

# EVALUATION OF PATIENT LIFE QUALITY AFTER CARDIAC RESYNCHRONISATION THERAPY PACEMAKER AND CARDIOVERTER-DEFIBRILLATOR (CARDIAC RESYNCHRONISATION THERAPY DEVICE) IMPLANTATION DEPENDING ON AGE

*Ocena jakości życia pacjentów po terapii CRT-P i implementacji kardiowertera–defibrylatora (urządzenia do terapii resynchronizacyjnej serca) w zależności od wieku*

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## SUMMARY

**Background.** Due to the ageing population and effective treatment of primary and secondary cardiovascular events, an epidemic of heart failure can be observed. Optimal treatment of the disease based on current guidelines and scientific data includes education, lifestyle modification, pharmacotherapy and cardiac resynchronisation device implantation. **Objectives.** The aim of this study was to provide an answer to the question whether or not and, if yes, then to what extent, the life quality of patients after cardiac resynchronisation device implantation is affected after no less than 6 months following the procedure, and what factors contribute to this change.

**Material and methods.** The study involved 21 patients (17 men) aged 54 to 81 years (the average: 68.86). QoL was evaluated with the Polish version of the World Health Organization Quality of Life Questionnaire WHOQoL-BREF, separately for individuals up to 65 and over 65 years of age.

**Results.** The somatic and psychological areas of life quality evaluation were homogeneous in the age subgroups compared, while the social and environment areas were not. Prior to the surgery, the WHOQoL-BREF scores in social sphere were significantly higher in younger patients. Post-surgery, much better results in the environmental sphere were recorded for older patients. The implantation of the cardiac resynchronisation device had a positive impact in all four areas of life quality.

**Conclusions.** In conclusion, our study revealed that resynchronisation therapy helps to improve patients' overall quality of life. The therapy had a positive impact on the perceived somatic, psychological and social area in each patient group, both up to 65 and over 65 years of age.

**Key words:** health-related quality of life; pacemaker; cardioverter-defibrillator.

## STRESZCZENIE

**Wstęp.** Z powodu starzenia się populacji, skutecznego leczenia pierwotnych i wtórnych incydentów sercowo-krażeniowych, obserwujemy epidemię niewydolności serca. Optymalne leczenie tej choroby oparte na aktualnych wytycznych i danych naukowych, obejmuje: edukację, modyfikację stylu życia, farmakoterapię oraz wszczepianie układów resynchronizujących.

**Cel pracy.** Udzielenie odpowiedzi na pytanie, czy, a jeśli tak, to w jakim stopniu, jakość życia pacjentów po implantacji urządzenia resynchronizacyjnego serca jest zmieniona po okresie nie mniejszym niż 6 miesięcy od zabiegu i jakie czynniki przyczyniają się do tej zmiany.

**Materiał i metody.** W badaniu wzięło udział 21 pacjentów (17 mężczyzn) w wieku od 54 do 81 lat (średnia wieku: 68,86). Jakość życia oceniano przy użyciu polskiej wersji Kwestionariusza Jakości Życia BREF WHOQoL Światowej Organizacji Zdrowia – osobno dla osób do 65. i powyżej 65. roku życia.

**Wyniki.** Somatyczne i psychologiczne obszary oceny jakości życia były jednorodne w porównywanych grupach wiekowych, podczas gdy obszary społeczne i środowiskowe nie były jednorodne. Przed operacją wyniki WHOQoL-BREF w sferze społecznej były istotnie wyższe u młodszych pacjentów. Po operacji o wiele lepsze wyniki w zakresie sfery środowiskowej odnotowano dla starszych pacjentów. Implantacja urządzenia resynchronizacyjnego serca miała pozytywny wpływ we wszystkich czterech obszarach jakości życia.

**Wnioski.** Podsumowując, nasze badania wykazały, że terapia resynchronizacyjna pomaga w poprawie ogólnej jakości życia pacjentów. Terapia miała pozytywny wpływ na postrzeganie sfery somatycznej, psychologicznej i społecznej w każdej grupie pacjentów, zarówno do 65. i powyżej 65. roku życia.

**Słowa kluczowe:** jakość życia uwarunkowana stanem zdrowia (HRQoL); stymulator; kardiowerter–defibrylator.

## BACKGROUND

The study presents an evaluation of changes in patients' quality of life assessed in four areas: somatic, psychological, environmental, and social, both before and after the cardiac resynchronisation device implantation. Following a similar path to economics, sociology, and psychology, medicine now encompasses quality of life evaluation; the concept has also been expanded to include criteria related to health. Based on the definition of the World Health Organization, quality of life is associated with objectives set out in life as well as interests, culture, accepted

norms, and the value system. Modern day medical care aims at prolonging life and ensuring the least possible deterioration in its quality [1]. Evaluation of quality of life is of particular importance in the case of chronic heart failure. The patient may be asked to describe how they feel; the answer to this question, however, is not sufficient to allow for the exact assessment of health and quality of life as a whole. For a variety of reasons, during the interview patients do not reveal a number of concerns and deficiencies. Since 2002, Resynchronisation Therapy has been considered a standard treatment of left ventricular heart failure. Were the questionnaires that examine the impact

of the disease on life quality to be used more often, they might motivate patients to exercise self-control, comply with recommendations, increase trust, and engage in a better rapport with the therapeutic team. In the case of heart failure, these factors are essential for effective treatment. Due to the ageing population and effective treatment of primary and secondary cardiovascular events, an epidemic of heart failure can be observed. Optimal treatment of the disease based on current guidelines and scientific data includes education, lifestyle modification, pharmacotherapy and cardiac resynchronisation device implantation [2].

There are now indications for CRT included in the ESC standards of 2012. Patients in class III or IV of the NYHA functional classification who used optimal pharmacotherapy experience the greatest benefits. Left ventricular ejection fraction LVEF is reduced ( $\leq 35\%$ ), left ventricle is enlarged ( $> 55$  mm), wide QRS complexes are observed as left bundle branch blocks LBBB. MADIT-CRT and REVERSE examinations provide evidence that such treatment should also be available in the I and II class of the NYHA functional classification. In this group of patients, the ventricular resynchronisation method can actually prevent the progression of LV remodelling, in addition to reduction of clinical symptoms perception. Atrial fibrillation is currently not considered to be a contraindication to CRT device implantation [3, 4].

The objective of this study is to provide an answer to the question whether or not and, if yes, then to what extent, the life quality of patients after cardiac resynchronisation device implantation is affected after no less than 6 months following the procedure, and what factors contribute to this change. QoL was evaluated with the Polish version of the World Health Organization Quality of Life Questionnaire WHOQoL-BREF developed by WHO experts. The questionnaire is a recognised and practical research tool. Its objectivity is guaranteed by the following criteria: reliability, validity, and sensitivity. It enables trustworthy data to be obtained in order to achieve the objective of the study. The work has been developed after in-depth study of a wide range of Polish and foreign literature on the subject, and based on the latest research on quality of life with heart failure, conducted around the world [5].

## MATERIAL AND METHODS

The study of life quality was conducted on patients who underwent the implantation procedure in the Heart Electrotherapy Lab of the Regional Specialist Hospital of one of the following systems: CRT-D ( $n = 20$ ) or CRT-P ( $n = 1$ ) between November 2011 and July 2012. The study involved 21 patients (17 men) aged 54 to 81 years (the average: 68.86). The group was divided into two smaller groups, based on age: up to 65 (43%) and over 65 (57%). Patients were qualified for treatment according to current ESC guidelines. On the day of the surgery, most patients (62%) were in a heart failure compensation phase, which corresponds to the stage II according to the NYHA classification. The remaining patients were in stage III or IV of NYHA ( $p = 0.97$ ). The smallest recorded LVEF was 17%; the highest 35% ( $p = 0.74$ ). The narrowest and widest QRS complexes were 130  $\mu$ s and 200  $\mu$ s respectively ( $p = 0.02$ ). RV electrode was implanted in the RVOT area in 62% of patients; for the remaining patients it was implanted in the area of central septum ( $p = 0.75$ ). RA electrode was implanted in the area of Bachmann's bundle in 85.7% of patients; in others the atrial appendage was used instead ( $p = 0.86$ ). The groups were homogeneous in terms of examination timing, LVEF, gender, NYHA symptom severity and in terms of RV, RL and RA electrode location. Older patients experienced a wider QRS complex. Basic data characterising the researched population are presented in Table 1.

## WHOQoL-BREF questionnaire

The study was approved by the Bioethics Committee of the Medical University (numbered KB-682/2011). The quality of life was evaluated twice with the shortened Polish version of the World Health Organization Quality of Life (WHOQoL) – BREF

questionnaire. It contained 26 closed questions covering four key areas: somatic, psychological, social, and environmental. To specify the research group details, an additional survey was also used; it was completed by the researcher on the basis of medical records and an interview with the health care provider. All participants filled in the questionnaire before the surgery and again, at least 6 months afterwards. The participants provided answers themselves, in accordance with their feelings. Each question was of a disjunctive nature and required a choice of one response out of five possible options.

**Table 1.** Basic statistical data of the test group

| Parameter                            | All        | Age       |            | p-value |
|--------------------------------------|------------|-----------|------------|---------|
|                                      |            | Up to 65  | Over 65    |         |
| Number of patients                   | 21 (100%)  | 9 (42.9%) | 12 (57.1%) |         |
| Age (years)                          |            |           |            |         |
| Average                              | 68.86      | 61        | 74.75      | < 0.001 |
| Median                               | 67         | 61        | 76         |         |
| Minimum                              | 54         | 54        | 66         |         |
| Maximum                              | 81         | 65        | 81         |         |
| QRS [ $\mu$ s]                       |            |           |            |         |
| Average                              | 152.86     | 142.22    | 160.83     | 0.02    |
| Median                               | 160        | 140       | 160        |         |
| Minimum                              | 130        | 130       | 140        |         |
| Maximum                              | 200        | 160       | 200        |         |
| LVEF [%]                             |            |           |            |         |
| Average                              | 28.9       | 28.33     | 29.33      | 0.74    |
| Median                               | 30         | 30        | 31         |         |
| Minimum                              | 17         | 20        | 17         |         |
| Maximum                              | 35         | 35        | 40         |         |
| Sex                                  |            |           |            |         |
| Female                               | 4 (19%)    | 2 (22.2%) | 2 (16.7%)  | 0.86    |
| Men                                  | 17 (81%)   | 7 (77.8%) | 10 (83.3%) |         |
| NYHA                                 |            |           |            |         |
| 1                                    | 0          | 0         | 0          | 0.97    |
| 2                                    | 13 (61.9%) | 5 (55.5%) | 8 (66.7%)  |         |
| 3                                    | 7 (33.3%)  | 4 (44.4%) | 3 (25%)    |         |
| 4                                    | 1 (4.8%)   | 0         | 1 (8.3%)   |         |
| Electrode location (right ventricle) |            |           |            |         |
| Middle Septum                        | 8 (38.1%)  | 3 (33.3%) | 5 (41.7%)  | 0.75    |
| RVOT                                 | 13 (61.9%) | 6 (66.7%) | 7 (58.3%)  |         |
| Electrode location (right auricle)   |            |           |            |         |
| Bachmann                             | 18 (85.7%) | 8 (88.9%) | 10 (83.3%) | 0.86    |
| Atrial appendage                     | 3 (14.3%)  | 1 (11.1%) | 2 (16.7%)  |         |
| Electrode location (left ventricle)  |            |           |            |         |
| CS/MCV                               | 5 (23.8%)  | 3 (33.3%) | 2 (16.7%)  | 0.38    |
| CS/ALV                               | 12 (57.1%) | 5 (55.6%) | 7 (58.3%)  |         |
| CS/PLV                               | 4 (19%)    | 1 (11.1%) | 3 (25%)    |         |

## Statistical research methods

The research material was stored in a Microsoft Office Excel database. All calculations were performed using the STATISTICA software. Evaluated features and parameters were described using mean, standard deviation SD, median, minimum, and maximum values. The significance level was set at 0.1, which is the level generally accepted for medical research. The patients were divided into two groups based on age; the first group comprised patients up to 65 years and the other over 65 years of age. The difference significance test for analysed subgroups (before and at least 6 months after the surgery) was performed using Student's *t*-test for quantitative data and the Mann-Whitney *U* test for qualitative data. The scores for each area in each questionnaire were provided in accordance with the instructions of the WHOQoL-BREF.

## Data collection and remote monitoring

Clinical data were collected on the basis of the analysis of medical records, interviews, observations and especially the questionnaire. The QoL evaluation was performed using a shortened version of the WHOQoL-BREF questionnaire, filled in by the pa-

tients themselves. After completion of hospitalization and surgery, all patients ( $n = 21$ ) reported on the date scheduled in the information sheet to the Stimulators and Cardioverters Control Clinic for a check-up visit. At the long-term follow-up, the following information was particularly important: the occurrence or absence of after surgery complications, the occurrence of adequate and inadequate discharge, the healing of the wound, hospitalisation, medical history, participation in the comprehensive cardiac rehabilitation (CCR). Every month 4.76% of the respondents reported for a control visit, 23.81% of the respondents every two months and 71.43% of the respondents every three months ( $p = 0.07$ ). The average period between the examinations was eight months ( $p = 0.61$ ). The collection of the data, which was subsequently statistically analysed, was completed in January and February 2013.

### Study inclusion criteria

The study involved 25 patients, of whom 21 completed the whole study. The main criterion for participation in the study was undergoing the CRT-P or CRT-D implantation procedure and procurement of the patient's consent to participation in the study and data processing. Each patient was informed in detail about the manner of research to be conducted and what their participation would involve. Each patient had the opportunity to ask researchers any questions and was provided with clear and comprehensive responses. Written information addressed the issues connected with the subject of the research, its purpose, rules of conduct, benefits and risks, as well as the patients' possible resignation from the study at any time and at any stage.

### Study exclusion criteria

The main study exclusion criteria was the inability to participate in the test after at least 6 months following the surgery, due to a change in place of residence or change of medical facility ( $n = 2$ ), and because of death ( $n = 1$ ) of non-cardiac causes three months after surgery. The lack of patient's consent was also an exclusion criterion.

**Table 2.** The details of the study group in terms of indication for the surgery and the heart condition

| Parameter                            | All         | Age       |            | p-value |
|--------------------------------------|-------------|-----------|------------|---------|
|                                      |             | Up to 65  | Over 65    |         |
| Prevention                           |             |           |            |         |
| Primary prevention                   | 19 (95.2%)  | 9 (100%)  | 11 (91.7%) | 0.75    |
| Secondary prevention                 | 1 (4.76%)   | 0         | 1 (8.3%)   |         |
| Heart failure                        | 21 (100%)   | 9 (100%)  | 12 (100%)  | N/A     |
| Dilated cardiomyopathy (DCM)         | 12 (57.14%) | 6 (66.7%) | 6 (50%)    | 0.55    |
| Hypertrophic cardiomyopathy (HCM)    | 0           | 0         |            | N/A     |
| Post-infarction DCM                  | 9 (42.86%)  | 3 (33.3%) | 6 (50%)    | 0.55    |
| Post-inflammatory DCM                | 2 (9.52%)   | 0         | 2 (16.7%)  | 0.55    |
| VF                                   | 1 (4.76%)   | 0         | 1 (8.3%)   | 0.75    |
| VT                                   | 19 (91.00%) | 8 (88.9%) | 12 (100%)  | 0.7     |
| Experienced SCA                      | 1 (4.76%)   | 0         | 1 (8.3%)   | 0.75    |
| Post-myocardial infarction condition | 9 (42.86%)  | 3 (33.3%) | 6 (50%)    | 0.55    |

## RESULTS

### The details of the study group in terms of heart condition and indications for surgery

All participating patients had been diagnosed with HR, ventricular dyssynchrony and dilated cardiomyopathy (DCM). In the over 65 group, 50% of patients had been diagnosed with post-

infarction cardiomyopathy and 17% had been diagnosed with post-inflammatory cardiomyopathy. Documented VT occurred in a total of 92% of patients and in 100% of the "over 65" group ( $p = 0.7$ ). In the group "up to 65", 95.2% of patients had CRT-D implanted for primary prevention of SCD (documented VT). In the "over 65" group, 8.3% received the system for secondary SCD prevention (documented VF and SCA,  $p = 0.75$ ). The study group was homogeneous in terms of indications for the surgery and heart condition (dilated cardiomyopathy). The details of the study group in terms of indication for the surgery and the heart condition are presented in Table 2.

### The details of the study group in terms of comorbidities

Other coexisting conditions which could affect the overall quality of life as perceived by the patients were diagnosed in the study group, including hypertension, present in 57% ( $p = 0.17$ ), depression (52%,  $p = 0.35$ ) and type 2 diabetes (48%,  $p = 0.35$ ). The study group was homogeneous in terms of coexisting diseases. The details of the study group in terms of coexisting diseases are presented in Table 3.

**Table 3.** The details of the study group in terms of coexisting diseases

| Parameter                             | All         | Age       |           | p-value |
|---------------------------------------|-------------|-----------|-----------|---------|
|                                       |             | Up to 65  | Over 65   |         |
| Post-CABG condition                   | 6 (28.57%)  | 3 (33.3%) | 3 (25%)   | 0.75    |
| Post-PCI condition                    | 10 (47.62%) | 4 (44.4%) | 6 (50%)   | 0.86    |
| Paroxysmal FA                         | 6 (28.57%)  | 3 (33.3%) | 3 (25%)   | 0.75    |
| Established FA                        | 1 (4.76%)   | 1 (11.1%) | 0         | 0.7     |
| Arterial hypertension                 | 12 (57.14%) | 7 (77.8%) | 5 (41.7%) | 0.17    |
| Type 2 Diabetes                       | 10 (47.62%) | 3 (33.3%) | 7 (58.3%) | 0.35    |
| Stroke                                | 3 (14.29%)  | 1 (11.1%) | 2 (16.7%) | 0.86    |
| RA                                    | 2 (9.52%)   | 1 (11.1%) | 1 (8.3%)  | 0.92    |
| Thyroid diseases                      | 3 (14.29%)  | 3 (33.3%) | 0         | 0.22    |
| Depression                            | 11 (52.38%) | 6 (66.7%) | 5 (41.7%) | 0.35    |
| Other significant conditions          |             |           |           | 0.19    |
| Chronic kidney disease                | 3 (14.29%)  | 0         | 3 (25%)   |         |
| Varicose veins of the lower limbs     | 1 (4.76%)   | 0         | 1 (8.3%)  |         |
| Atherosclerosis                       | 1 (4.76%)   | 1 (11.1%) | 0         |         |
| Left lung resection                   | 1 (4.76%)   | 0         | 1 (8.3%)  |         |
| Chronic obstructive pulmonary disease | 2 (9.52%)   | 2 (9.52%) | 0         |         |

### The details of the study group at least 6 months after the surgery

In 29% of patients, a pressure dressing was applied to prevent local haematoma formation. No complications related to wound healing were recorded in 19 ( $p = 0.92$ ) patients. One patient complained about pain lasting for more than a fortnight. Also, redness around the wound was observed in only one patient. In the researched population ( $n = 21$ ) in the outpatient follow-up observation, LV lead displacement and ineffective stimulation was reported for one patient. Due to electrode dislocation, radiological diagnostics was performed and the device was reprogrammed in order to ensure a higher level of efficient pacing of the left ventricle. Lack of complications in the outpatient follow-up observation was reported for a total of 95.24% of participating patients ( $p = 0.7$ ). In total, 57% of patients ( $p = 0.42$ ) attended comprehensive cardiac rehabilitation. Effective discharge and life-threatening arrhythmias interruption was recorded for 6 patients 28.57% ( $p = 0.07$ ) during the outpatient follow-up. Re-hospitalisation was necessary for 33% of patients ( $p = 0.02$ ); 67% in the "over 65 group". In the "up to 65 group", one of the patients qualified for a heart transplant and another for a Percutaneous Coronary Angioplasty (PTCA). In the "over 65 group", one patient was qualified for radio frequency ablation of the supra-ventricular arrhythmia (atrial flutter, AFL). The study group was homogeneous in terms of outpatient follow-up

observation. The details of the study group at least 6 months after the surgery are presented in Table 4.

**Table 4.** The details of the study group, at least 6 months after the surgery

| Parameter                           | All         | Age       |            | p-value |
|-------------------------------------|-------------|-----------|------------|---------|
|                                     |             | Up to 65  | Over 65    |         |
| Pressure dressing [days]            |             |           |            |         |
| 0                                   | 6 (28.57%)  | 1 (11.1%) | 5 (41.7%)  | 0.7     |
| 1                                   | 1 (4.76%)   | 1 (11.1%) | 0          |         |
| 2                                   | 8 (38.1%)   | 5 (55.6%) | 3 (25%)    |         |
| 6                                   | 6 (28.57%)  | 2 (22.2%) | 4 (33.3%)  |         |
| Healing of the wound                |             |           |            |         |
| Normal                              | 19 (90.48%) | 8 (88.9%) | 11 (91.7%) | 0.92    |
| Swelling                            | 1 (4.76%)   | 0         | 1 (8.3%)   |         |
| Pain                                | 1 (4.76%)   | 1 (11.1%) | 0          |         |
| After surgery complication          |             |           |            |         |
| None                                | 20 (95.24%) | 8 (88.9%) | 12 (100%)  | 0.7     |
| LV electrode displacement           | 1 (4.76%)   | 1 (11.1%) | 0          |         |
| CCR                                 | 12 (57.14%) | 4 (44.4%) | 8 (66.7%)  | 0.42    |
| Follow-up observation in the clinic |             |           |            |         |
| Once a month                        | 1 (4.76%)   | 1 (11.1%) | 0          | 0.07    |
| Every two months                    | 5 (23.81%)  | 4 (44.4%) | 1 (8.3%)   |         |
| Every three months                  | 15 (71.43%) | 4 (44.4%) | 11 (91.7%) |         |
| Efficient intervention – discharge  | 6 (28.57%)  | 5 (55.6%) | 1 (8.3%)   | 0.07    |
| Hospitalisation                     | 7 (33.33%)  | 6 (66.7%) | 1 (8.3%)   | 0.02    |
| Qualification for another treatment |             |           |            |         |
| Heart transplant                    | 1 (4.76%)   | 1 (11.1%) | 0          | 0       |
| PTCA                                | 1 (4.76%)   | 1 (11.1%) | 0          |         |
| RFA                                 | 1 (4.76%)   | 0         | 1 (8.3%)   |         |

### Analysis of the impact of the surgery on the patients' quality of life

The somatic and psychological areas of life quality evaluation, calculated on the basis of data obtained through the WHOQoL questionnaire, were homogeneous in the subgroups compared, while the social and environment areas were not. The social area prior to the surgery clearly shows much better results for younger patients. In the environmental area, much better results are recorded for older patients post-surgery (Tables 5a and 5b). The analysis of the impact of the surgery on the patients' quality of life is presented in Table 6.

**Table 5a.** The areas of life quality evaluation prior to the surgery

| Parameter                                   | All   | Age      |         | p-value |
|---------------------------------------------|-------|----------|---------|---------|
|                                             |       | Up to 65 | Over 65 |         |
| Somatic area (prior to the treatment)       |       |          |         |         |
| Average                                     | 40.95 | 39.67    | 41.92   | 0.72    |
| Standard deviation SD                       | 13.63 | 14.5     | 13.5    |         |
| Median                                      | 38    | 44       | 38      |         |
| Minimum                                     | 13    | 13       | 25      |         |
| Maximum                                     | 69    | 56       | 69      |         |
| Psychological area (prior to the treatment) |       |          |         |         |
| Average                                     | 56.29 | 56.33    | 56.25   | 0.98    |
| Standard deviation SD                       | 8.43  | 9.42     | 8.04    |         |
| Median                                      | 56    | 56       | 56      |         |
| Minimum                                     | 44    | 44       | 44      |         |
| Maximum                                     | 75    | 69       | 75      |         |

|                                             |       |       |       |      |
|---------------------------------------------|-------|-------|-------|------|
| Social area (prior to the treatment)        |       |       |       |      |
| Average                                     | 65.19 | 71.67 | 60.33 | 0.05 |
| Standard deviation SD                       | 13.22 | 13.24 | 11.42 |      |
| Median                                      | 69    | 69    | 56    |      |
| Minimum                                     | 44    | 44    | 50    |      |
| Maximum                                     | 94    | 94    | 81    |      |
| Environmental area (prior to the treatment) |       |       |       |      |
| Average                                     | 63    | 60.56 | 64.83 | 0.19 |
| Standard deviation SD                       | 7.33  | 7.83  | 6.67  |      |
| Median                                      | 63    | 63    | 63    |      |
| Minimum                                     | 50    | 50    | 56    |      |
| Maximum                                     | 81    | 69    | 81    |      |

**Table 5b.** The areas of life quality evaluation post-surgery

| Parameter                       | All   | Age      |         | p-value |
|---------------------------------|-------|----------|---------|---------|
|                                 |       | Up to 65 | Over 65 |         |
| Somatic area post-surgery       |       |          |         |         |
| Average                         | 62.33 | 58.44    | 65.25   | 0.17    |
| Standard deviation SD           | 10.36 | 12.48    | 7.76    |         |
| Median                          | 63    | 56       | 63      |         |
| Minimum                         | 44    | 44       | 56      |         |
| Maximum                         | 81    | 75       | 81      |         |
| Psychological area post-surgery |       |          |         |         |
| Average                         | 62.05 | 60.44    | 63.25   | 0.57    |
| Standard deviation SD           | 9.59  | 13.73    | 5.14    |         |
| Median                          | 63    | 63       | 63      |         |
| Minimum                         | 31    | 31       | 56      |         |
| Maximum                         | 81    | 81       | 69      |         |
| Social area post-surgery        |       |          |         |         |
| Average                         | 74.43 | 76.33    | 73      | 0.54    |
| Standard deviation SD           | 11.87 | 11.99    | 12.11   |         |
| Median                          | 75    | 81       | 69      |         |
| Minimum                         | 50    | 50       | 56      |         |
| Maximum                         | 94    | 94       | 94      |         |
| Environmental area post-surgery |       |          |         |         |
| Average                         | 72.95 | 68.89    | 76      | 0.06    |
| Standard deviation SD           | 7.81  | 9.25     | 5.01    |         |
| Median                          | 75    | 69       | 75      |         |
| Minimum                         | 50    | 50       | 69      |         |
| Maximum                         | 81    | 81       | 81      |         |

**Table 6.** The analysis of the impact of the surgery on the patients' quality of life

| Parameter                          | Mean  | SD t. | t     | df | p       | -90% CI | +90% CI |
|------------------------------------|-------|-------|-------|----|---------|---------|---------|
| Somatic prior the surgery          | 40.95 | 13.63 |       |    |         |         |         |
| Somatic post-surgery               | 62.33 | 10.36 | -6.49 | 20 | < 0.001 | -27.07  | -15.7   |
| Psychological prior to the surgery | 56.29 | 8.43  |       |    |         |         |         |
| Psychological post-surgery         | 62.05 | 9.59  | -2.38 | 20 | 0.03    | -9.93   | -1.59   |
| Social prior to the surgery        | 65.19 | 13.22 |       |    |         |         |         |
| Social post-surgery                | 74.43 | 11.87 | -4.32 | 20 | < 0.001 | -12.93  | -5.55   |
| Environment prior to the surgery   | 63    | 7.33  |       |    |         |         |         |
| Environmental post-surgery         | 72.95 | 7.81  | -4.97 | 20 | < 0.001 | -13.4   | -6.5    |

The implantation of the cardiac resynchronisation device had a positive impact in all four areas of life quality. The analysis was performed using Student's *t*-test for dependent variable, 2 sets of results for the same items measured at different times. The questions evaluating physical well-being concerned in particular: restrictions in daily life caused by illness, dependence on treatment, vital energy resources, acceptance of illness, satisfaction with sleep, general efficiency, independence, ability to work and run a household. The questions evaluating psychological well-being concerned in particular: experiencing joy and meaning of life, attention focus, self-acceptance of appearance, self-satisfaction, frequency of experiencing unpleasant moods.

The questions evaluating social relationships concerned in particular: satisfaction with relationships and personal relations with others, sex life, and support of friends and relatives. The questions evaluating environmental conditions concerned in particular: a sense of security in everyday life, life environment assessment, satisfying financial needs, leisure activities, travelling, housing conditions satisfaction, access to information about the disease, treatment, rehabilitation, healthy lifestyle and health care.

## DISCUSSION

The evaluation of the impact of chronic heart failure on the quality of life is a subject that is increasingly often undertaken in single and multi-centre research studies [6]. The diversity of published questionnaires indicates a lack of universal measuring tools. Researchers most often choose the most general or most specific questionnaire, which is a practical and proven research tool including a multi-level assessment of the impact of the disease on everyday life. Resynchronisation therapy (CRT-P and CRT-D) has been proven in large multi-centre studies to positively affect the quality of patient life (COMPANION, MIRACLE, MUSTIC) [7–9]. A reduction of failure symptoms and increased exercise tolerance were experienced by the patients as a higher quality of life. This was also confirmed in Cleland's study in which significant clinical benefit from cardiac resynchronisation therapy was observed compared with pharmacological treatment as well as an improvement of the quality of life [10]. In the CONTAK CD study, a trend towards improving the quality of life in this group of patients was also recorded [11]. In recent years the utilisation of implantable cardioverter-defibrillators (ICD, CRT-D) has been increasing. In the clinic where the survey was carried out, as many as 25 CRT-D devices are implanted annually. The study confirmed the positive impact of the surgery on general QoL. Contrary to the expectations that QoL will reduce with age, the study did not record this connection, possibly due to non-acceptance of the disease among the

younger population of patients. For older people even a small improvement in physical well-being may increase the positive perception of certain aspects of life [12]. In other studies which evaluate the QoL in heart failure, it has been shown that somatic factors, factors including the perception of the disease symptoms, and psychological, social, and environmental factors have a strong influence. The most frequently mentioned included social isolation, fear of death, lack of knowledge about the disease and treatment, depression, insomnia [13]. QoL evaluation is an important supplement to the clinical parameters; it cannot be forgotten, however, that this is a qualitative rather than quantitative study. The points given in the self-evaluation process may be used to compare the results in a particular category (area). This explains the possible lack of correlation of the subjective evaluation of QoL with the objective medical data. Self-evaluation of the patient does not necessarily reflect the actual stage of the disease. A detailed analysis of the impact of co-existing diseases on QoL after CRT device implantation is an area of research that has not been addressed so far. The aim of modern medicine is not only to prolong life but also to improve its quality; it is crucial, therefore, to evaluate the efficiency of treatment from the patient's perspective. Future studies on this subject may be of some value, both multi- and single-centre.

## Practical implications

It is currently very important to improve patient care; its low quality may reduce the number of hospitalisations. The study confirms that frequent outpatient checks (every month) had a negative impact on the quality of life. However, there was no such impairment in re-hospitalised patients. This may be associated with the difficulties the patients must overcome to visit the clinic and with the sense of security while being actually hospitalised. The issue requires additional research and analysis. Education and patient motivation is necessary and significant. An important role in this care system has to be played by nurses. A group of specially trained nurses would add great value by establishing strong relations with their patients and providing education and rehabilitation. Well-organised nursing care significantly reduces the number of hospital admissions and outpatient visits.

## CONCLUSIONS

1. Resynchronisation therapy helps to improve patients' overall quality of life.
2. The therapy had a positive impact on the perceived somatic, psychological and social area in each patient group, both up to 65 and over 65 years of age.

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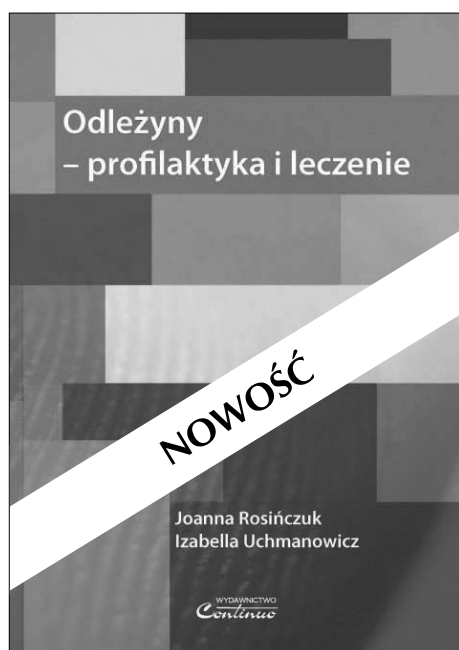
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## Odleżyny – profilaktyka i leczenie

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Monografia „Odleżyny – profilaktyka i leczenie” opisuje m.in. zagadnienia dotyczące:

- klinicznych aspektów powstawania i rozwoju odleżyn, zagrożeń związanych z ich obecnością oraz skutkami powikłań i znajomości dynamiki procesu chorobowego;
- standardów profilaktyki i zapobiegania odleżynom – praktycznego postępowania pielęgniarsko-opiekuńczego z zastosowaniem skal do oceny ryzyka, prowadzeniem dokumentacji, a także pielęgnacji pacjenta oraz dostosowania materaców przeciwoodleżynowych i innych sprzętów do konkretnych potrzeb pacjentów;
- leczenia odleżyn – rodzajów opatrunków, leczenia w zależności od stopnia odleżyn, terapii światłem BIOPTRON, leczenia ran Inem, terapii tlenem hiperbarycznym, larwoterapii, podciśnieniowej terapii miejscowej, wibroakustyki, fal akustycznych, a także innych metod leczenia (np. inżynierii tkankowej, leczenia komórkowego) oraz leczenia operacyjnego;
- żywienia dietetycznego, ekonomicznych aspektów leczenia, ochrony psychiki i współdziałania z rodziną;
- standardów zapobiegania i schematów postępowania pielęgniarskiego;
- przykładowych diagnoz pielęgniarskich pacjentów z odleżyną.

Uzupełniające tę wiedzę ilustracje sprawiają, że publikacja jest jeszcze bardziej przejrzysta i przystępna dla każdego czytelnika.

Książka ta adresowana jest do pielęgniarek oraz położnych w szpitalach, przychodniach, zakładach opiekuńczych i leczniczych, w których sprawowana jest opieka nad pacjentem, a także do nauczycieli prowadzących kształcenie pielęgniarek i położnych oraz wszystkich innych osób zajmujących się profilaktyką i leczeniem odleżyn, którzy chcieliby poszerzyć swoją wiedzę na ten temat.

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