ICD-10-AM codes for cirrhosis and related complications: key performance considerations for population and healthcare studies

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Introduction

The utility of International Classification of Diseases (ICD) codes for Health Department reporting and epidemiological research relies on the accuracy of clinical documentation and administrative coding.

This study of the Australian and New Zealand patient Health Information Database (ANZHID) explored the accuracy and limitations of individual and grouped ICD-10-AM codes to detect the presence of cirrhosis and key complications.

Methods

• ICD-10-AM codes in a random sample of 540 admitted patient encounters at a major Australian tertiary hospital were compared with data abstracted from patient’s medical records by four blinded clinicians.

• All public and private hospital admission data was obtained from the Queensland Hospital Admitted Patient Data Collection registry (QHPDC) between 1st July 2007 and 31st December 2016 for every patient who had at least one encounter during this time frame that contained an ICD-10-AM code.

• Proportion of encounters with ICD-10-AM codes the correctly identify patients without cirrhosis (or a complication)

• Sensitivity, positive predictive value (PPV), negative predictive value (NPV) and Cohen’s kappa coefficient (κ).

Definitions

• The NPV of ‘grouped cirrhosis’ codes (0.95) were good (κ ≥0.60); Table 1.

• The algorithm detected a large proportion of ‘unplanned liver-related’ encounters but only one-third of day admissions (Figure 1).

• The PPVs for ‘grouped cirrhosis’ codes (0.96), HCC (0.97), ascites (0.97) and ‘grouped varices’ (0.95) were good (κ ≥0.60); Table 2.

• For more information, the full paper is available at: https://bmjopengastro.bmj.com/content/7/1/e000485.long

Results

• Among the ‘validation cohort’, 82 patients had ≥1 admission.

• The PPVs for ‘grouped cirrhosis’ codes (0.96), HCC (0.97), ascites (0.97) and ‘grouped varices’ (0.95) were good (κ ≥0.60); Table 2.

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Discussion

Our data demonstrate the importance of using multiple ICD-10-AM codes to study the burden of cirrhosis in Australia, to avoid underestimation of prevalence, morbidity, mortality and resource utilisation.

We recommend adoption of specific codes for hepatitis vira hepatitis and spontaneous bacterial peritonitis, and improved clinician training about accurate clinical documentation.

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Table 1. Concordance between select ICD-10-AM codes for cirrhosis or cirrhosis related complications and medical chart review

<table>
<thead>
<tr>
<th>ICD-10-AM algorithm</th>
<th>n identified by algorithm</th>
<th>PPV</th>
<th>NPV</th>
<th>Kappa</th>
<th>Misclassification</th>
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<tr>
<td>0</td>
<td>578</td>
<td>0.85 (0.84-0.86)</td>
<td>0.85 (0.84-0.86)</td>
<td>0.85 (0.84-0.86)</td>
<td>0.85 (0.84-0.86)</td>
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<td>1</td>
<td>475</td>
<td>0.76 (0.75-0.77)</td>
<td>0.75 (0.74-0.76)</td>
<td>0.74 (0.73-0.75)</td>
<td>0.74 (0.73-0.75)</td>
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<tr>
<td>2</td>
<td>352</td>
<td>0.71 (0.70-0.72)</td>
<td>0.70 (0.69-0.71)</td>
<td>0.70 (0.69-0.71)</td>
<td>0.70 (0.69-0.71)</td>
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<tr>
<td>3</td>
<td>282</td>
<td>0.66 (0.65-0.67)</td>
<td>0.65 (0.64-0.66)</td>
<td>0.65 (0.64-0.66)</td>
<td>0.65 (0.64-0.66)</td>
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<tr>
<td>4</td>
<td>212</td>
<td>0.59 (0.58-0.60)</td>
<td>0.58 (0.57-0.59)</td>
<td>0.58 (0.57-0.59)</td>
<td>0.58 (0.57-0.59)</td>
</tr>
<tr>
<td>5</td>
<td>142</td>
<td>0.52 (0.51-0.53)</td>
<td>0.51 (0.50-0.52)</td>
<td>0.51 (0.50-0.52)</td>
<td>0.51 (0.50-0.52)</td>
</tr>
</tbody>
</table>

Table 2. Accuracy of combination ICD-10-AM codes to identify the presence of cirrhosis

Heatmap

Figure 1. Heatmap depicting prevalence and clustering of select ICD-10-AM codes in 116 unplanned liver-related encounters (A), 111 elective day admissions (B), and 94 ‘other’ encounters (C). Columns represent individual ICD-10-AM codes; horizontal axis shows the proportion of unplanned liver-related encounters included at least one of the following ICD-10-AM codes: alcoholic liver disease (K70), primary biliary cirrhosis (K74.7), secondary biliary cirrhosis (K74.6), alcoholic hepatitis (K74.5), alcoholic cirrhosis (K74.0) and chronic hepatitis (K74.1). Rows depict the proportion of unplanned liver-related encounters included at least one of the following ICD-10-AM codes: alcoholic liver disease (K70), primary biliary cirrhosis (K74.7), secondary biliary cirrhosis (K74.6), alcoholic hepatitis (K74.5), alcoholic cirrhosis (K74.0) and chronic hepatitis (K74.1).