VIEWPOINT

Gender Disparities in Psychological Distress and Quality of Life among Patients with an Implantable Cardioverter Defibrillator

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A subset of patients with an implantable cardioverter defibrillator (ICD) reports psychological distress and poor quality of life (QoL). Gender is one of the factors that has been proposed to explain individual differences in these outcomes. In this viewpoint, we (1) review the evidence for gender disparities in psychological distress and QoL in ICD patients by means of a systematic review, and (2) provide recommendations for future research and clinical implications. A systematic search of the literature identified 18 studies with a sample size ≥ 100 that examined gender disparities in anxiety/depression and QoL in ICD patients (mean prevalence of women = 21%; mean age = 62 years). Our review shows that there is insufficient evidence to conclude that gender per se is a major autonomous predictor for disparities in psychological distress and QoL in ICD patients. Women had a higher prevalence of anxiety and poorer QoL in some studies, but there was no statistically significant gender effect in relation to 80% (26/32) of the outcomes reported in the 18 studies. Studies are warranted that are designed a priori and sufficiently powered to examine gender disparities in distress and QoL outcomes in order to establish the exact gender-specific effect. Due to a need to explore the complexity of this issue further, at this time, caution is warranted with respect to the clinical implications. (PACE 2011; 34:798–803)

anxiety, depression, quality of life, gender disparities, implantable cardioverter defibrillator

Gender, Psychological Distress, and Quality of Life (QoL)

Implantable cardioverter defibrillator (ICD) therapy is generally well accepted by the majority of patients.1,2 However, a subset of patients experience clinical levels of anxiety and depression, with prevalence rates of 25–33% being reported in the literature.3 In turn, the presence of psychological distress, such as anxiety,4,5 posttraumatic stress,6 depression,7 anger,8 the clustering of Type D personality with anxiety,9 and high levels of preimplantation ICD concerns10 increase the risk of tachyarrhythmias and mortality. Hence, there is an ongoing quest to gain a better understanding of characteristics that differentiate patients at risk of psychological distress from patients with no risk, in order to optimize the clinical care of ICD patients.

Symptomatic heart failure,11 ICD shocks,12 younger age,13,14 lack of optimism,15 and Type D personality9,16 comprise some of the factors that have been identified as determinants of psychological distress and poor QoL in ICD patients. There is also an increasing interest in the influence of gender on outcomes in ICD patients, as the general cardiovascular literature and epidemiological studies indicate that women may experience more symptoms of psychological distress compared to men.17–19

Why Might Women with an ICD Experience More Symptoms of Psychological Distress and a Poorer QoL than Men?

There are several reasons why it would be reasonable to expect psychological distress and poor QoL to be more prevalent in women with an ICD than men. Following myocardial infarction, stent implantation, or congestive heart failure, the prevalence of anxiety and depression has been found to be higher in women than in men.20–23 This difference in the prevalence

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of psychological distress might be attributed to gender differences in susceptibility to concerns about body image, shifts in role responsibilities, and changes in physical functioning, but also to differences in somatosensory amplification. Somatosensory amplification refers to a greater awareness of and attention to weak or diffuse bodily sensations, which can result in the tendency to perceive normal somatic sensations as unusually intense. In relation to physical functioning, it is possible that women experience more pain and limitations in daily activities than men post ICD implantation because of the sensitivity of breast tissue and women’s tendency to intensively use their arms to perform daily activities as a family caretaker.

In addition, women’s body and self-image and role identity, which are incorporated in cultural gender expectations and are heavily influenced by media and social aspects of beauty and femininity, may be altered negatively due to the ICD implantation. In turn, this may lead to increased psychological distress, and influence satisfaction with treatment and device acceptance, and may play even a larger role than gender per se. These cultural gender expectations may explain why women score higher on body awareness than men, resulting in greater concerns about how the ICD site and scar makes them feel about their body, how clothes fit, and about wearing a bathing suit.

The general way of socialization, communication, and dealing with stressful situations may also differ between women and men. As reported by Barsky et al., the socialization process, which begins in earliest childhood, may profoundly influence the willingness to disclose and communicate distress. Boys are taught to be less expressive about illness and discomfort, to be more stoical, and to use more denial, resulting in the fact that it may be more socially acceptable for women to openly acknowledge distress and pain than for men. As a result, while men tend to revert to a “fight or flight” response to stress, women seem to display a “tend and befriend” response with the objective of eliciting social support from their network. Consequently, women are more likely to suffer from ICD-related distress in the absence of appropriate support and care compared to men.

Hence, several calls have been made in the device literature for intensified research on gender disparities in psychological distress and QoL in ICD patients. Recommendations have also been put forward advocating careful monitoring of female ICD patients, and the initiation of treatment with cognitive behavioral therapy specifically targeted to women and their gender-specific issues, as reflected in the following quotes:

(1) “Further research on gender differences and other variables such as age and comorbidity variables that might affect symptoms, health status, recovery, learning, and coping behavior after ICD implantation would provide important directions for evidence-based care of ICD patients.”

(2) “In clinical practice, female ICD patients should be closely monitored, and if warranted offered psychosocial intervention to avoid increasing the risk of arrhythmic events associated with increased anxiety. Further studies are warranted that examine the influence of gender and age on psychological distress, ICD concerns, and device acceptance, including analyses that are stratified for gender, as inconsistent findings in the literature may be attributable to methodological issues.”

(3) “The lack of research in the female adjustments to the ICD represents the absence of innovation in the area of comprehensive care for women.”

(4) “Only with appropriate facilitative care can female ICD patients return to previous levels of physical and psychological functioning.”

However, since some, but not all, studies find support for gender disparities in psychological distress and QoL among ICD patients, there is an urgent need to evaluate this evidence systematically and critically.

What Is the Evidence for a Link between Psychological Morbidity and Gender in ICD Patients?

PubMed was searched in the period from January 1980 to October 2010, using a combination of the following search terms: Implantable cardioverter defibrillator, anxiety, depression, quality of life, and health-related quality of life. The minimum sample size was set at N = 100 to ensure the inclusion of sufficiently powered studies. We identified 18 articles (sample sizes N = 100–645; mean prevalence of women = 21%; mean age = 62 years), which coincided with our inclusion criteria from a total of 678 candidate articles, four of which were found by hand searching references. The studies are presented in Table I. In total, 32 outcomes were investigated in the 18 studies.

Anxiety and Depression

In total 13 of 18 studies examined gender disparities in relation to anxiety.
Table I.
Overview of Studies Examining Gender Disparities in Psychological Distress and Quality of Life in ICD Patients Listed Chronologically According to Year of Publication

<table>
<thead>
<tr>
<th>Author</th>
<th>Study Design</th>
<th>N</th>
<th>% Women (N)</th>
<th>Endpoint</th>
<th>Impact of Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>De Groot et al. * (2003)⁴⁰</td>
<td>C</td>
<td>219</td>
<td>19.0 (42)</td>
<td>Anxiety (G), depression (G)</td>
<td>–</td>
</tr>
<tr>
<td>Pedersen et al. (2004)¹⁶</td>
<td>C</td>
<td>182</td>
<td>19.0 (35)</td>
<td>Anxiety (G), depression (G)</td>
<td>–</td>
</tr>
<tr>
<td>Whang et al. (2005)⁷</td>
<td>C</td>
<td>645</td>
<td>18.3 (118)</td>
<td>Depression (G)</td>
<td>+</td>
</tr>
<tr>
<td>Luyster et al. * (2006)³⁸</td>
<td>C</td>
<td>100</td>
<td>19.0 (19)</td>
<td>Anxiety (G), depression (G)</td>
<td>–</td>
</tr>
<tr>
<td>Dickerson et al. ** (2006)⁴¹</td>
<td>C</td>
<td>112</td>
<td>21.0 (24)</td>
<td>Quality of life (D)</td>
<td>–</td>
</tr>
<tr>
<td>Smith et al. ** (2006)⁴⁴</td>
<td>C</td>
<td>240</td>
<td>25.0 (60)</td>
<td>Anxiety (G), depression (G), Quality of life (G)</td>
<td>+ (FS)³</td>
</tr>
<tr>
<td>Passman et al. * (2007)⁴⁶</td>
<td>P</td>
<td>453</td>
<td>29.0 (130)</td>
<td>Quality of life (G/D)</td>
<td>–</td>
</tr>
<tr>
<td>Beery et al. (2007)²⁹</td>
<td>C</td>
<td>174</td>
<td>26.4 (46)</td>
<td>Anxiety (D), depression (G)</td>
<td>–</td>
</tr>
<tr>
<td>Piotrowicz et al. * (2007)³⁷</td>
<td>RCT</td>
<td>638</td>
<td>26.0 (168)</td>
<td>Quality of Life (G)</td>
<td>+</td>
</tr>
<tr>
<td>Pedersen et al. * (2008)⁴⁵</td>
<td>P</td>
<td>176</td>
<td>19.3 (34)</td>
<td>Anxiety (G), depression (G)</td>
<td>–</td>
</tr>
<tr>
<td>Van en Broek et al. * (2009)⁹,⁵⁴</td>
<td>P</td>
<td>165</td>
<td>12.7 (26)</td>
<td>Anxiety (G)</td>
<td>–</td>
</tr>
<tr>
<td>Spindler et al. (2009)¹¹,³⁵,⁵⁵</td>
<td>C</td>
<td>535</td>
<td>18.1 (97)</td>
<td>Anxiety (G), depression (G), Quality of life (D)</td>
<td>++ (PF, SF, MH)⁶</td>
</tr>
<tr>
<td>Dunbar et al. * (2009)⁴⁴</td>
<td>RCT</td>
<td>246</td>
<td>27.0 (69)</td>
<td>Anxiety (G), depression (G), Quality of life (D)</td>
<td>++ (FS)⁵</td>
</tr>
<tr>
<td>Noyes et al. * (2009)³⁹</td>
<td>P</td>
<td>983</td>
<td>17.0 (168)</td>
<td>Quality of Life (G)</td>
<td>–</td>
</tr>
<tr>
<td>Versteeg et al. (2010)²⁵</td>
<td>C</td>
<td>241</td>
<td>33.0 (90)</td>
<td>Anxiety (G)</td>
<td>–</td>
</tr>
<tr>
<td>Keren et al. * (2010)⁴³</td>
<td>C</td>
<td>416</td>
<td>15.0 (63)</td>
<td>Anxiety (G), depression (G)</td>
<td>–</td>
</tr>
<tr>
<td>Crössmann et al. * (2010)⁴²</td>
<td>P</td>
<td>119</td>
<td>14.0 (17)</td>
<td>Anxiety (G), depression (G), Quality of Life (G)</td>
<td>–</td>
</tr>
</tbody>
</table>

*Gender only used as covariate.
**Included by hand-search; ++ impact of gender (unadjusted analysis); ++ impact of gender (adjusted analysis); – no impact of gender (unadjusted analysis); – no impact of gender (adjusted analysis); ++– mixed results for impact of gender (unadjusted analysis); +++– mixed results for impact of gender (adjusted analysis).
³G = cross-sectional; P = prospective; RCT = randomized clinical trial; ²D = disease-specific instrument; G = generic instrument;
³FS = functional status (DASI); ⁴PF = physical functioning (SF-36); SF = social functioning (SF-36); MH = mental health (SF-36);
⁵merged data of two studies (MIDAS + independent cohort).

that women reported more anxiety than men, and that female gender was significantly associated with anxiety, independent of other clinical and sociodemographic variables.³⁵ Twelve studies did not find support for a statistically significant difference in anxiety stratified by gender. Five of these studies did show that women had higher levels of anxiety or scored higher on the anxiety (sub)scales, but these differences were not statistically significant.¹⁶,²⁵,²⁹,³⁴,⁴⁰ Of the 12 studies, seven included gender as a covariate in adjusted analysis rather than focusing on gender disparities as the primary objective of the study.³¹,³⁶,³⁸,³⁹,⁴²–⁴⁵

In total 10 of 18 studies investigated gender differences in depression.⁷,¹⁶,³⁴,³⁵,³⁶,⁴⁰,⁴²–⁴⁵ One
study found that gender varied significantly according to depression severity, and that patients with depression were more often women compared to patients without depression, although these results were based on univariate analysis.\textsuperscript{7} Results from the nine other studies showed no association between gender and depression.\textsuperscript{16,25,34,35,38,40,42–45}

### Quality of Life

In total, nine of 18 studies examined gender disparities in relation to QoL.\textsuperscript{29,34,35,37,38,41,52,44,46} Four studies found that women had poorer functional status, physical functioning, social functioning, and mental health compared to men.\textsuperscript{24,35,37,44} but two of these studies did not control for potential confounders.\textsuperscript{34,37} The other five studies did not find a significant association between QoL and gender.\textsuperscript{29,35,41,42,46}

Taken together, there was no statistically significant gender effect in relation to 80\% (26/32) of the outcomes reported in the 18 studies (Table I). Hence, there is no solid evidence to suggest a gender difference in patient-reported outcomes at this time.

### Limitations of the Studies

The potential limitations of the studies selected for this review merit some consideration. First, there was considerable methodological heterogeneity between the studies with respect to study design, timing of assessment of patient-reported outcomes since ICD implantation, and the instruments used (e.g., disease-specific versus generic) to assess these outcomes. Therefore, it was not possible to perform a meta-analysis of the results. Several studies were based on a convenience sample rather than designed \textit{a priori} to examine gender differences in patient-reported outcomes. Hence, the proportion of women in some of the studies was relatively small. However, by including only studies with a sample size >100 an attempt was made to constrain this limitation in the best possible way. Many of the studies used a cross-sectional study design that does not allow for the determination of cause and effect. The prospective studies were prone to suffer from attrition during follow-up, thereby losing statistical power to test the relationship between gender and psychological distress and QoL. In addition, several studies did not adjust statistically for potential confounders that may impinge on the relationship between gender and these outcomes.\textsuperscript{13,16}

### Where to Go from Here?

Given that studies examining gender disparities in psychological distress and QoL in ICD patients show inconsistent results, it seems too premature to conclude that gender per se comprises a risk factor for psychological distress and poor QoL in ICD patients. In part, the mixed findings may be attributed to the general absence of well-designed, large-scale studies set up and statistically powered \textit{a priori} to examine potential gender disparities in these outcomes, as proposed by others.\textsuperscript{34,35} Alternatively, it may not be gender per se that explains the higher prevalence of anxiety and poorer QoL in women found in some of the studies. As suggested by Lampert et al. and indicated in a previous section of this manuscript, there may be a multitude of reasons for these gender disparities including differences in clinical presentation or, in fact, in the experience of symptoms in the presence of similar clinical findings. But disparities could also be due to differences in cultural role expectations, socialization, and in the tendency to report symptoms.\textsuperscript{47}

As shown in two recent meta-analyses, women implanted with an ICD tend to be older and have a worse clinical status, as indicated by higher New York Heart Association (NYHA) functional class, poorer left ventricular ejection fraction, and more comorbidities than men. However, it has been established that women have a lower risk of experiencing ventricular tachyarrhythmias and sudden cardiac death, independent of any biological mechanisms.\textsuperscript{48} For example, the effect of sex-specific hormone interaction on the electrophysiology of the myocardium, differences in calcium handling, repolarization of potassium currents, and autonomic modulation are well documented.\textsuperscript{48,49} This decrease in overall rate of sudden cardiac death combined with an increased rate of other competing causes of death leads to the fact that women in general do not seem to derive the same survival benefits from ICD therapy as men.\textsuperscript{48,49} Taken together, it seems unlikely that differences in clinical presentation between male and female ICD patients can explain the gender disparities in patient-reported outcomes found in some studies. It is more like that the explanation has to be sought in a complex interaction between cultural, social, sociodemographic, personal, and a myriad of other factors that have not yet been fully examined.

Overall, carefulness in drawing conclusions about gender disparities in psychological distress and QoL, at least based on current evidence, seems warranted. Simultaneously, the mixed findings comprise a call to action with respect to intensifying research in this area, as has also been
proposed by others.\textsuperscript{28,34–36} In order to provide the best clinical care for ICD patients, the quest for risk factors for poor patient-reported outcomes, such as psychological distress and poor QoL, needs to adopt a more systematic and rigorous methodological approach. Information on factors that may serve as confounders on the relationship between gender and these outcomes, such as shocks, comorbidities, younger age, symptomatic heart failure,\textsuperscript{31} and the \textit{distressed} (Type D) personality,\textsuperscript{13,16,50} should also be gathered. This implies the need for studies with larger sample sizes (N > 200), including more female study participants, in order to have sufficient power to study gender disparities while taking into account potential confounders.

Only with more insight into these potentially competing determinants of poor patient-reported outcomes are we likely to further advance and optimize the care and management of ICD patients. For this end, delineating risk profiles for ICD patients, reckoning with demographic, clinical, and psychological factors, may be the way forward, thereby leaving the “one size fits all” approach behind.\textsuperscript{24,44,51,52} Initiation of tailored rehabilitation programs for various subpopulations, such as women, is the first crucial step in addressing psychological distress in ICD patients.\textsuperscript{24,53}

Conclusions

In conclusion, given current evidence, it seems premature to conclude that gender \textit{per se} is a major autonomous predictor for disparities in psychological distress and QoL among ICD patients. Although women seem to have a higher prevalence of anxiety and tend to report poorer physical and mental health, the exact influence of gender on these outcomes will remain elusive until we include determinants and mechanisms in our research efforts that may impinge on the relationship between gender and these outcomes. Hence, future research based on well-designed, large-scale studies need to investigate the contribution of each individual determinant and unravel the gender-specific complexity in relation to psychological distress and QoL. Studies on tailored cardiac interventions, with bundled intervention components, such as behavior change strategies, motivational interviewing, and sex-specific education,\textsuperscript{53} are currently paving the way for more optimal clinical care in the future, in which every patient can receive customized treatment.

References


GENDER DISPARITIES IN PSYCHOSOMATIC DISTRESS AND QUALITY OF LIFE


