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ANALYSIS OF EXPERIENCES IN PATIENTS' WITH CARDIOVERTER DEFIBRILLATOR AFTER AN EPISODE OF ELECTRICAL STORM

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Summary

Objectives: Cardioverter-defibrillator (ICD) reduces the risk of sudden cardiac death and ensures a feeling of safety in the patient. In some patients, an electrical storm can be a source of difficulties in adaptation process, requiring psychological interventions. The electrical storm is a rare, but psychologically burdensome situation in patients with ICD. The aim of the study was the analysis of the experiences of electrical storm in patients with cardioverter defibrillator taking into account the severity of state anxiety.

Methods: The study and the psychological intervention were conducted in the first three days after the ICD electric storm in the Intensive Cardiology Care Ward. Data was analyzed on the basis of narrative interview and thematic analysis. The severity of state and trait anxiety was also assessed with the use of STAI questionnaire.

Results: All the patients were characterized by a medium to high level of anxiety as personality trait. In response to electrical storm two groups were found: a high – and medium- level of anxiety group. In the high-level of anxiety group, the statements had anxious and/or depressive characteristics, while in the medium-level of anxiety group the statements indicated an acceptance of the ICD treatment.

Conclusions: The main result of the analysis is the distinction of two theme groups identified on the basis of the statements concerning the electric storm experience. In the high-level of anxiety group, lack of acceptance of this method of treatment and anxious statements were found more often, whereas the statements of the medium-level of anxiety group presented better adaptation.

Introduction

Implantable cardioverter defibrillator (ICD) is the method of choice for secondary and primary prevention of sudden cardiac death [1]. It has been shown to be superior to pharmacotherapy. [2]. The reason for using ICD is life-threatening arrhythmias, especially when they are accompanied by loss of consciousness. The most common causes of arrhythmias are organic heart disease, myocardial infarction or coronary artery disease. In case of sudden cardiac death risk, the ICD provides the patient with a feeling of safety and increases a chance that if there is a life-threatening arrhythmia, it will be interrupted. On the other hand, besides potentially life-saving ICD interventions, an electrical storm (defined as ≥3 discharges / 24 hours) or an inadequate discharge may be a source of emotional difficulties, adaptive problems, and poor quality of life. It is estimated that the problem of electrical storm affects 10-20% of patients with implanted ICD [3]. Specific risk factors for psychological difficulties in patients with ICD are young age (<50 years old), frequent discharges and difficulties in psychological functioning before ICD implantation [4]. It has been proved that electrical storm is a risk factor for adaptive problems, anxiety-depressive and PTSD symptoms. [5-7], as well as lowering the quality of life that hinder normal, daily functioning and coping with stress [8]. Hence, in this group of patients there is a special need for psychological interventions and support [9-10]. Even in patients who have not experienced ICD interventions, fear of device intervention may increase psychophysical tension, anxiety, avoidance behaviours, and reduced daily activity [5], for example due to a tendency toward catastrophic thinking [6]. It has been shown that anxiety symptoms and anxiety inclinations (e.g., excessive worry, physiological arousal) are psychological reactions most often experienced by persons with ICD. About 13-38% of these patients are diagnosed with anxiety disorders that require psychiatric or psychological help. While depressive symptoms in this group of patients are comparable with the level of depression in other cardiologic patients [11].

These results indicate that patients with ICD who have experienced electrical storms are a group that requires specific psychological care and monitoring of mental status. This problem is addressed in previous studies [5, 7].

The aim of the study was to analyze the electrical storm experiences in people with ICD taking into account the anxiety level concerning this situation.

Method

The studied group consisted of 23 patients (21 males, 2 females) with ICD treated in the 1st Department of Cardiology, Interventional Electrocardiology and Arterial Hypertension in Kraków (21 men, 2 women) who suffered from arrhythmia and experienced electrical storm, with an average age of 63 years (SD = 21.0). The average number of ICD interventions was 5.5 discharges (SD = 0.71).The study was conducted in the first three days after the intervention of the ICD in the Intensive Care Unit of Cardiology.

The following research tools were used:

1. Narrative interview: It is a specific method aimed at obtaining information from the interlocutor about his subjective experiences, and in the study conducted, this experience was connected with the experience of an electrical storm. The interview consisted of four parts. The first part involved creating a therapeutic relationship

without discussing content related to the main topic. The second step was to stimulate the narration by asking general questions about the experiences and feelings of the person. In this study, patients were encouraged to narrate by saying: "Tell me about your electrical storm experience, please." The third phase was a proper narrative of the researcher on the main subject of the interview. And after the end of the patient's story, a fourth step was started, in which the researcher could clarify ambiguity, ask for narrative elements that raised doubts. Examples of questions that supplemented the patient's story were: "How did you experience the intervention of a cardioverter-defibrillator?", "What thoughts and emotions have emerged during and after the storm?". At the end of the interview, the conversation returned to the everyday matters [12]. The qualitative method was used to describe the results in accordance with the thematic analysis of emotions and beliefs related to ICD implementation and intervention, sense of acceptance of the device, and safety due to cardioverter defibrillator.

2. State and Trait Anxiety Inventory (STAI) in Polish adaptation of Spielberger, Strelau and Tysarczyk. STAI consists of two scales: X1 measuring state, X2 measuring feature, each made up of twenty items. The patients assigned the answer using four possible ones. The test has high reliability measured by an internal compliance coefficient, which has 0.9 and 0.88 in both scales and an internal stability of 0.46 for X1 and 0.79 for X2. Anxiety as a state reflects the magnitude of the response to the threat, which in the case of the examined group, could have been the experience of an electrical storm. Anxiety as a trait is understood as "a motive or acquired behavioural disposition that makes a person susceptible to perceive a wide range of objectively benign situations as threatening and responsive to the state of anxiety, disproportionate to the magnitude of objective danger" ([13, p.4]). Such an approach of anxiety indicates its behavioral nature and the dependence of the level of anxiety on the interpretation of the perceived situation. STAI emphasizing the psychological, behavioural and vegetative-somatic aspects of anxiety is widely used in the studies of somatic patients.
3. STAI results were analysed after conversion of raw scores into sten scores. The sten scale average score for the group of standardization is 5.5 and the standard deviation 2. This means that the average result is within the limit sten 5 and 6, the low scores ranging from 1 to 4, and the high range from 7 to 10 [14].
4. History of the disease - the history of ICD patients was analyzed and a group of patients was identified based on such indicators as: life-threatening cardiac arrhythmias resulting in ICD electrical shock interruption, history of cardiac arrest, edema and dyspnoea showing heart failure, reduced ejection fraction.

Statistical analyses were performed using the Statistica 10.

Results

In the analysis of reactions to the electrical storm, two categories emerged. One involved an emotional response and the other was related to convictions about ICD intervention.

Considering the intensity of anxiety as a state (sten values), the group was divided into two subgroups: the high-anxiety group (anxiety in the 7-9 sten range) with a very strong anxiety as a state ($x = 8$ sten, $SD = 1.13$) and moderately anxious group (anxiety in the 4-6 sten range)

with moderate anxiety as a state (x = 5 sten, SD = 1.00). All subjects were characterized by moderate to high levels of anxiety as a trait: in the high-anxiety group x = 6.89 sten, SD = 2.05, in the moderately anxious group x = 6.5, SD = 2.38.

At the same time, all patients required antianxiety pharmacotherapy for at least the first three days of hospitalization. Whatsmore, it was necessary to include antidepressant therapy in one patient.

Table 1. presents patients' statements on ICD interventions selected in two categories: statements indicating anxiety and / or depressive reactions, and statements indicating acceptance of device intervention.

Table 1.**Examples of patients' statements on ICD interventions.**

Statements indicating the reactions of anxiety and / or depression	***Statements indicating acceptance***
"When at home I had discharges two nights in a row, the third night I could not sleep - I was afraid that I would wake up never again"	*"What will be, will be, ICD is on and it will react as it should"*
"If I were alone ... if the ambulance arrived a minute too late ...„, "Foolish it was not to talk to my doctor what to do in case of ICD intervention", "It was hard to force myself and go out for a walk", "It would be better if they hadn't saved me"	*"ICD discharge is like a kick - it is unpleasant and very painful but I have such a nature that I do not care"*
"At full electrical shocks I think I would not agree again for ICD implementation"	*"It is difficult to live with ICD but I want to live"*
„I have 'crying thoughts' and I feel helpless", "I was energetic, now I just do what I have to do"	*„My doctor suggests to forget about it [ICD] a little bit"*

The themes most frequently mentioned in patients' statements were: emotions and beliefs related to storm experiences, fear of death, awareness of need for ICD implantation to save life, changes in daily functioning after cardioverter-defibrillator implantation, dependence of one's life on a device, satisfaction with treatment, acceptance of the device and sense of security.

Discussion

Although the frequency of psychological difficulties in patients with ICD is similar to that in the general population of cardiologic patients, in ICD users specific anxiety and fears can be identified such as fear of ICD discharge or malfunction of the device, fear of death, or concerns about embarrassment in social situations.

In the studied group, two distinctive and at the same time opposite attitudes were distinguished in relation to the experience of electrical storms: a high- and a medium-level of anxiety. The results are consistent with Sears et al. [4] on the topic of the continuum of dependence between the frequency of ICD discharges and the severity of anxiety disorders, change in thinking and behaviour.

Some patients, in accordance with previous studies, have developed anxiety and / or depressive symptoms and adaptive difficulties, which were apparent in their belief systems and cognitive attitudes. It was catastrophic thinking, social withdrawal tendencies, negative depressive thinking, helplessness, loss of control and predictability. These people were characterized by fear of death, guilt and shame, sometimes regret that had agreed to the

implementation of the device, increased tendency to crying. Psychological symptoms were accompanied by physiological disorders, including sleep disorders and decrease in psychomotor propulsion.

The quantitative and qualitative analysis also made it possible to distinguish a group of patients who, despite the electric storm, demonstrated a good adaptation to this experience. The intensity of anxiety-state in these patients, despite a situation of a multiple cardioverter-defibrillator intervention, was moderate. A qualitative analysis of the beliefs of patients with milder anxiety showed that such cognitive mechanisms were frequently used as a positive reframing strategy, avoidance and acceptance of electrical storms as a life-saving intervention. As a psychological resources facilitating the management of this stressful experience, patients presented their personality traits and the influence of the doctor suggesting an acceptance of the ICD as a life-saving device, as well as the support and help of loved ones.

Both high-anxiety as a state people and those with moderate anxiety reactions were characterized by medium to high level of trait anxiety. Perhaps other factors, including proper preparation through psychoeducation of the patients and psychological help, are more important for their adaptation to functioning after an electrical storm than the intensity of anxiety as a trait, hence the lack of differences in the distinguished patient groups.

In the analysis of the results, it is also important to address the issue of ambivalence over this treatment procedure experienced by ICD patients. Based on interviews with patients, it has been found that the source of ambivalent attitudes is the fear of electric shocks and the belief of dependence on the operation of the device, while at the same time feeling more secure thanks to ICD. On the one hand, it can lead to withdrawal from daily activities, a loss of sense of life, or the presentation of depressive and anxiety symptoms. On the other hand- to satisfaction and return to professional activity and social roles.

Literature indicates that psychological theories and constructs such as classical conditioning, cognitive assessment and learned helplessness model are important in better understanding and explaining the observed symptoms of anxiety in patients with ICD, also those with electrical storm experience [4, 8, 15]. The electrical storm experience may, under certain conditions, affect the patient's reactions in situations cognitively associated with the circumstances of the storm through a mechanism of generalization or/ and conditioning. It can cause a reaction of avoidance of these situations, such as bathing without the presence of loved ones in the apartment or withdrawal from activities, such as walking alone. Thus, previously indifferent and neutral stimuli, which are now associated with an electrical storm, can turn into signals that trigger a strong stress response, anxiety and distress, and a belief of helplessness over emerging symptoms. The experience of the electrical storm and the accompanying thoughts and associations contribute to the formation and consolidation of maladaptive beliefs about oneself, the world, the influence and control of everyday life. Fixation of this way of thinking and anxiety responses supports the development of helplessness reaction in electrical storm situations and thus non-adaptive attitude towards ICD treatment.

In the treatment of individuals who experienced the electrical storm, a psychological procedure is reasonable in a period before implantation of the device, as well as after an episode of electrical storm [4, 8, 15]. Prior to the implementation of the ICD, interventions should include planning with patients how they should behave in the situation of discharges, education about the device functions, and discussing the need for regular medication and primary heart

disease therapy [5, 15]. Psychological preparation of patients facilitates adaptation to a possible change of self-image as a patient requiring medical protection against sudden cardiac death. After the implementation of the ICD, even more so in the context of the electrical storm, it is important to analyse with the patient the circumstances of the discharges and the accompanying thoughts to their constructive re-definition. At the same time, the emphasis should be put on minimizing the effects of the association of neutral stimuli, which accompany the device's intervention situation, with ICD shocks. Obtaining the knowledge of the defibrillator and learning how to distinguish the correct functioning of ICD from the signals of possible intervention strengthens patient's sense of control. Instructing and educating the patient about the operation of the device and its interaction with the cardiac muscle allows them to better understand the mechanisms of ICD and respond appropriately (e.g. by seeing a physician), thus reducing the feeling of helplessness.

In conclusion, the results obtained and literature review indicate the need for routine psychological counselling in patients after cardiovascular-defibrillator interventions, within the framework of interdisciplinary and comprehensive hospital care. Special care should be given to patients who have experienced the first electric storm since it is a critical moment for the development of beliefs that affect their way of adapting to this form of treatment. Patients with ICD who receive adequate support from the doctor and have a possibility to work with a psychologist on understanding better their emotional reactions and make a cognitive analysis of their beliefs, appear to have a better chance of returning to functioning at a level similar to that before an ICD intervention. This is an important clinical issue and it would be important to investigate the effects of psychological intervention in the adaptation of patients after an electrical storm. This study encourages research into the influence of psychological work with ICD patients in the field of their level of adaptation.

Conclusions

1. The standard for comprehensive care of ICD patients is the assessment and monitoring of their mental status and the psychological support to help them in adaptation to treatment.
2. Emotional reactions and convictions proving difficulty in adaptation to ICD intervention are reported in patients with electrical storm.
3. In the study group, two subgroups were selected: (1) persons who reacted with a high level of anxiety during the storm. Thematic categories in this group were: fear of death, awareness of the need for ICD implantation to save one's own life, changes in daily functioning after cardioverter-defibrillator implantation, and one's life dependence on ICD treatment. While, in subjects with moderate levels of anxiety (2) such categories were found as: satisfaction with treatment, acceptance of the device and sense of security. This suggests that they are well adapted to the treatment with ICD implementation.

Limitations

Data collected concerns only a small group of patients what may be a limitation of the analysis. However, the individual perspective of adaptation to the cardioverter-defibrillator, the experiences patients describe and the difficulties experienced are crucial to understanding the

burden that they undergo. It could be argued that the average level of anxiety experienced by patients (as an example of measurable value), seems to only be auxiliary to the individual perspective of experiencing the treatment with ICD implementation in these persons.

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