The Burden of Cardiovascular Disease and Mortality Across a Spectrum Of Non-Alcoholic Fatty Liver Disease: A 14-year Follow-up Population Study of 929,465 Individuals

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Introduction

- ACALM study group
  - Dr Rahul Potluri

- NIHR Centre for Liver Research
  - Professor Phil Newsome

- No conflicts of interest to declare
Background

- Non-alcoholic fatty liver disease (‘fatty liver’) is a risk factor for cardiovascular disease (CVD)

- Greater risk with more advanced fatty liver?
Aims and Objectives

• From routinely collected data:
  • What is the burden of cardiovascular disease across spectrum of fatty liver?
  • What is the mortality across the spectrum of fatty liver?
Methodology

• Anonymous routinely collected data from several hospitals in England 2000-2013

• Population = 929,465 patients

• ICD-10 codes identify diagnoses:
  • NAFLD
  • NASH (non-alcoholic steatohepatitis)
  • Cryptogenic cirrhosis
    • Assumed to be predominantly NAFLD-cirrhosis
  • Cardiovascular co-morbidities
### Results

<table>
<thead>
<tr>
<th>Clinical outcome</th>
<th>NAFLD (n=1,294)</th>
<th>NASH (n=122)</th>
<th>Cirrhosis (n=1,285)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congestive Cardiac Failure</td>
<td>49 (3.8)</td>
<td>11 (9.0)‡</td>
<td>85 (6.6)*</td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>64 (4.9)</td>
<td>10 (8.2)</td>
<td>107 (8.3)**</td>
</tr>
<tr>
<td>Type 2 Diabetes</td>
<td>271 (20.9)</td>
<td>30 (24.6)</td>
<td>401 (31.2)**</td>
</tr>
<tr>
<td>Chronic Kidney Disease</td>
<td>40 (3.1)</td>
<td>6 (4.9)</td>
<td>89 (6.9)**</td>
</tr>
<tr>
<td>Hyperlipidaemia</td>
<td>156 (12.1)</td>
<td>21 (17.2)</td>
<td>64 (5.0)**</td>
</tr>
<tr>
<td>Hypertension</td>
<td>381 (29.4)</td>
<td>42 (34.4)</td>
<td>351 (27.3)</td>
</tr>
<tr>
<td>Mortality</td>
<td>188 (14.5)</td>
<td>27 (22.1)†</td>
<td>682 (53.1)**</td>
</tr>
</tbody>
</table>

For NAFLD vs. NASH: †p<0.05, ‡p<0.01.
For NAFLD vs. cirrhosis: * p<0.001, **p<0.0001.
Results

Cumulative survival

Follow-up (years)

Rest of population
NAFLD
NASH
Cryptogenic (NAFLD) cirrhosis
Results

- NASH vs. NAFLD adjusted mortality HR 1.5 (CI 0.9-2.6)
- Cirrhosis vs. NAFLD adjusted mortality HR 5.1 (CI 4.3-6.0)
Conclusions and Limitations

• Largest UK study of this kind

• Increasing mortality and burden of CVD with increasing severity of NAFLD spectrum disease