Poor health status in implantable cardioverter defibrillator patients: Shock, patient pre implantation personality, or both as culprits?

Susanne S. Pedersen, Professor of Cardiac Psychology
Declaration of interest

Moderate consultancy and speaker’s fees from:

• Cameron Health BV
• Medtronic
• Sanofi-Aventis
• St. Jude Medical
Affiliations

Prof.dr. Susanne S. Pedersen

- CoRPS - Center of Research on Psychology in Somatic diseases, Tilburg University, The Netherlands
- Thoraxcenter, Erasmus Medical Center, Rotterdam, The Netherlands
- Department of Cardiology, Odense University Hospital, Denmark

Phone: + 31 (0) 13 466 2503
E-mail: s.s.pedersen@uvt.nl

www.tilburguniversity.nl/corps
ICD shock: A critical event to patients

- Used as primary and secondary prevention of sudden cardiac death
- ICD is superior to anti-arrhythmic drugs in saving lives
- The ICD can shock with up to 700-800 volts
- “It’s like getting kicked in the chest by a big horse!”

Ahmad et al. PACE 2000;23:931-3
Sears et al. Pacing Clinical Electrophysiol 2010; 33:1437-41
Intra-individual changes in psychological functioning between pre implantation and 12 months stratified by ICD shock*

N = 308

Explained variance in changes:
ICD concerns: 5.1%
Anxiety: 3.1%
Depression: 3.5%

* A positive mean score change indicates improvement in psychological functioning
Predictors of quality of life (8 months)

<table>
<thead>
<tr>
<th></th>
<th>Age, LVEF</th>
<th>Psychological variables*</th>
<th>Shocks</th>
<th>Total variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>General health</td>
<td>21.2%</td>
<td>39.9%</td>
<td>3.5%</td>
<td>64.5%</td>
</tr>
<tr>
<td>Mental health</td>
<td>13.7%</td>
<td>27.4%</td>
<td>0.7%</td>
<td>41.8%</td>
</tr>
<tr>
<td>Physical health</td>
<td>23.4%</td>
<td>24.1%</td>
<td>7.3%</td>
<td>54.8%</td>
</tr>
</tbody>
</table>

* Social support, optimism, depression, anxiety

N = 88
Prevalence of anxiety and depression in patients stratified by Type D and shocks

N = 182

Predictors of persistent depression

Figure 1.

- Shocks during follow-up
- High levels of ICD concerns
- Type D personality
- Smoking
- Diabetes
- Atrial fibrillation
- NYHA III-IV
- Heart failure
- Ischemic etiology
- LVEF ≥35%
- QRS >120 msec
- CRT-D
- Primary prevention indication
- Low education
- No partner
- Age >65
- Men

N = 386

HR: 2.60 [95% CI: 2.44-1.71]
HR: 8.30 [95% CI: 4.42-15.58]
HR: 2.09 [95% CI: 1.01-4.29]
HR: 2.47 [95% CI: 1.36-4.48]
HR: 2.29 [95% CI: 1.26-4.15]
HR: 1.92 [95% CI: 1.05-3.52]
VIEWPOINTS

Shock as a Determinant of Poor Patient-Centered Outcomes in Implantable Cardioverter Defibrillator Patients: Is There More to It Than Meets the Eye?

SUSANNE S. PEDERSEN, Ph.D.,*,† KRISTA C. VAN DEN BROEK, Ph.D.,* MARTHA VAN DEN BERG, M.Sc.,* and DOMINIC A. M. J. THEUNS, Ph.D.†

From *CoRPS – Center of Research on Psychology in Somatic diseases, Tilburg University, Tilburg, The Netherlands; and †Department of Cardiology, Thoraxcenter, Erasmus Medical Center, Rotterdam, The Netherlands.

Given that programming of the ICD is changing, leading to fewer shocks and improved quality of life, it may be timely to also examine the influence of other determinants (e.g. heart failure progression and personality) of patient-reported outcomes...

to be able to draw firm conclusions about the impact of ICD shocks on individual patients. We also need to acknowledge that the impact of shocks on psychological functioning and quality of life may not be as straightforward as previously assumed. Given that programming of the ICD is changing, leading to fewer shocks and improved quality of life, it may be timely to also examine the influence of other determinants (e.g., heart failure progression and the patient’s psychological profile) of patient-centered outcomes both in research and in clinical practice. (PACE 2010; 33:1430–1436)
To compare the influence of shock and the patient’s pre implantation personality on health status, using a prospective study design.
Methods: Participants

- Consecutive patients (N=383; 79% men; mean age = 57.7 ± 12.0) with a first-time ICD or CRT-D
- Implanted between August 2003 to March 2010 in the Erasmus Medical Center, Rotterdam
- Participating in Mood and personality as precipitants of arrhythmia in patients with an Implantable cardioverter Defibrillator: A prospective Study (MIDAS)
Methods: Design and measures

- **Prospective 12-months** follow-up study
- **Demographic and clinical characteristics** (incl. device therapy) obtained from medical **chart abstraction** and purpose-designed questions
- **Patients completed:**
  - Type D Scale (DS14) at baseline – **Type D personality**
  - Short Form Health Survey (SF) 36 at baseline, 3-, 6-, and 12 months post implant – **Health status**
- **Statistical analysis:** Generalized linear mixed modeling
Results

- **23.5%** had a **Type D personality**
- **13.8%** experienced a **shock** during the **12-month** follow-up period
  - 10.7% an **appropriate** shock
  - 3.9% an **inappropriate** shock

**Analyses:** any shock
Health status stratified by shock

Legend
- No shock during follow-up (n = 330)
- Shock(s) during follow-up (n = 53)
Health status stratified by Type D

- Physical functioning
- Role functioning - physical
- Bodily pain
- Social functioning
- Mental health
- Role functioning - emotional
- Vitality
- General health perceptions

Legend:
- Non-Type D personality
- Type D personality
Health status stratified by Type D and shock

Legend:
- Shock & Type D (n = 14)
- Shock & non-Type D (n = 39)
- No shock & Type D (n = 76)
- No shock & non-Type D (n = 254)
Independent predictors of health status at 12 months*

<table>
<thead>
<tr>
<th></th>
<th>Shock: 4/8 domains – ↓ 4.79 to 13.30 points</th>
<th>Type D personality: 6/8 domains – ↓ 3.10 to 8.02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical functioning</td>
<td>ns</td>
<td>-4.42 (-8.65 – 0.19)</td>
</tr>
<tr>
<td>Role functioning - physical</td>
<td>-3.30 (-22.78 – -3.82)</td>
<td>-8.02 (-15.51 – -0.54)</td>
</tr>
<tr>
<td>Bodily pain</td>
<td>ns</td>
<td>-4.04 (-8.04 – -0.04)</td>
</tr>
<tr>
<td>Social functioning</td>
<td>-6.74 (-12.05 – -1.42)</td>
<td>-6.21 (-10.40 – -2.01)</td>
</tr>
<tr>
<td>Mental health</td>
<td>-5.27 (-8.84 – -1.71)</td>
<td>-3.10 (-6.02 – -0.35)</td>
</tr>
<tr>
<td>Role functioning – emotional</td>
<td>ns</td>
<td>-6.75 (-13.16 – -0.35)</td>
</tr>
<tr>
<td>Vitality</td>
<td>-4.79 (-9.02 – -0.54)</td>
<td>ns</td>
</tr>
<tr>
<td>General health perceptions</td>
<td>ns</td>
<td>ns</td>
</tr>
</tbody>
</table>

* Adjusted for gender, age, marital status, education, ICD indication, CRT, CAD, atrial fibrillation, diabetes, smoking, amiodarone, beta-blockers, psychotropic medication, and baseline health status
Take home message

- **ICD shock** (4/8 sub domains) and **Type D personality** (6/8 sub domains) were independent predictors of poor health status.

- Given **reduction in incidence of shocks**, **time to expand our focus** to other factors in clinical practice to **identify patients at risk of poor health status and well being**.
Acknowledgements

FUNDING
• VENI (451-05-001) from the Netherlands Organisation for Scientific Research (NWO)
• VIDI grant (91710393) from the Netherlands Organisation for Health Research and Development (ZonMw)

CO-AUTHORS
• Fetene B Tekle (PhD) – Department of Methodology and Statistics, Tilburg University, NL
• Madelein T Hoogwegt (MSc) – Department of Medical Psychology, Tilburg University, NL
• Luc Jordaens (MD, PhD) – Department of Cardiology, Thoraxcenter, Erasmus Medical Center, NL
• Dominic AMJ Theuns (PhD) - Department of Cardiology, Thoraxcenter, Erasmus Medical Center, NL