Epidemiology of Cirrhosis in the United States

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Content

- Introduction
- Define: Cirrhosis
- Burden of liver disease
- Clinical diagnosis
- Risk prediction
- Classification: Baveno V
- Reversibility of cirrhosis
- Trends in transplantation
Cirrhosis: Definition

- Cirrhosis represents a late stage of progressive hepatic fibrosis characterized by distortion of the hepatic architecture and the formation of regenerative nodules.

Is there a change in cirrhosis related death rates?
### Causes of death in the US: 2009

<table>
<thead>
<tr>
<th>Rank</th>
<th>Cause of death (Based on the Tenth Revision, International Classification of Diseases, Second Edition, 2004) and State</th>
<th>Number</th>
<th>Percent of total deaths</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Diseases of heart (I00-I09,I10,I11,I13,I20-I51)</td>
<td>2,437,163</td>
<td>100.0</td>
<td>703.8</td>
</tr>
<tr>
<td>2</td>
<td>Malignant neoplasms (C00-C97)</td>
<td>596,413</td>
<td>24.6</td>
<td>195.2</td>
</tr>
<tr>
<td>3</td>
<td>Chronic lower respiratory diseases (J40-J47)</td>
<td>567,628</td>
<td>23.3</td>
<td>184.9</td>
</tr>
<tr>
<td>4</td>
<td>Cerebrovascular diseases (I60-I69)</td>
<td>137,953</td>
<td>5.6</td>
<td>44.7</td>
</tr>
<tr>
<td>5</td>
<td>Accidents (unintentional injuries) (V01-X59,Y85-Y86)</td>
<td>128,842</td>
<td>5.3</td>
<td>42.0</td>
</tr>
<tr>
<td>6</td>
<td>Alzheimer's disease (G30)</td>
<td>118,021</td>
<td>4.8</td>
<td>38.4</td>
</tr>
<tr>
<td>7</td>
<td>Diabetes mellitus (E10-E14)</td>
<td>79,003</td>
<td>3.2</td>
<td>25.7</td>
</tr>
<tr>
<td>8</td>
<td>Influenza and pneumonia (J09-J18)</td>
<td>68,795</td>
<td>2.8</td>
<td>22.4</td>
</tr>
<tr>
<td>9</td>
<td>Nephritis, nephrotic syndrome and nephrosis (N00-N07,N17-N19,N25-N27)</td>
<td>53,692</td>
<td>2.2</td>
<td>17.5</td>
</tr>
<tr>
<td>10</td>
<td>Intentional self-harm (suicide) (*U03,X60-X84,Y87.0)</td>
<td>48,835</td>
<td>2.0</td>
<td>15.9</td>
</tr>
<tr>
<td>11</td>
<td>Septicemia (A40-A41)</td>
<td>39,809</td>
<td>1.5</td>
<td>12.0</td>
</tr>
<tr>
<td>12</td>
<td>Chronic liver disease and cirrhosis (K70,K73-K74)</td>
<td>30,568</td>
<td>1.3</td>
<td>10.0</td>
</tr>
</tbody>
</table>

Death rate up by 3%
Overall dropping down from 11 to 12 as cause of death

NCHS/CDC/2009 data

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**Is there a difference in cirrhosis-related death rates within United States?**
Geographic variability in cirrhosis deaths

1. New Mexico: 2.4% (18.4 per 100000) – 9th
2. California: 1.8% (11.6 per 100000) – 9th
3. Oregon: 1.6% (13.3 per 100000) – 9th
4. Washington: 1.6% (11.3 per 100000) – 9th
5. Texas: 1.7% (11.3 per 100000) – 11th

US rate is 1.3%

NCHS/CDC/2009 data

Major trends in liver-related death rates
Death rates due to hepatitis C

Death rates due to hepatitis B

Everhart et al. Gastro 2009
Trends in HBV-associated liver transplants in the US

Rising incidence of HCC

Everhart et al. Gastro 2009
How good are we in diagnosing cirrhosis clinically?

Increase the likelihood of diagnosing cirrhosis

<table>
<thead>
<tr>
<th>Clinical finding/parameter</th>
<th>Likelihood of cirrhosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ascites</td>
<td>LR, 7.2 (95% CI, 2.9-12)</td>
</tr>
<tr>
<td>Platelet count &lt;160K/μL</td>
<td>LR, 6.3 (95% CI, 4.3-8.3)</td>
</tr>
<tr>
<td>Spider nevi</td>
<td>LR, 4.3 (95% CI 2.4-6.2)</td>
</tr>
</tbody>
</table>

Udel et al. JAMA. 2012;307(8):832-842
Lab parameters help rule in or out cirrhosis

Three most reliable predictors for excluding cirrhosis

- **Lok index <0.2 (Plts, AST/ALT, INR)**
- **Platelet count ≥ 160 K**
- **Absence of hepatomegaly**

The overall impression of the clinician was not as informative as the individual findings or laboratory combinations.
Are all cirrhotics equal?

Natural history of compensated cirrhosis

213 compensated patients

- 10 patients died
- 12 patients transplanted
- 129 patients alive

62 decompensated patients
- 46 (74%) ascites
- 6 (10%) varical bleeding
- 17 (27%) hepatic encephalopathy

Ripoll et al. Gastro 2007
Can we predict who is at risk of decompensation?

MELD and risk of decompensation

| MELD <10 | At risk | 154 | 145 | 129 | 116 | 91 | 71 | 26 |
| Events | 0 | 3 | 12 | 17 | 22 | 24 | 33 |
| MELD ≥ 10 | At risk | 54 | 46 | 41 | 36 | 30 | 22 | 9 |
| Events | 0 | 7 | 12 | 16 | 20 | 21 | 24 |
HVPG and risk of decompensation

Emerging staging system of cirrhosis
Baveno V: Classification of cirrhosis

Can we reverse cirrhosis?
<table>
<thead>
<tr>
<th>Etiologies with longstanding proof of reversibility with treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Hemochromatosis (1970): Phlebotomy</td>
</tr>
<tr>
<td>• AIH (1986, 1997): Steroids</td>
</tr>
<tr>
<td>• PBC (1997): Ursodeoxycholic acid</td>
</tr>
<tr>
<td>• Alcoholic cirrhosis (1980): Abstinence</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hepatitis B cirrhosis: reversal with treatment</th>
</tr>
</thead>
<tbody>
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<td>• TDF treatment over 5 years led to reversal of cirrhosis in 74% of patients with cirrhosis at baseline</td>
</tr>
<tr>
<td>• Predictors of regression:</td>
</tr>
</tbody>
</table>
  – Lower BMI  |
  – Absence of diabetes  |

Afdhal et al. EASL 2012
HCV cirrhosis: Reversal with treatment

Overall impact, and changing tides
Leading indications for liver transplant

NASH would be leading indication of LT

Summary

- Cirrhosis remains an important cause of mortality
- Geographic variability
- Risk prediction is possible
- Baveno V classification
- HCC is rising
- Treatment can reverse cirrhosis
- Decline of HCV, and HBV cirrhosis due to improved treatment
- Exponential increase in NASH cirrhosis
Thank you

Pathologic classification of cirrhosis

- Micronodular
  - < 3 mm
  - Alcohol, hemochromatosis, cholestatic causes of cirrhosis, and hepatic venous outflow obstruction
- Macronodular
  - > 3 mm
  - Viral hepatits
- Mixed