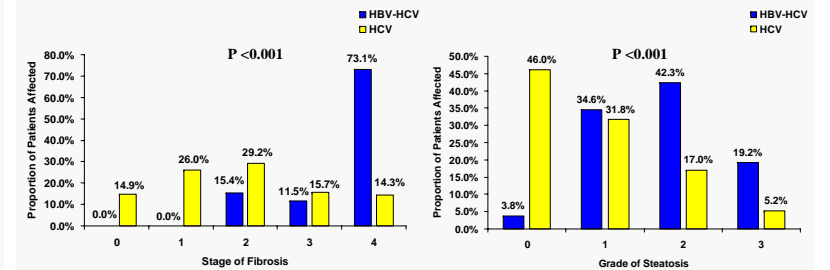
HCV RNA Levels in HBV-HCV Coinfected and HCV Monoinfected Patients



Liver Biopsy Results in the 26 HBV-HCV Coinfected and 658 HCV Monoinfected Patients

Severity of Fibrosis

Severity of Steatosis



- Liver biopsy results showed that stage 3 or 4 fibrosis (84.6% vs. 29.9%, p < 0.001) and grade 2 or 3 steatosis (61.5% vs. 22.2%, p < 0.001) were significantly more common in those with HBV-HCV

CONCLUSIONS

- Among a cohort of American patients with chronic HCV infection, we found that HBV coinfection was not uncommon (5.7%)
- The prevalence of coinfection differed according to age and race and was associated with more severe liver disease
- There are substantial viral interactions between HBV and HCV
- HBV appears to have a suppressive effect on HCV viral replication