Chronic Hepatitis C (HCV) Infections and the Risk of Depression and Other Adverse Events

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BACKGROUND

Hepatitis C (HCV) is a major medical and public health concern worldwide. In the United States, the Centers for Disease Control estimate the prevalence of chronic HCV at between 2.7 and 3.9 million Americans.¹ The cost associated with chronic HCV infection in the U.S. was estimated at $1.8 billion in 1997 and these costs are expected to increase significantly over the next 2 decades.² Serious complications of HCV may develop, such as liver failure, liver transplantation and cancer. HCV patients may suffer from depression which is thought to be associated with treatment. However, a rigorous study design is required to measure the incremental effects of HCV on the risk of depression and other adverse clinical outcomes. Specifically, HCV patients must be compared to similar patients without an HCV diagnosis and multi-variable statistical methods are required to adjust for any remaining potential confounding factors.

OBJECTIVES

Estimate the incremental impact of HCV on incidence of depression and other serious clinical events adjusting for age, gender, and non-HCV related co-morbidities.

METHODS

Data for this study were derived from a large health insurance company in the U.S. These data consisted of all paid claims for all enrollees covered during a 6-year period [2003 to 2008]. The study then selected a sample of enrollees with a minimum of two years of uninterrupted eligibility. Patients with an HCV infection were identified based on ICD-9 diagnostic codes recorded on paid claims [070.41, 070.44, 070.50, 070.51, 070.70, 070.71, or V02.62]. A two-year observation period was defined for each HCV patient centered on the first observed HCV diagnosis or the start of drug therapy for HCV [index date]. A corresponding 2-year observation period was defined for all non-HCV patients based on their first day of eligibility and their index date was set at one year following their eligibility date. Non-HCV patients were matched to HCV patients on a 1:1 ratio using a propensity score derived from a parsimonious logistic regression model of the likelihood of an HCV infection. The list of potential risk factors included age, gender, type of insurance [Medicare, Medicaid, commercial], plan type [e.g., HMO, indemnity, PPO, etc.], state of residence, baseline diagnostic mix, prescription drug profile, and the prior use of health services. Finally, HCV and non-HCV patients with hepatitis B, HIV, cirrhosis, liver cancer or a liver transplant during the year prior to their index date were excluded from the analysis.

The risk of liver-related clinical events was estimated by comparing the matched HCV and non-HCV patients. Adverse events were identified based on the filing of a paid claim with one of the following diagnoses: liver cancer [155.3]; liver transplantation [996.82, V42.7; CPT codes: 00789, 4713, 47135]; depression [296.2, 296.3, 300.4, 311] and cirrhosis [571.5, 571.2, 571.6]. Differences in event rates between the HCV and matched non-HCV populations were documented using descriptive statistics and chi square statistics were calculated. Multivariate models of adverse events [logistic regression] were estimated which included all baseline demographic, diagnostic, and drug profile variables listed above.

RESULTS

Table 1: Event Rates of Adverse Clinical Events

<table>
<thead>
<tr>
<th>Event</th>
<th>HCV patients</th>
<th>Non-HCV patients</th>
<th>Rate Ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td>120</td>
<td>150</td>
<td>0.8</td>
<td>0.7-0.9</td>
</tr>
<tr>
<td>Cirrhosis</td>
<td>210</td>
<td>250</td>
<td>0.8</td>
<td>0.7-0.9</td>
</tr>
<tr>
<td>Liver Transplant</td>
<td>55</td>
<td>65</td>
<td>0.8</td>
<td>0.7-0.9</td>
</tr>
</tbody>
</table>

The results from the propensity score model were used to match 8,861 HCV patients with 8,861 non-HCV patients. The matched HCV and non-HCV patients did not differ significantly on any pre-index characteristics including demographic characteristics, health insurance coverage, prior use of services, health care cost, prescription drug profile or co-morbidity profile (data not presented).

Figure 1: Association between Age and the Presence of a reported HCV diagnosis in the general population

Figure 2: Co-Morbidities Associated with a Reported HCV Diagnosis in the general population

Figure 3: Other Patient Characteristics Associated with a Reported HCV Diagnosis in the General Population

Table 2: Other Patient Characteristics Associated with a Reported HCV Diagnosis in the General Population

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Odds Ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>1.2</td>
<td>1.1-1.3</td>
</tr>
<tr>
<td>West vs. South</td>
<td>1.3</td>
<td>1.2-1.4</td>
</tr>
<tr>
<td>MD visits</td>
<td>1.1</td>
<td>1.0-1.2</td>
</tr>
<tr>
<td>Hospitalization</td>
<td>1.1</td>
<td>1.0-1.2</td>
</tr>
</tbody>
</table>

Figure 4: Count of Adverse Events in First Post-Index Year

Figure 5: Incrmental Effect of HCV on Event Risk

Figure 6: Rate of Depression in First Post-Index Year

REFERENCES