Psychiatric Disorders and Quality of Life in Patients With Implantable Cardioverter Defibrillators: A Systematic Review

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ABSTRACT

Objective: To systematically review the literature with regard to psychiatric disorders and quality of life in patients with an implantable cardioverter defibrillator.

Data Sources: Research was conducted in 3 databases (ISI Web of Science, PubMed, and PsycINFO) using the terms *implantable*, *cardioverter*, *defibrillator*, *quality of life*, *psych**, *anxiety*, and *depression*.

Study Selection: The search yielded 1,399 references. Non-English and repeated references were excluded. After abstract analysis, 42 references were recovered for full-text reading, and 25 articles were selected for this review.

Data Extraction: Research took place in April 2012, and no time restriction was placed on any of the database searches. Review or theoretical articles were excluded, and only clinical trials and epidemiologic studies were selected for this review.

Results: A systematic review of the literature revealed mostly observational prospective cohort studies followed by cross-sectional observational studies and randomized clinical trials. Few studies included in the review were observational retrospective cohort or case-control studies. There are prominent signs and symptoms of anxiety and depression in patients with an implantable cardioverter defibrillator. Disorders include phobic anxiety, posttraumatic stress disorder, panic disorder, somatoform disorder, agoraphobia, and depression. Quality of life in the physical, social, and psychological domains is affected and is related to the intensity and the frequency of the device's electrical discharge.

Conclusions: Work regarding psychiatric comorbidity in patients with an implantable cardioverter defibrillator has shown that anxiety and depression are common. The patients and their families should be informed by their doctors that the presence of the device minimizes risk of sudden death and allows them to have a normal life.

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Arrhythmias are sudden changes in the regular rhythm of the heart that occur without warning, and tachyarrhythmias are those that present with a heart rate over 100 bpm.[1] Among the tachyarrhythmias, ventricular tachycardia and ventricular fibrillation are the most feared because they represent a break in the electrical and mechanical integrity of the heart, with the loss of pump function and high risk of sudden death. To have a cardioversion, ie, a return to normal rhythm, immediate intervention is required with antiarrhythmic drugs (chemical cardioversion) and defibrillation (cardioversion).[1–3]

Long term, the prevention of new arrhythmia outbreaks and sudden death can be achieved with antiarrhythmic drugs, surgical resection of the arrhythmogenic area, endocardial ablation by catheter, or installation of an implantable cardioverter defibrillator.[4,5] Since 1984, the implantable cardioverter defibrillator has been used in primary prevention of sudden death.[6] There is evidence that the device is an effective alternative to antiarrhythmic drugs to interrupt ventricular tachycardia and ventricular fibrillation, thus contributing to the reduction of sudden death and improving long-term survival.[4–6]

The implantable cardioverter defibrillator monitors the heart rate as a conventional pacemaker.[4] When ventricular tachycardia or ventricular fibrillation are detected, electrodes implanted in the heart muscle discharge an electric shock in accordance with a predetermined program and revert the arrhythmia.[1–4] The shock is very uncomfortable, but most patients tolerate discharges, mainly because they appreciate the severity of their condition and the security that the device provides.[1–6]

In spite of its function of saving lives, however, the implantable cardioverter defibrillator can cause negative emotional effects among patients. Studies have revealed signs and symptoms of depression and poor quality of life in 30% of patients with an implantable cardioverter defibrillator who are younger than 70 years.[7] Furthermore, the first shock sensations occur during moments of arrhythmia and cause anxiety among patients who experience the shock.[7–9]

This study aims to systematically review the scientific literature regarding the presence of psychiatric comorbidities and the quality of life in patients with an implantable cardioverter defibrillator.

METHOD

The literature review was conducted in 3 databases (ISI Web of Science, PubMed, and PsycINFO) using the terms *implantable*, *cardioverter*, *defibrillator*, *quality of life*, *psych**, *anxiety*, and *depression*.

The research took place in April 2012, and no time restriction was placed on any of the database searches. Review or theoretical articles were excluded, and only clinical trials and epidemiologic studies were selected.

RESULTS

A total of 1,399 references were found (720 in PubMed, 649 in ISI Web of Knowledge, and 30 in PsycINFO). From the total, 398 were duplicate references and 204 were not in English. The remaining 797 references

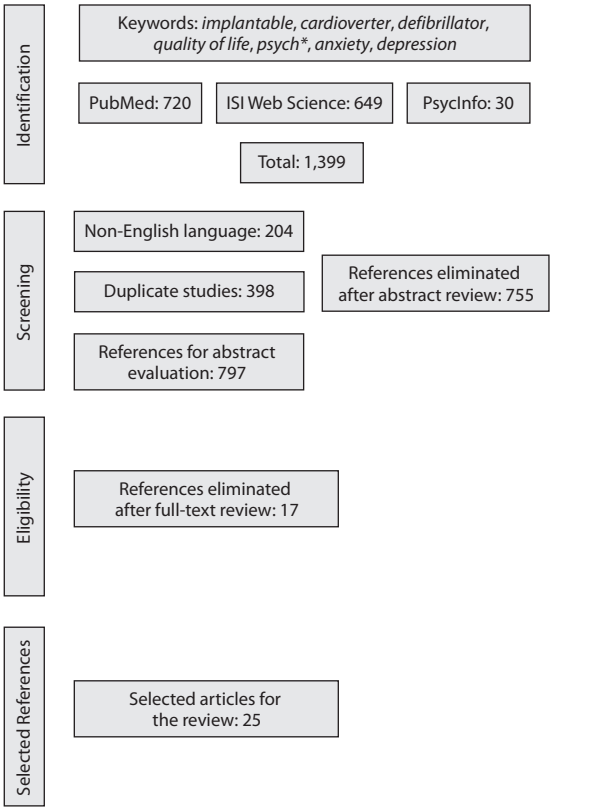
Clinical Points

- Implantable cardioverter defibrillators, while potentially effective for the prevention of sudden death, may have serious psychological effects for patients and their families.
- The frequency and intensity of shocks may promote anxiety and depression and may worsen depressive and anxiety disorders among those who already have them.
- New strategies should be developed to improve quality of life and minimize psychiatric disorders that can be triggered with the implant of a cardioverter defibrillator or the first shock.

underwent abstract analysis and 755 were excluded. Forty-two articles were recovered for full-text reading. After this process, only 25 met the inclusion criteria of articles that assessed the prevalence of psychiatric problems and/or quality of life in patients with an implantable cardioverter defibrillator. These articles included 8 cross-sectional observational studies, 2 retrospective cohort studies, 9 prospective cohort studies, 2 case-control studies, and 4 randomized clinical trials (Figure 1).

Among the articles that have been published since the first cardioverter defibrillator implant surgery, many studies have been conducted to evaluate the clinical effectiveness and reduction of sudden death among users.[9] Other research has been conducted to assess the psychiatric and emotional well-being of patients with a cardioverter defibrillator implant.[1–8] Data from the 25 studies found on the subject are shown in Table 1.

Figure 1. Results of the Systematic Review



Cross-Sectional Observational Studies

Ten cross-sectional observational studies were included. The first study was conducted in 1991 by Morris et al[10] 7 years after the first cardioverter defibrillator implantation. The authors examined a sample of 20 participants 3 to 21 months after cardioverter defibrillator implantation to identify the psychological impact of the intervention both in patients and in their relatives. The prevalence of psychiatric disorders in this population was 50%; 6 patients were behaviorally maladjusted and specifically phobic, 3 suffered from major depression, and 1 developed panic disorder. The patients and their relatives experienced adverse effects following the first shock scare during the postoperative period.[10]

In 2004, Godemann et al[11] investigated the prevalence of anxiety disorders in 90 patients with an implantable cardioverter defibrillator and found that 16.7% of these patients developed anxiety disorders after the impact of a shock. The prevalence of panic disorder with agoraphobia was higher in patients experiencing an electrical discharge more than 2 times a year than in patients with a single discharge annually (62% vs 10%, respectively, $P<.01$). The intensity of self-observation of their body was significantly related to the development of anxiety disorders ($P<.001$).[11] Two years later, Leosdottir et al[12] surveyed 76 patients with cardioverter defibrillator implants or pacemakers who were 40 to 70 years old and who completed the Hospital Anxiety and Depression Scale (HADS), Beck Anxiety Inventory, Beck Depression Inventory, and Medical Outcomes Study 36-item Short-Form Health Survey (SF-36) quality of life inventory. Forty-five patients had experienced a cardioverter defibrillator electrical discharge and 31 with a pacemaker had not. Both groups had increased symptoms of anxiety and depression. Patients with cardioverter defibrillators were as a group more fearful of death ($P=.056$) and showed more concerns about returning to work ($P=.072$). No significant difference in quality of life was noted between the 2 groups. Physical function, mental health, and social function improved with time in both treatment groups, and it was observed that the 45 patients who experienced a shock reported that they would like to be clinically followed in a group.[12]

In 2009, Jacq et al[13] evaluated 40 patients with implantable cardioverter defibrillators who also had comorbidities. They divided the patients into those who had experienced a shock from the device and those who had not. Using the Mini International Neuropsychiatric Interview, HADS, and SF-36, the researchers found that among those who had experienced a shock, 37.5% had anxiety disorder in contrast to 8% in the group who had not experienced a shock.[13] Prevalence of depressive disorders was higher in the group that had experienced a shock (50%) than in the group that had not (23%). Also, depressive symptom scores were higher in those who experienced a shock (4.75) than in those who did not (2.24; $P=.04$). But, the prevalence of depression and the depression scores were not significantly different. However,

Table 1. Published Studies of the Psychiatric Prevalence and Quality of Life in Patients With an Implantable Cardioverter Defibrillator

Author	No. of Participants	Study Type	Results
Morris et al, 1991[10]	20	Cross-sectional, observational	First study on psychiatric prevalence; 50% of patients with a cardioverter defibrillator implant exhibited some disorder; 6 had symptoms of specific phobia, 3 had major depression, and 1 had panic disorder
Crow et al, 1998[20]	35	Observational, prospective cohort	Interviews evaluated 35 patients 3 mo after cardioverter defibrillator implantation; some patients had alcohol abuse and comorbidities with mood disorders; 2 cases of depression were followed
Kuijpers et al, 2002[31]	5	Randomized, clinical trial	Of 5 patients with cardioverter defibrillator implants and panic disorder, agoraphobia, and depression, 4 improved after treatment with cognitive-behavioral therapy combined with selective serotonin reuptake inhibitors
Carroll et al, 2002[18]	70	Observational, retrospective cohort	The authors found that quality of life in patients with implantable cardioverter defibrillators is tightly linked to the physical, social, and emotional domains; the implantation of the device interferes directly as a stressor
Godemann et al, 2004[11]	90	Cross-sectional, observational	After cardioverter defibrillator implantation, 16.7% of patients were diagnosed with generalized anxiety disorder and 21% with panic disorder and agoraphobia; these results were twice as high as those in the general population
Godemann et al, 2004[21]	93	Observational, prospective cohort	Somatic symptoms were found in 30% of patients with implantable cardioverter defibrillators, as were high scores for anxiety and depression; patients with the device developed phobic anxiety
Whang et al, 2005[29]	645	Case-control, observational	Among patients with an implantable cardioverter defibrillator, 14% had mild depression and 4% had moderate-to-severe depression, especially after the first shock; there is a relationship between depression and cardiac arrhythmia
Leosdottir et al, 2006[12]	121	Cross-sectional, observational	In 44 patients with an implantable cardioverter defibrillator compared to a randomized group of cardiac patients, quality of life, anxiety, and depression inventories concluded that besides low quality of life, patients with the device have high scores for anxiety and depression
Crössmann et al, 2007[32]	35	Randomized, clinical trial	Over 2 y, a group of patients with cardioverter defibrillator implants experienced high anxiety toward the shock; this group experienced decreased anxiety following a therapeutic intervention
Jacq et al, 2009[13]	40	Cross-sectional, observational	The effect of shock in patients with an implantable cardioverter defibrillator increases the prevalence of anxiety and depression symptoms and worsens quality of life; this study compared patients with the device who had and who had not experienced a shock
van den Broek et al, 2009[14]	40	Cross-sectional, observational	The authors found that cardioverter defibrillator implantation causes symptoms of anxiety and increases the incidence of generalized anxiety disorders
Maryniak et al, 2009[15]	16	Cross-sectional, observational	Among 16 patients with implantable cardioverter defibrillators, 14 feared the shock, 7 had anxiety and stress disorders, and 4 experienced depression; the implant caused psychiatric comorbidities in 90% of patients
Noyes et al, 2009[22]	983	Prospective cohort, observational	This study evaluated benefits for quality of life after the cardioverter defibrillator implantation in 983 patients; the effects of the shock were minimal regarding sudden death due to cardiac arrhythmias
Jaafari et al, 2009[19]	1	Retrospective cohort, observational	This study demonstrated the validity of the development of obsessive-compulsive disorder among a group of cardiac patients with implantable cardioverter defibrillators
Kapa et al, 2010[23]	308	Prospective cohort, observational	Among 308 patients with cardioverter implants, 223 met the criteria for diagnosis of anxiety disorders, specifically posttraumatic stress disorder
Versteeg et al, 2010[16]	241	Cross-sectional, observational	High anxiety is more common in women with implantable cardioverter defibrillators and has been described as somatic and phobic
Dickerson et al, 2010[24]	80	Prospective cohort, observational	After 3 mo with an implantable cardioverter defibrillator, 44.7% of patients had no change, and 22% had decreased quality of life due to anxiety
Ladwig et al, 2010[25]	80	Prospective cohort, observational	30%–50% of patients with cardioverter defibrillators showed worsening of quality of life 1 y after implantation
Redhead et al, 2010[26]	106	Prospective cohort, observational	The shock experienced by patients with implantable cardioverter defibrillators increased anxiety from 34%–66% and increased anxiety in their partners from 25%–48%
Mark et al, 2010[33]	107 patients and their spouses/ companions	Randomized, clinical trial	The study evaluated quality of life in patients with an implantable cardioverter defibrillator and in their partners and found that those who participated in a support group had greater quality of life than those who did not
Probst et al, 2011[30]	109	Case-control, observational	A quality of life questionnaire assessed the following 3 groups: those with implantable cardioverter defibrillators who were symptomatic, those with the device who were asymptomatic, and those without the device; no significant differences were found between the 3 groups
Meischke et al, 2011[34]	305	Randomized, clinical trial	Patients with cardioverter defibrillator implants and their families attended a psychoeducation and mental health program and experienced improved quality of life afterward
Arnous et al, 2011[17]	71	Cross-sectional, observational	In a demonstration of cardioverter defibrillator implantation, 25% of patients reported better quality of life, 10% reported that the shock was inappropriate, and 7% encountered complications
Marshall et al, 2012[27]	47	Prospective cohort, observational	In a gender study on quality of life, greater anxiety and concern about the impact of the intervention were found among men, and greater concern regarding their appearance after surgery was found among women
von Känel et al, 2011[28]	107	Prospective cohort, observational	Posttraumatic stress disorder is a common type of anxiety disorder among patients with a cardioverter defibrillator implant; moreover, depression is a common comorbidity present in women

depression and quality of life differed on the basis of the frequency of the shocks. A positive correlation was found between the number of shocks and the depressive symptom scores ($P = .05$, $r = 0.24$). There was a negative correlation between the mental health subscore of the SF-36 and the number of shocks ($r = -0.36$, $P = .003$).[13]

In 2009, van den Broek et al[14] investigated general feelings of independence, anxiety, and quality of life among patients with an implantable cardioverter defibrillator and noted signs of anxiety related to cardiorespiratory-specific symptoms that hindered their quality of life. Maryniak et al[15] studied 16 patients aged 24 to 73 years with an implantable cardioverter defibrillator who experienced many discharges (from 25 to 200 discharges) or electric shock (≥3 discharges following one after another). They noted that 14 patients were phobic of the shock. In addition, 11 patients had comorbidities: 4 had generalized anxiety, 3 had PTSD, and 4 had depression.[15]

Versteeg et al[16] conducted a study that included 241 patients with an implantable cardioverter defibrillator, of whom 33% were women. These female patients reported more symptoms of anxiety ($\beta = 0.13$, $P = .04$), phobic anxiety ($\beta = 0.13$, $P = .05$), and somatic health complaints ($\beta = 0.15$, $P = .02$) and scored higher on somatosensory amplification ($\beta = 0.24$, $P < .001$) than men.[16] In 2011, Arnous et al[17] investigated the effectiveness of the cardioverter defibrillator and quality of life among 71 patients who were implanted with the device between 2002 and 2006. Of these patients, 7% had comorbidities. They found that 25% of patients had experienced a shock that they considered beneficial; 10% considered the shock experience to be inappropriate. The authors concluded that cardioverter defibrillator implantation is associated with a high incidence of life-saving therapy, a low complication rate, and a high level of tolerability.[17]

Retrospective Cohort Studies

In 2002, Carroll et al[18] assessed the quality of life before and after cardioverter defibrillator implantation among 70 patients with a mean age of 64 years. There was no agreement among patients with regard to whether living with the cardiac arrhythmia before the implantation or dealing with the shocks after the implantation was worse. Worsening of quality of life occurred more often in social and psychological domains. Further research is needed to identify what actually worsens the quality of life of patients who receive an implantable cardioverter defibrillator.[18]

In 2009, Jaafari et al[19] examined a case report of a patient in whom cardioverter defibrillator implantation triggered worsening of obsessive-compulsive disorder. The patient developed "twiddler's syndrome," in which mechanical manipulation can induce the malfunction of the implant. In this case, twiddler's syndrome resulted from compulsive checking of the device. Two invasive procedures were required to replace the cardioverter defibrillator. Psychiatric intervention prevented the recurrence of twiddler's syndrome in this patient for more than 2 years of follow-up.[19]

Prospective Cohort Studies

In 1998, Crow et al[20] administered the Structured Clinical Interview for *DSM-III-R* in 35 patients 3 days after they were implanted with a cardioverter defibrillator and repeated the same interview 9 to 18 months later. Alcohol abuse and dependence were present in 14.3%, 8.6% had comorbid mood disorders, and 5.7% had major depression.[20]

In 2004, Godemann et al[21] investigated the quality of life among 93 patients 1 to 6 years after having a cardioverter defibrillator implanted. In the assessment, 30% had decreased quality of life in the physical domain and experienced phobic anxiety after the first shock.[21] In a 2009 study by Noyes et al,[22] quality of life was examined among 983 patients with a cardioverter defibrillator at 3, 12, 24, and 36 months after the implantation and following the first shock. The authors noted that following the first shock, 41% experienced negative effects in the physical and psychological domains.[22] The overall health-related quality of life was reduced by 0.04 ($P = .04$) at the assessment following the first shock. The negative effect of cardioverter defibrillator firing on health-related quality of life was an order of magnitude greater than the effect of congestive heart failure. A higher prevalence of congestive heart failure and shocks among patients with cardioverter defibrillator implants and their negative effect on health-related quality of life may partially explain the lack of benefit of the device on health-related quality of life.[22]

In 2010, Kapa and colleagues[23] administered the HADS, SF-36, and Impact of Events Scale-Revised (IES-R) to 308 patients who had been implanted with a cardioverter defibrillator and found that 223 had developed anxiety disorders, especially PTSD. In this study,[23] the frequency of PTSD declined from 78 of 223 (35%) at baseline (within 2 months of implantation) to 34 of 223 (15%) at both 6- and 12-month assessments ($P < .01$). There was a significant improvement over time in HADS ($P < .001$) and IES-R PTSD scores ($P < .001$). Patients who experienced shock storms (≥ 3 shocks in 24 h) ($n = 5$) had significantly higher mean ± SD baseline PTSD scores (29.6 ± 11.4 vs 14.6 ± 11.6, respectively, $P < .01$). In 2010, Dickerson et al[24] examined changes in quality of life 3 months after cardioverter defibrillator implantation in 80 patients and noted that 44.7% reported no change, 20.7% had worsened due to anxiety, and 34.2% had improved. Anxiety state was significantly higher for the worsening group.[24] Ladwig et al[25] investigated the quality of life in patients with a cardioverter defibrillator after the first year of implantation and found that a high rate of shock increased the anxiety of both patients and their partners, thus worsening their quality of life.

In 2010, Redhead et al[26] conducted a survey on the prevalence of anxiety and depression among 106 patients 3 years after cardioverter defibrillator implantation. Experience of shocks and shock storms (≥ 3 shocks in 24 h) increased anxiety significantly from 24% to 34% ($P < .01$). Experience of shock storms precipitated pathologic levels of anxiety in implant recipients, and need for the device contributed to anxiety in the spouse. Among the patients' partners, anxiety due to the shocks increased from 24% to 48% and depression from 14% to 22% in all groups.[26]

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In 2012, Marshall et al[27] performed a prospective study among 47 patients who had an implantable cardioverter defibrillator for 12 months regarding their quality of life and anxiety. They found that men were more anxious about the shock and that women had a worse quality of life due to worrying about their appearance.[27] Fourteen women and 33 men completed a series of questionnaires over a 12-month period. Women reported higher levels of anxiety than men at discharge but over time demonstrated a significant improvement such that at 4, 8, and 12 months men were more anxious.[27] Finally, in 2011, von Känel et al[28] investigated 107 patients with cardioverter defibrillator implants using the IES-R and found that 30% of these patients were diagnosed with PTSD after the surgery. Mean ± SD PTSD severity increased from baseline to follow-up (19 ± 22 vs 25 ± 19, respectively, $P < .001$); 19% of patients had PTSD at both assessments, 12% had PTSD at baseline only, and 18% had PTSD at follow-up only. Between 2 and 5.5 years, chronic PTSD related to cardioverter defibrillator placement slightly increased, and nearly one-fifth of patients had newly developed PTSD.[28]

Case-Control Studies

In 2005, Whang et al[29] investigated the prevalence of symptoms of depression after cardioverter defibrillator implantation through the Center for Epidemiologic Studies of Depression by using scales that were tested in 645 coronary patients with the device. Among patients, 14% experienced mild depression and 4% experienced moderate-to-severe depression after the first shock, pointing out the relationship between depression and shock.[29] In 2011, Probst et al[30] published a study on the hereditary syndrome of bradycardia in a population divided into the following 3 groups: those with cardioverter defibrillator placement who were asymptomatic (group 1), those with cardioverter defibrillator placement who were symptomatic (group 2), and those without the device (group 3). SF-36 questionnaires investigating quality of life were evaluated. The results were statistically significant (60 in group 1, 78 in group 2, and 52 in group 3; $P < .001$), and the researchers concluded that the patients had a good quality of life with no difference between implanted and nonimplanted patients. However, cardioverter defibrillator implantation was accompanied by difficulties in the patients' social and professional lives.[30]

Randomized Clinical Trials

In 2002, Kuijpers et al[31] reported anxiety and depression to be very common among 10 patients with an implantable cardioverter defibrillator who had been diagnosed with panic disorder, agoraphobia, and depression. After the use of selective serotonin reuptake inhibitors (SSRIs) combined with a program of cognitive-behavioral therapy performed over 6 months, 4 of 5 patients who received this treatment improved markedly. The total number of ventricular premature beats decreased significantly after treatment.[31] In 2007, Crössmann et al[32] used clinical monitoring to reduce anxiety disorder in 35 patients with an implantable cardioverter defibrillator. Psychometric measures of anxiety were collected for 2 years and 5 months. During this period, shocks and antitachycardia pacing were assessed. Psychoeducation and relaxation were done as a treatment and resulted in a reduction in anxiety 2 years and 5 months after surgery to control tachycardia.[32]

In 2010, Mark et al[33] used a structured interview to investigate quality of life 12 to 24 months after cardioverter defibrillator implantation and found that patients and their partners participating in a support group had greater quality of life than patients who did not.[33] In 2011, Meischke et al[34] trained 305 patients with implantable cardioverter defibrillators and their families with live psychoeducation programs or videos that emphasized self-efficacy (belief that one has the power to effect change based on one's own action) and control (belief that one has the internal and external resources to exert positive changes over one's illness or caregiving situation). In this study, there were 300 control cases. The researchers found that the beliefs of the patients and their families regarding self-efficacy in managing the device after 3 months of training were more positive than those of patients and families who did not receive training.[34]

DISCUSSION

According to the available literature, patients with an implantable cardioverter defibrillator require greater emotional attention due to the imminent risk of sudden death. Although the device represents a major innovation in the reduction of sudden cardiac death, it has a negative impact on quality of life and can increase anxiety and depression. The high energy shock from an implantable cardioverter defibrillator is uncomfortable; however, most patients tolerate discharges, mainly because they realize they represent security for their lives.

Initial studies[10,11,20,31] of psychiatric comorbidities and poor quality of life in patients with an implantable cardioverter defibrillator reported that the negative effects related to experiencing a shock provoked somatization, phobias, and depressive symptoms that affected their social relations and undermined their quality of life. The age of patients seems to be a factor in determining the degree to which the device interferes with quality of life. Older individuals adapt better compared to younger people.

Anxiety and depressive disorders starting from the first shock were shown to be the most common psychiatric disorders in observational studies[10,23] and clinical trials.[13,31] However, conducting psychoeducation or providing follow-up information and guidance to patients and their families led to emotional improvement in all selected studies.[31–34]

Some studies[24,30,33] described an improvement in quality of life after implantation due to the decreased risk of sudden death. However, other retrospective observational studies[18,19] evaluated the prevalence of psychiatric disorders before and after implantation and noted that existing psychiatric comorbidities worsened after surgery due to increased anxiety. Comparisons[29,30] between patients with and

without an implantable cardioverter defibrillator showed that anxiety and depression are prevalent with heart disease, even in those potentially requiring the device.

When patients experiencing low rates of shocks are compared with those having many in a brief interval of time, some results require attention. In cases of more than 2 discharges annually, the incidence of panic disorder with agoraphobia was higher than that of patients with a single discharge annually,[11] and a positive correlation was found between the number of shocks and depressive symptom scores, and a negative correlation was found between the number of shocks and the mental health subscore of the SF-36.[13] Shock discharges over time can be predictors of phobic and anxiety disorders.[23]

One prospective study showed a high incidence of use and abuse of alcohol associated with psychiatric comorbidities after cardioverter defibrillator implantation.[20] There is also a tendency toward worse psychiatric outcome after the first shock, and decreased quality of life in the physical domain and phobic anxiety have been described.[21] Negative effects in physical and psychological domains may be present.[22]

Studies show that families of patients with cardioverter defibrillator implants are affected as well. In those with high rates of shock, partners as well as patients have increased rates of anxiety and consequent low quality of life.[25] Shock storms significantly increased anxiety levels of patients and spouses.[26]

With regard to therapeutic possibilities, prospective studies show the potential benefits of a support intervention. Patients who have obsessive-compulsive disorder can develop an obsessive ritual of checking the device, leading to malfunction. These patients require a psychiatric intervention for a better quality of life.[19] Four of 5 patients with cardioverter defibrillator implants who received combined treatment with SSRIs and CBT over 6 months improved markedly.[31] Psychoeducation and relaxation were found to reduce anxiety symptoms in 35 patients 2 years and 5 months after surgery.[32] Also, 3 months of training regarding self-efficacy and control related to the implantable cardioverter defibrillator improved the beliefs of both patients and their families and resulted in more positive results compared to those who did not receive training.[34]

We found no reports of psychiatric disorders other than depressive or anxiety disorders. Many of these studies[10,11,20,31] reported a low quality of life among patients due to symptoms of anxiety and depression that developed after cardioverter defibrillator implantation. It seems important to know the concerns from the patient's perspective to ensure that they are addressed and to provide support for families.

CONCLUSION

On the basis of the reviewed studies, it is clear that implantable cardioverter defibrillators, while potentially effective for the prevention of sudden death, may have serious psychological effects for patients and their families. The frequency and intensity of shocks may promote anxiety and depression and may worsen depressive and anxiety disorders among those who already have them.

Among the most common anxiety disorders in patients with implantable cardioverter defibrillators were PTSD, phobias, somatoform disorders, and generalized anxiety and panic, which may occur with or without agoraphobia. Low quality of life due to difficulties related to the physical, psychological, and social domains was observed in patients who developed a depressive disorder.

Not all patients receiving an implantable cardioverter defibrillator get the same therapeutic benefit and have the same risk of psychiatric side effects. An individual's specific resilience factors may influence his/her course, and with an increase in the number of patients using the device worldwide, is worthy of more detailed research.

This study, in addition to serving as a motivation for further research, provides information for the development of new strategies to improve quality of life and minimize psychiatric disorders that can be triggered with the implant of a cardioverter defibrillator or the first shock. Additionally, patients receiving an implantable cardioverter defibrillator should be informed by their doctors that the presence of the device minimizes risk of death and allows them to have a normal life.

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