Chronic hepatitis C virus (HCV) infection is associated with the reduced average annual rate of renal decline by half (SVR). Cure was defined as sustained viral response at 24 weeks (SVR-24) after interferon (IFN)-based therapy. No-SVR was a rare event, particularly in those with no cirrhosis and SVR (Table 2). The impact of HCV cure on renal progression is poorly understood.

Introduction

- Chronic hepatitis C virus (HCV) infection is associated with the development of chronic kidney disease (CKD).
- The impact of HCV cure on renal progression is poorly understood.
- We compared differences in the change in estimated glomerular filtration rate (eGFR) over time to time to end-stage renal disease (ESRD) by cure status. Cure was defined as sustained viral response at 24 weeks (SVR-24) after interferon (IFN)-based therapy.
- Definition of Baseline: The year prior to the start of therapy.
- Outcomes of Interest: a) Change in posttreatment eGFR (as per CKD-EPI definition); b) Time to 25% change in eGFR; c) Time to ESRD, defined as eGFR <15 mL/min/1.73 m\(^2\) at least 3 months apart, dialysis, or kidney transplant approval.

Methods

- Study Population: KPSC or KPMAS patients ≥18 years of age with incident HCV diagnosed from 1/1/2004 to 12/31/2014 and who had completed at least 4 weeks of IFN-based therapy (including boceprevir or telaprevir). Chronic HCV was defined by at least one of: positive HCV RNA, detectable HCV genotype, ≥2 refills of anti-HCV drugs within 1 year, or positive HCV antibody test plus ≥1 HCV-coded visit.
- Definition of SVR (exposure): Assessed at ≥24 weeks after termination of last therapy during the study period.
- Definition of Baseline: The year prior to the start of therapy.

Results

- Figure 1. The cohort

Table 1. Clinical and demographic characteristics of HCV patients prior to treatment

<table>
<thead>
<tr>
<th>Age in years, mean (SD)</th>
<th>Sex (female)</th>
<th>Race/Ethnicity</th>
<th>Comorbid Conditions</th>
<th>HCV Viral Load</th>
<th>HCV Genotype</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>SVR</td>
<td>No-SVR</td>
<td>Total</td>
<td>SVR</td>
<td>No-SVR</td>
</tr>
<tr>
<td>(n=2,262)</td>
<td>(n=1,499)</td>
<td>(n=823)</td>
<td>(n=2,262)</td>
<td>(n=1,499)</td>
<td>(n=823)</td>
</tr>
<tr>
<td>51.67 (8.99)</td>
<td>50.73 (9.12)</td>
<td>53.26 (8.53)</td>
<td>930 (39.04)</td>
<td>588 (39.23)</td>
<td>342 (38.73)</td>
</tr>
</tbody>
</table>

Conclusions

- We note differential distribution of genotype, cirrhosis, diabetes, and race by SVR status (Table 1).
- The number of eGFR measurements was higher in non-SVR (mean=10.2) vs SVR (mean=6.0).
- The average length of follow-up was ~4 yr in both SVR and non-SVR.
- ESRD was a rare event, particularly in those with no cirrhosis and SVR (Table 3).

Limitations

- Results for the time to ESRD analysis may be unstable due to the small number of observed ESRD events (Table 3).
- A larger proportion of Blacks and those with cirrhosis were excluded from analysis due to missing SVR.
- However, we do not expect that missing Black and cirrhotic patients have worse outcomes than those included in the analysis and thus, do not expect bias from their exclusion.
- These results may not be generalizable to cure by IFN-free direct-acting antivirals.

Table 2. Adjusted hazard ratios for ESRD and 25% decline in eGFR by SVR status

<table>
<thead>
<tr>
<th>SVR (n=2,262)</th>
<th>All</th>
<th>Cirrhosis</th>
<th>No Cirrhosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESRD (n=3,806)</td>
<td>0.13 (0.03, 0.56)</td>
<td>0.21 (0.03, 1.40)</td>
<td>No Estimate*</td>
</tr>
<tr>
<td>25% Decline (n=1,247)</td>
<td>0.85 (0.70, 1.05)</td>
<td>0.53 (0.37, 0.77)</td>
<td>1.14 (0.88, 1.48)</td>
</tr>
</tbody>
</table>

*No estimate because 0 events observed in SVR group with no cirrhosis in adjusted analysis.

Table 3. Number and percent of patients with 25% eGFR decline or ESRD events by SVR status

<table>
<thead>
<tr>
<th>SVR (n=2,262)</th>
<th>All</th>
<th>Cirrhosis</th>
<th>No Cirrhosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESRD (n=3,806)</td>
<td>3 (0.2%)</td>
<td>3 (1.1%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>25% Decline (n=1,247)</td>
<td>19 (2.4%)</td>
<td>9 (3.1%)</td>
<td>10 (2.9%)</td>
</tr>
</tbody>
</table>

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Conflicts of interest: JA Arduino is an employee and stockholder of Merck & Co., Inc.

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Impact of Hepatitis C Viral Cure on Progression of Renal Disease

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