Risk of motor vehicle accidents in patients with an implantable cardioverter defibrillator

– a Danish nationwide study

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Declaration of Interest

Nothing to declare.

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Background

- Implantable Cardioverter Defibrillator (ICDs) are used to prevent sudden cardiac death
  - Primary prevention
  - Secondary prevention

Consensus statement of the European Heart Rhythm Association: updated recommendations for driving by patients with implantable cardioverter defibrillators

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www.ascardio.org
Purpose and key points about methods

*Investigate the risk of motor vehicle accidents following ICD implantation in a nationwide cohort of ICD patients compared to age and sex matched controls*

**Methods:**
- Retrospective cohort study
- Nationwide Danish registers
- Study period: 2008 – mid 2012
- All first ICD implantations
- Control population:
  - 2:1 match on sex and age
- Primary endpoint:
  - Fatal and non-fatal motor vehicle accidents
## Results

<table>
<thead>
<tr>
<th>Baseline characteristics</th>
<th>Controls (N=9748)</th>
<th>ICD (N=4874)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, median [IQR]</td>
<td>66 [58, 73]</td>
<td>66 [58, 73]</td>
</tr>
<tr>
<td>Male, n (%)</td>
<td>7782 (79.8)</td>
<td>3891 (79.8)</td>
</tr>
</tbody>
</table>

### Cardiovascular disease*
- Ischemic heart disease: 1094 (11.2) vs 3784 (77.6)
- Heart failure: 290 (3.0) vs 3773 (77.4)
- Atrial fibrillation/flutter: 367 (3.8) vs 1198 (24.6)
- Vascular disease: 864 (8.9) vs 1041 (21.4)

### Cardiovascular pharmacotherapy*
- Betablockers: 1240 (12.7) vs 4155 (85.2)
- Antiarrhythmics: 49 (0.5) vs 602 (12.4)
- ACE/ARB: 2351 (24.1) vs 3943 (80.9)
- Diuretics: 1471 (15.1) vs 3247 (66.6)

### Non-cardiovascular comorbidities*
- Diabetes: 817 (8.4) vs 1018 (20.9)
- Chronic kidney disease: 64 (0.7) vs 184 (3.8)
- Chronic obstructive pulmonary disease: 827 (8.5) vs 834 (17.1)
- Alcohol abuse: 172 (1.8) vs 137 (2.8)
- Anxiolytics: 773 (7.9) vs 884 (18.1)

*All p-values < 0.001

- No fatal motor vehicle accidents in the ICD-population
Results

Cumulative incidence of motor vehicle accidents in ICD patients and matched controls from 2008-2012

<table>
<thead>
<tr>
<th>Number of patients</th>
<th>Years after implant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controls 9748 (0.0)</td>
<td>0 8222 (0.6) 5771 (1.4) 3572 (2.1) 1657 (2.6)</td>
</tr>
<tr>
<td>Primary 2568 (0.0)</td>
<td>1 1988 (1.0) 1282 (1.9) 737 (2.3) 276 (3.8)</td>
</tr>
<tr>
<td>Secondary 2306 (0.0)</td>
<td>2 1823 (1.4) 1244 (2.3) 707 (3.4) 334 (4.6)</td>
</tr>
</tbody>
</table>

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## Results

### Hazard ratio for motor vehicle accidents

<table>
<thead>
<tr>
<th>Group</th>
<th>Events (%)</th>
<th>HR (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controls</td>
<td>166 (1.7%)</td>
<td>ref</td>
<td>ref</td>
</tr>
<tr>
<td>Total iCD</td>
<td>114 (2.3%)</td>
<td>1.51 (1.19-1.91)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Primary prevention</td>
<td>53 (2.1%)</td>
<td>1.48 (1.01-2.19)</td>
<td>0.039</td>
</tr>
<tr>
<td>Secondary prevention</td>
<td>61 (2.7%)</td>
<td>1.55 (1.10-2.19)</td>
<td>0.013</td>
</tr>
</tbody>
</table>

Multiple Cox proportional hazard model
*Stratified by match (age and sex) with adjustment for alcohol abuse*
Conclusions

In a nationwide cohort of ICD-patients we found:

- a 51% increased risk of motor vehicle accidents compared with an age and gender matched control population

- no significant risk difference between primary and secondary prevention ICD-patients

Thank you for your attention!

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