

## CREATING A PROTOCOL FOR THE TESTING OF PATIENTS WITH IMPLANTED PACEMAKER FOR THE NEEDS OF KINESITHERAPY

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**Abstract.** One of the most important discoveries of the 20<sup>th</sup> century in cardiology is the implantation of a pacemaker. Indisputable evidence exist of the effectiveness of this procedure for the improvement of quality of life. With the aging of the population and the increasing indications for implanting a pacemaker, the number of people, which have an implant, constantly increases. The aim of this study is to create a protocol with which to track the condition of patients with implanted pacemakers. From a literary reference, which we made, we could not find a template, with which the condition of patients with implanted pacemaker can be tracked. We suggest our protocol for examination to include the following components: personal information, data for the heart rate and blood pressure values, Borg’s scale, 6-minute walk test, gait analysis, assessing orthostatic reactivity, questionnaires, and telemetry. The personal information includes name, gender, age, primary reason for the implantation of pacemaker as well as the type of pacemaker. In the first hours after implantation, it is necessary to follow the values of heart rate and arterial blood pressure, in order to observe if the implanted device functions properly. The gait analysis assesses the cadence and speed of movement. An active orthostatic test is used to assess the reactivity, in which the heart rate is measured in laying, standing, and again in laying position. Borg’s scale is used for a subjective determination of the exertion rating when performing a physical effort. The 6-minute walk test is used to assess the functional capacity by measuring the distance walked in six minutes. According to the literary reference, we believe, that it is appropriate to include the flowing questioners to assess the quality of life: Minnesota Living with Heart Failure, Assessment of QUALity of Life and RELated Events – SQUAREL, Medical Outcomes Study 36 Items Short Form (SF-36) and Mini geriatric depression scale. We suggest the data from the telemetry performed to be included, because that is the main tool that assesses the function of the implanted pacemaker. In conclusion, we can summarize, that interventional cardiology is a modern approach of treatment, which is more and more popular. The number of people with implanted pacemaker increases. The modern look cardiology rehabilitation requires the use of modern methods for testing, in which the physical and mental condition of the patient is considered. That is why it is needed to create a common protocol, with which to track the condition of the patients (physically and emotionally).

**Keywords:** Pacemaker, Create a protocol, Kinesitherapy

### 1. INTRODUCTION

In the last few decades, interventional cardiology has been developing with at a very fast pace. One of the most important discoveries of the 20th century, in this field, is the implantation of pacemaker. Ake Sening and Rune Elmqvist performed the first implantation of pacemaker in the year 1958. Since then, a great improvement can be observed in this area, in the type of the device, as well as the way of implanting. Indisputable evidence exist of the effectiveness of this procedure for the improvement of quality of life. With the aging of the population and the increasing indications for implanting a pacemaker, the number of people, which have an implant, constantly increases. The routine follow-up, as well as the care for the very patients with implants is difficult for the corresponding national services. [13]

### 2. METHODS

**The aim** of this study is to create a protocol, with which to track the condition of patients with implanted pacemaker.

From a literary reference, which we made, we could not find a template, with which the condition of patients with implanted pacemaker can be tracked. From a medical perspective, it is essential to follow the enzyme levels and telemetry data. Cardiac rehabilitation is a coordinated sum of activities required to influence favorably the underlying cause of cardiovascular disease, as well as to provide the best possible physical, mental and social conditions, so that the patients may, by their own efforts, preserve or resume optimal functioning in their community and through improved health behavior. [9]. This is the reason why it is important to track the physical, mental and social condition of the patients. From our research, we have established that there are many authors, which offer to use different questionnaires for patients with implanted pacemaker. We suggest our protocol for examination to include the following components: personal information, data for the heart rate and blood pressure values, Borg’s scale, 6-minute walk test, gait analysis, assessing orthostatic reactivity, questioners and telemetry.

**Personal information.** Here, as well as in any research, we suggest for the personal information of the patient to be included – name, gender, age, primary reason for the implantation, as well as the type of pacemaker. According to Becker et al. the reasons for implanting a pacemaker are persistent or paroxysmal AV block; Mobitz II AV block; sinoatrial block; slow atrial fibrillation (<40 bpm); alternating branch block; or Sick sinus syndrome. [1]

Pacemakers can be temporary or permanent. Temporary pacemakers are used to treat short-term cardiac problems like, for example, slow heart rate, caused by a heart attack, cardiac operation or overdosing with medication. Permanent pacemakers are used to control long-term heart rate problems. [5]. There are different types of pacemakers, depending on the number of active connections, placed in the heart and the programming of the pacemaker.

- Single chamber pacemakers – use one electrode in the right atrium or right ventricle of the heart.
- Dual chamber pacemakers.
- Bi-ventricular pacemakers. [10]

**Heart rate and arterial blood pressure.** During the first hours after surgery, it is necessary to observe the values of heart rate and arterial blood pressure, in order to track if the pacemaker functions properly.

**Gait Analysis.** It assess its cadence and speed of movement. To assess the cadence, the number of steps, made to walk six and ten meters, are counted. The sick is asked to walk the distance with a usual speed, which he himself chooses [Bronstein A et al, 1996]. The speed of the gait is determined in m/min by way of dividing the distance traveled (m) by the time (min), for which it was walked. For this purpose is instructed do walk the distance with usual walking speed. [11]

#### **Evaluation of Orthostatic Reactivity**

In order to assess the orthostatic reaction, an active orthostatic test is used. Arterial blood pressure and heart rate were defined for 10 minutes laying, after that standing position on 1, 5 and 10 minutes. After verticalization, the sick again take the position of laying down, by observing, analogically, the changes in the parameters. The classification of Thulesius is used to divide the patients into two groups, according to the type of their orthostatic reactivity. [12]

**Borg scale.** Megova offers, for more precise assessment of the subjective complains and more correct dosage of the physical activity, to use Borg's scale for subjective assessment of the fatigue during physical activities. [6]

**6 minute walking test** is a method for assessment of the functioning capacity, in which is measured the distance that the patient can walk, on a hard, smooth surface, for six minutes. It assesses the submaximal physical capacity, because the patient controls the intensity of the activity. The 6-minute walking test best determines the daily functioning exertion, in comparison with the rest of the assessment methods. [8]

**Questionnaires.** In the modern methods of treatment, an emphasis is placed on the emotional condition of the patients, which is assessed with questionnaires. They include question for assessment of the quality of life.

- Młynarski suggests to include MLWHF (Minnesota Living With Heart Failure) to assess the quality of life. This questionnaire assesses the condition and perceptions of the patient for the effects of congestive heart failure. Because of the similarity of the symptoms of heart failure and these, connected with cardiac rhythm, disorders, it is reasonable to use it with patients with implanted pacemakers. This questionnaire consists of 21 questions, which assess the quality of life in five areas: mobility, everyday activity, pain and anxiety/depression.[7]

- AQUAREL (Assessment of QUality of life and RELated events) Stofmeel et al. developed and published a questionnaire, specifically directed for patients with a pacemaker, assessing the quality of life and related events (Assessment of QUality of Life And RELated Events -AQUAREL), which should be used as a continuation of the Medical Outcomes Study 36 Items Short Form (SF-36) questionnaire. AQUAREL consists of 20 questions, divided into three areas: chest discomfort (answering questions: 1 to 6 for chest pain and questions 11 and 12 for shortness of breath), arrhythmia (answering questions 13 to 17) and load breathing (answering questions 7 to 10 for lead breathing and questions 18 to 20 for fatigue). SF-36 consists of questions divided into eight areas: physical functionality, physical role, body pain, general health, liveliness, social functioning, emotional role and mental health. [3]

- “Mini geriatric depression scale“ is a quick screening test with four questions. Depression is connected with a more severe cardiovascular prognosis and poorer treatment adherence in the elderly. [4]

**Telemetry.** Telemetry is a tool used to follow the condition of the pacemaker. A telemetry is a box connected by wires to your chest. [2]. It is placed in first hours after surgery. After the hospital stay, the patient is observed in a certain amount of time, through telemetry. The procedure is painless and continues for less than half an hour. Telemetry head is place in the area of the pacemaker and the date regarding the battery and heart rate is taken. The doctor can also change some of the setting via the device.

### 3. CONCLUSION

In conclusion, we can summarize, that interventional cardiology is a modern method of treatment, which is more and more popular. The number of people with implanted pacemaker grows. The modern look on cardiac rehabilitation requires using modern methods for study, which take into account the physical and mental condition of the patient. That is why it is needed to draft a common protocol, with which to track the condition of the patients (physically and mentally).

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