

A new programme of multidisciplinary care for patients with heart failure in Poznań: one-year follow-up

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Abstract

Introduction: Recent trials have demonstrated the effectiveness of multidisciplinary care (MDC) for patients with chronic heart failure (CHF). However, results of the assessment of different programmes in individual countries could be different because of local specificities of health care systems.

Aim: We sought to determine whether MDC for patients with CHF has an influence on mortality, rate of rehospitalisation, quality of life (QoL) and self-care (SC) during a one-year study period.

Methods: 160 patients with CHF treated in our unit were randomly assigned to receive either MDC or routine care (RC). Patients from the MDC group (n=80; mean age 67±10.2 years) attended follow-up visits at the heart failure clinic after 14 days and 3, 6, 9 and 12 months after discharge. They were cared for by a team which consisted of a cardiologist, a heart failure nurse (HF nurse), a psychologist and a physiotherapist. This group of patients received comprehensive education from the HF nurse and the cardiologist. Telephone counselling and home-based interventions by the HF nurse were also available daily. Patients from the RC group (n=80, mean age 69.5±10.7 years) were cared for by their primary care physician only. In both groups QoL and SC scores were calculated based on a 21 and 12-item questionnaire completed by the patients at discharge and after one year.

Results: After one-year follow-up the two groups did not differ in terms of either total and HF mortality or number of sudden deaths. In the MDC group when compared to the RC group we observed a significant decrease in the total number of hospital readmissions (by 37%, $p < 0.05$), a decrease in hospital admissions due to HF (by 48%; $p < 0.05$) and decreased length of stay during both all-cause readmissions and those due to HF ($p < 0.05$). After one year of follow-up both QoL and SC scores were significantly lower in the MDC group than in the RC group ($p < 0.001$), indicating improved QoL in the MDC group.

Conclusions: The one-year multidisciplinary care programme for patients with chronic heart failure in Poznań demonstrated significant improvement of treatment results in terms of frequency of readmissions and length of hospital stay as well as improved QoL. A tendency to decreased total and heart failure related mortality and decreased number of sudden deaths was also observed.

Key words: chronic heart failure, multidisciplinary care programme, Heart Failure Clinic, mortality, hospitalisations, quality of life, self-care

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Introduction

Translation of evidence-based medicine into daily practice has resulted in significant advances in the treatment of chronic heart failure (CHF). However, morbidity and mortality in patients suffering from CHF are still high. Low quality of life (QoL) observed in patients with CHF could be caused by insufficient self-

-control or self-care (SC). A further substantial problem is poor education of physicians on the management of CHF [1, 2]. Programmes of outpatient multidisciplinary care (MDC) developed during the last 10 years seem to be promising regarding the improvement of treatment outcomes [3-9]. However, due to the varied health care system structures in individual countries and varied

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programme models in individual centres, results of these programmes could be different.

The aim of this study was to determine the influence of our one-year complex MDC programme for patients with CHF on mortality, frequency of readmissions and length of hospital stay during readmissions, QoL and the level of SC. This is the first such programme of care in patients with CHF in Poland, introduced in 2002 by the 2nd Department of Cardiology of the Karol Marcinkowski Medical University in Poznań, Franciszek Raszeja Community Hospital. Key features of this programme are the cooperation between a cardiologist, an HF nurse, a physiotherapist and a psychologist on the basis of heart failure clinic as well as home visits by the HF nurse and telephone counselling by the cardiologist and the HF nurse. This programme is being conducted largely thanks to the financial support of the Health and Welfare Department in Poznań.

Methods

Study group

One hundred and sixty patients with CHF hospitalised in the 2nd Department of Cardiology, with established diagnosis and on optimal medical treatment, according to the evidence-based medicine rules, were randomised to the MDC group or routine care (RC). Demographic and clinical characteristics of both groups are shown in Table 1. No differences between the two groups were found.

Multidisciplinary care – visit schedule

80 patients from the MDC group continued the treatment based on follow-up visits at the Heart Failure Clinic (HFC) in Franciszek Raszeja Hospital in Poznań after 14 days and 1, 3, 6, and 12 months post discharge. Follow-up visits included consultation of the cardiologist, the HF nurse, the physiotherapist and the

Table 1. Clinical characteristics of patients with chronic heart failure (both groups)

| Demographics and clinical parameters | MDC group | RC group | p |
|--|-----------|-----------|----|
| n | 80 | 80 | |
| Age (years) | 67.3±10.2 | 69.5±10.7 | NS |
| Women, n (%) | 32 (40) | 33 (41) | NS |
| NYHA, n (%) | | | |
| II | 13 (16) | 10 (12.5) | NS |
| III | 35 (44) | 40 (50) | NS |
| IV | 32 (40) | 30 (37.5) | NS |
| EF (ECHO), % | 36±15 | 35±18 | NS |
| Systolic HF (EF <45%), n (%) | 66 (82.5) | 62 (77.5) | NS |
| HF with preserved systolic function (EF ≥45%), n (%) | 14 (17.5) | 18 (22.5) | NS |
| Ischemic cardiomyopathy, n (%) | 25 (31) | 26 (32.5) | NS |
| Idiopathic dilated cardiomyopathy, n (%) | 16 (20) | 19 (24) | NS |
| History of myocardial infarction, n (%) | 40 (50) | 42 (52.5) | NS |
| Hypertension, n (%) | 40 (50) | 37 (46) | NS |
| Diabetes, n (%) | 18 (22.5) | 26 (32.5) | NS |
| Permanent atrial fibrillation, n (%) | 20 (25) | 25 (31) | NS |
| VT/VF, n (%) | 20 (25) | 12 (15) | NS |
| Drugs, n (%): | | | NS |
| Angiotensin converting enzyme inhibitors | 76 (95) | 72 (90) | NS |
| β-blockers | 55 (69) | 50 (62.5) | NS |
| Spironolactone | 60 (75) | 55 (69) | NS |
| Diuretics | 70 (87.5) | 66 (82.5) | NS |
| Digitalis | 30 (37.5) | 31 (39) | NS |

MDC – multidisciplinary care, RC – routine care, HF – heart failure, VT – ventricular tachycardia, VF – ventricular fibrillation, EF – ejection fraction

psychologist. Patients and their general practitioners also had the opportunity of telephone counselling by the HF nurse and the cardiologist. For patients with advanced HF who were unable to come to the heart failure clinic, the HF nurse telephoned to arrange a home visit. Between visits to the clinic patients were under the care of their primary care physicians.

Multidisciplinary care – tasks of the cardiologist

The cardiologist's duties were to determine the underlying disease, reasons for deterioration (if it occurred), prognostic evaluation including the need for heart transplantation, assessment of current treatment and its possible modifications, the control of drugs titration, especially of β -blockers and angiotensin-converting enzyme inhibitors (ACEI), ordering work-up investigations and laboratory tests when needed, qualifying patients for the exercise rehabilitation programme and referring patients to the psychologist when needed.

Multidisciplinary care – tasks of the HF nurse

The HF nurse, during a patient's 30–40 minute visit at the clinic, informed the patient about the rules and potentials of the programme, disease, factors deteriorating HF, symptoms requiring contact with the clinic or an emergency care or other medical institution and about the side-effects of used drugs. She checked the patient's adherence to the drug regimen, dosing in particular (most importantly of ACEI and β -blockers) and informed the patient about the next scheduled visit. She gave advice about salt, fluids and alcohol intake, sexual activity, necessity of vaccinations, capabilities of a patient to travel or work, etc. She made the patient familiar with pulse, blood pressure and body mass measurement techniques, assessment of dyspnoea, oedemas and respiratory rate as well as the side effects of the treatment, pointing out the possibility of self-control and potential of self-adjustment in drug titration, i.e. furosemide (after telephone call), and scheduled visits to the heart failure clinic. Patients from the MDC group were provided with a diary in which they collected daily the above-mentioned data. The patients received a brochure discussing significant everyday problems of HF. The HF nurse was available by telephone for counselling daily during her working hours.

As part of the home-based interventional programme the HF nurse carried out home visits to patients with advanced HF who were unable to reach the clinic. During such visits, lasting for about an hour, the HF nurse had the same range of tasks as during the visit in the clinic. All data were collected in survey form.

Quality of life and self care questionnaires

At the baseline and after one year 56 patients from the MDC group and 35 from the RC group with the help of the HF nurse responded to the 21-item questionnaire with a 6-point scale from 0 to 5, concerning their QoL during the month preceding the examination ("Minnesota Living with Heart Failure questionnaire") [10]. To assess QoL the questionnaire was scored by summing the responses to all 21 questions. After one year these patients additionally answered a 12-item questionnaire with a 5-point scale from 1 to 5 assessing their self-care in CHF ("The European Heart Failure Self-Care Behaviour Scale") [11]. Self-care score (SC) was obtained by summing all items. The lower value of the score corresponds with better QoL and the ability to self-control in a patient with CHF.

Multidisciplinary care – educational activities

One of the most important elements of the programme was the educational sessions. They were addressed only to patients from the MDC group. Once a month physicians from our department and cardiologists from the HF clinic gave a lecture for patients and their family concerning the nature, aetiology, diagnosis and therapy of CHF. One-to-one education at the clinic, at the patient's home or by telephone, was conducted by the HF nurse.

Multidisciplinary care – physiotherapist's tasks

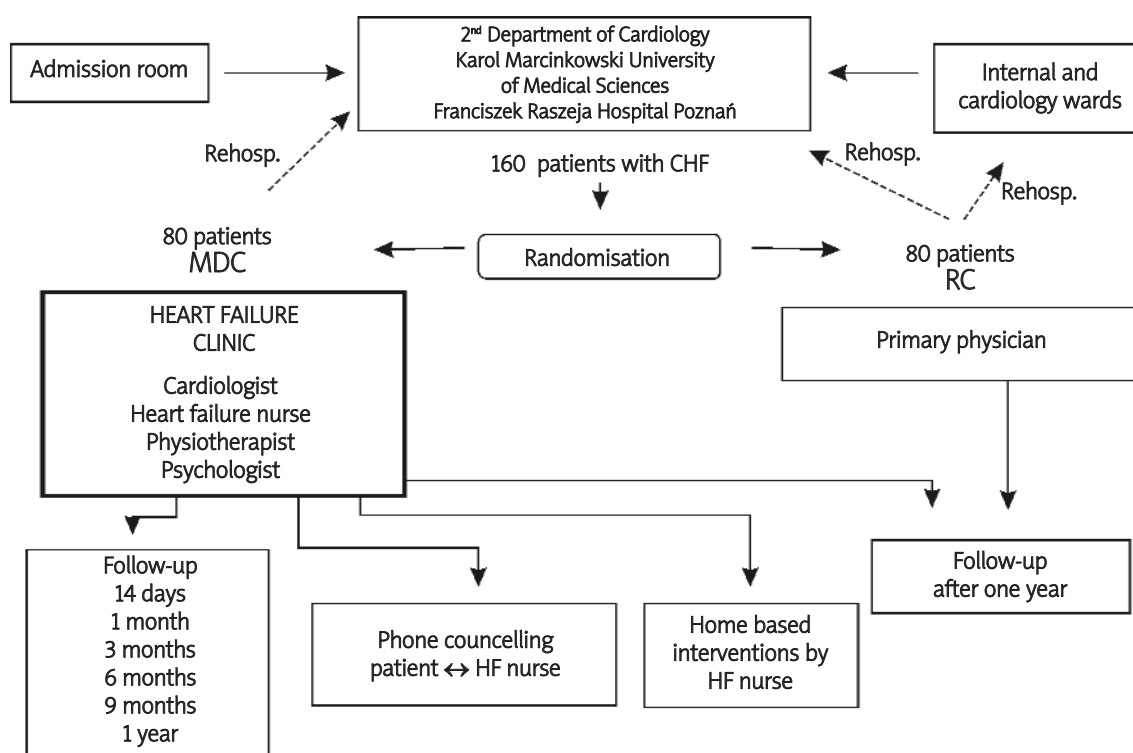
Duties of the physiotherapist included, along with the cardiologist, setting up the exercise rehabilitation programme and the subsequent learning and monitoring of the exercises, which were modified during group and individual meetings.

Multidisciplinary care – psychologist's tasks

The psychologist during group and individual educational activities with patients and their family tried to present advice on "how to cope with disease" and, after the cardiologist's order, performed psychotherapy in patients in whom a high level of trait anxiety was observed (depressive syndrome).

Routine care

Eighty patients from the RC group were cared for by their primary care physicians only. They did not participate in any educational or therapeutic activities of the programme. After one year they were controlled in the HF clinic once only. The process of assessment of patients is shown in Figure 1.



CHF – chronic heart failure, MDC – multidisciplinary care, RC – routine care

Figure 1. Outline of the one-year assessment of patient with chronic heart failure.

Statistical analysis

The study design was approved by the local ethics committee and all patients provided written consent. Statistical analysis was performed using Statistica 6.1 (StatSoft Inc.) and GraphPad INStat Version 3.0 (GraphPad Software Inc.). Data are presented as numbers, percentage, mean and standard deviation, median and 25th and 75th percentiles. Data expressed in percentages were compared using exact Fisher test. Comparison of means was performed by using Student's *t*-test for independent variables. Differences between QoL and SC scores were assessed using Wilcoxon rank-sum statistic for dependent variables and Mann-Whitney test for independent variables. Values of $p < 0.05$ were considered statistically significant.

Results

Both total and CHF-related mortality after the one-year study period tended to be lower in the MDC group than the RC group (NS) (Figure 2). The number of sudden deaths in the MDC group also tended to be lower (3.8% vs 5%; $p=0.77$). During the one-year follow-up period the

numbers of both all and CHF-related readmissions in the MDC group were significantly lower than in the RC group (22 vs 35 and 13 vs 25; respectively) (Figure 3). The length of hospital stay in both all and CHF-related hospitalisations was significantly decreased in the MDC group compared to the RC group (Figure 4).

After one year the score of QoL decreased significantly in MDC in comparison with the RC group (median [25th, 75th percentiles]: 30 [20, 45] and 14 [4.5, 26.5]; $p < 0.001$). The score decreased significantly in the MDC group compared to the baseline value (from 26 [17, 47] to 14 [4.5, 26]; $p < 0.001$), as well. No differences were observed between groups at the baseline (26 [17, 47] vs 27 [18, 44]) and in the RC group between the baseline and one-year measurement. The change in QoL score after one year compared to the baseline was significantly greater in MDC than in the RC group (Figure 5). The SC score after one year increased significantly in MDC when compared to the RC group: median [25th, 75th percentile] was 19.5 [16, 24] and 42 [37, 7] respectively; $p < 0.001$.

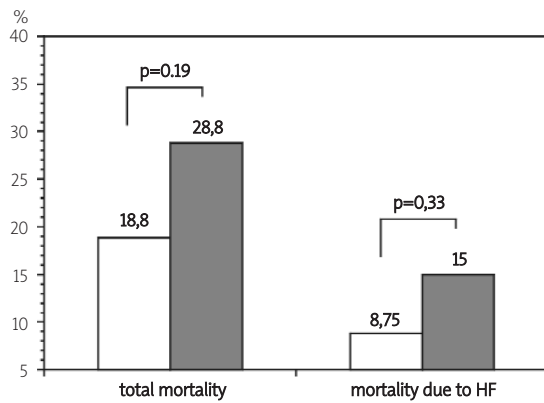


Figure 2. Total mortality and mortality due to HF during one-year follow-up. White bars – the MDC group, grey bars – the RC group

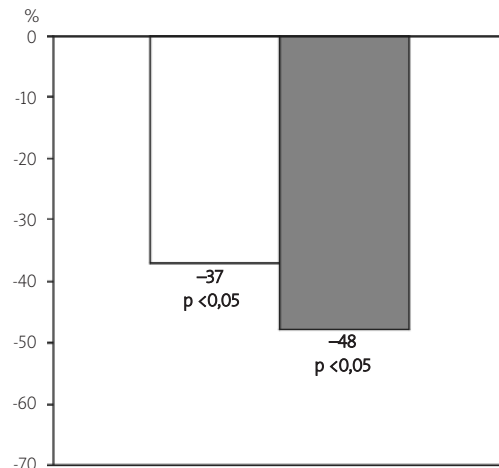


Figure 3. Percentage difference in total hospitalisations (white bars) and hospitalisations related to CHF (grey bars) in the MDC vs RC group (the rate of readmissions was significantly lower in the MDC group)

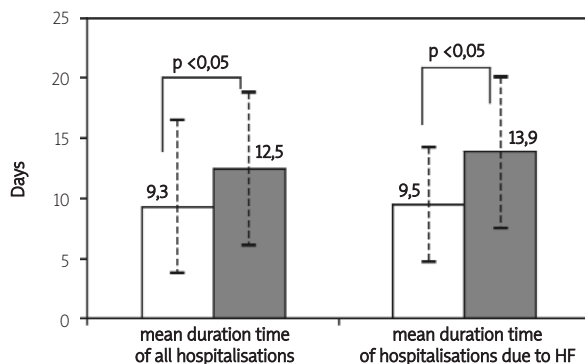


Figure 4. Duration of the hospital stay: all hospitalisations and hospitalisations related to CHF in the MDC group (white bars) and the RC group (grey bars)

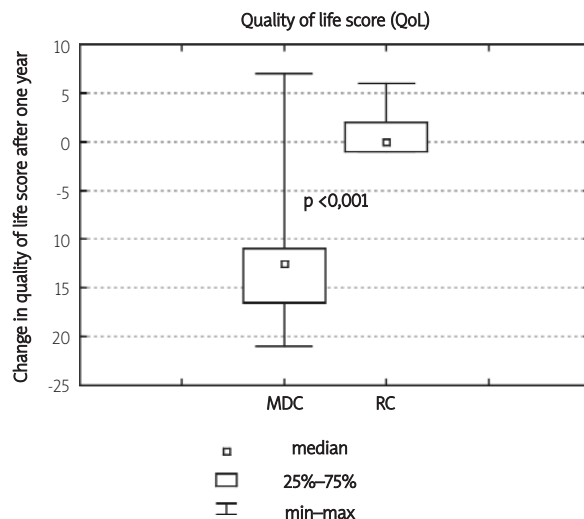


Figure 5. Change of QoL score in the MDC group and the RC group

Discussion

A new model of multidisciplinary outpatient care in patients with CHF introduced in Poznań demonstrated a beneficial effect of decrease of frequency and duration of readmissions from all causes and due to HF during one year of observation. It has improved patients' QoL and SC as well. Total and HF related mortality as well as the number of sudden deaths decreased insignificantly.

Our results are similar to other observations; however, the wide range of follow-up duration (from 1 month to 4.2 years) and the diversity of care models applied (HFC, home-based interventions), groups observed (age, severity of HF) or health care systems from country to country make objective comparison difficult. A metaanalysis by Gonthier et al. [3] including 27 randomised trials from years 1993-2003 on the effectiveness of programmes of care for patients with HF

older than 65 years has revealed that in comparison to RC these programmes have reduced rehospitalisations from HF or cardiovascular diseases by 30%, from all causes by 12% and composite end point (rehospitalisation or death) by 18%. In another metaanalysis [12] which assessed the effectiveness of HF clinic with HF nurse intervention in the majority of 18 randomised trials decreased rehospitalisation numbers and shorter rehospitalisation times were observed. Programmes offering home visits of an HF nurse have been proven to be more effective. In a recently published meta-regression analysis by Phillips et al. [13] only a few studies met the following criteria: participation of an HF nurse, HF clinic and at least one hundred patients randomised. Special benefit was observed in programmes which used hospital discharge planning, in which patients were clinically stable at discharge and those with first post-discharge follow-up within 14 days. In complex programmes incorporating all these components a 70% risk reduction of rehospitalisation relative to usual care was observed. In less complex programmes there was a 35% reduction in risk of readmission only. A reduction in costs of USD 278 per patient per month was observed. Decrease in costs of care was shown also by other authors [6, 7, 9].

Reduction of mortality in HF management programmes was not unequivocally shown; it was decreased only in a few studies [8, 14, 15]. More often there was an improvement in composite end point consisting of reduction of deaths and readmissions [3].

In our opinion we chose the optimum model of MDC, based on close cooperation between the cardiologist and the HF nurse without predominance of either of them, with independence of decision making for the cardiologist. Perhaps in the future it will be possible to implement models of HF care based mainly on an HF nurse, like in Sweden, with periodic control by a cardiologist only. It would be helpful considering the shortage of certified cardiologists.

Incorporation of physiotherapist and psychologists seemed to us to be of value. Simple exercise rehabilitation plays an important role in the treatment of HF. For some patients, because of increased trait (depressive syndrome) and substantial psycho-social and occupational problems, psychotherapy and psycho-social support are very important.

Cooperation between the cardiologist and the HF nurse with particular emphasis on optimisation of therapy conducted according to the guidelines, education of patients and their families or carers, learning of self-care and self-control with the possibility of self-adjustment of some medications (e.g. furosemide) play a central role for the success of every model of HF care [11, 16]. Telephone counselling

and home visits of the HF nurse, implemented also in our model, are valuable supplements.

Similar to our study, other randomised studies have shown that QoL scores improved [5, 6, 7]. The QoL questionnaire could be the instrument of assessment of the individual's state in a general physical, psychic and socio-economic perspective and could determine the influence of the programme on these factors. Our programme also had a beneficial influence on SC score. It should be one of the main purposes of MDC programmes because it is likely to contribute to the beneficial change in QoL. The questionnaire could be recommended on account of its simplicity and reliability. Systematic use of a diary is crucial for the patients' education and facilitates a partial uptake of the responsibility for the disease by a patient. This was documented in the twelve-month observation by Wright et al. [16].

It is of note that the treatment of the control group, number of visits, and the knowledge and experience of the physician could have an influence on the results of a programme. In our study patients from the control group were cared for by their primary care physician only and the frequency of visits was dependent only on them.

The MDC programmes are more and more implemented worldwide. Further studies are needed to explain their effects on mortality, maintenance of its effects, treatment of co-morbidities (diabetes, COPD, renal dysfunction, depression) and the role of telemonitoring. Professional support of the specialist societies and change of the health care systems (financial support) are needed. Every effort should be made to convince not only physicians but also governing bodies that these programmes are efficacious and their implementation is the only way to improve long-term care for these patients. Even if such programmes do not have any significant influence on mortality or are only slightly beneficial, it should be emphasised that improvement of QoL, diminishing of symptoms and psycho-social support are essential for patients with CHF, whereas cost reduction is important on a social scale.

Conclusions

Our new model of multidisciplinary care for patients with chronic heart failure implemented in Poznań demonstrated significant reduction of frequency and duration of readmissions, improvement of QoL and self-control and a trend to decrease the all-cause and heart failure related mortality and number of sudden deaths. Because of the growing number of patients and increased costs of treatment of HF, this model should be widely implemented in the whole county. It should

be implemented in HF clinics on the hospital basis and should involve at least a cooperating cardiologist and HF nurse in terms of patient education, monitoring and therapy with the possibility of telephone counselling and, in some situations, home visits of the HF nurse.

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Nowy wielodyscyplinarny program opieki nad chorymi z niewydolnością serca w Poznaniu. Obserwacja roczna

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Streszczenie

Wstęp: Ostatnie badania wykazały skuteczność programów opieki wielodyscyplinarnej (OWD) nad chorymi z przewlekłą niewydolnością serca (PNS). Wyniki ocen prowadzonych w różnych krajach mogą się różnić ze względu na specyfikę opieki medycznej.

Cel: Określenie wpływu OWD nad chorymi z PNS na śmiertelność, ponowne hospitalizacje, jakość życia (QoL) i samokontrolę (*self-care*, SC) w okresie rocznym.

Metodyka: Grupę badaną stanowiło 160 chorych z PNS leczonych w II Klinice Kardiologii w Poznaniu, losowo przydzielonych do OWD lub opieki rutynowej (OR). Grupę OWD tworzyło 80 chorych w wieku $67 \pm 10,2$ lat. Po 14 dniach oraz 3, 6, 9 i 12 mies. od wypisania z Kliniki poddano ich wizytom kontrolnym przeprowadzanym w Poradni Niewydolności Serca (POR-NS) przez kardiologa, pielęgniarkę niewydolności serca (PIEL-NS), psychologa oraz rehabilitanta. Chorzy ci otrzymali szeroką edukację ze strony PIEL-NS i kardiologa. Mogli również korzystać z codziennych pielęgniarskich konsultacji telefonicznych oraz wizyt PIEL-NS w domu. Grupę OR tworzyło 80 chorych w wieku $69,5 \pm 10,7$ lat. Byli oni leczeni wyłącznie w poradni lekarza rodzinnego. W obu grupach obliczano wskaźniki QoL oraz SC na podstawie 21- i 12-punktowej ankiety wypetnianej przez chorych wyjściowo oraz po upływie roku.

Wyniki: W grupie OWD nieistotnie w stosunku do grupy OR zmniejszyła się roczna śmiertelność całkowita, śmiertelność z powodu NS oraz liczba nagłych zgonów. W grupie tej w porównaniu z grupą OR stwierdzono po roku istotny spadek całkowitej liczby hospitalizacji (o 37%; $p < 0,05$), redukcję hospitalizacji z powodu NS (o 48%; $p < 0,05$), a także skrócenie czasu hospitalizacji ze wszystkich przyczyn oraz z powodu NS ($p < 0,05$). Po upływie roku istotnie niższy okazał się wskaźnik QoL w grupie OWD w stosunku do grupy OR ($p < 0,001$). Także wskaźnik SC po roku był znacznie niższy w grupie OWD niż OR ($p < 0,001$), co wskazuje na poprawę QoL.

Wnioski: Roczny wielodyscyplinarny program opieki nad chorymi z PNS w Poznaniu pozwolił na istotną poprawę wyników leczenia w zakresie wpływu na częstość i czas trwania ponownych hospitalizacji, jakość życia oraz samokontrolę chorych. Stwierdzono również tendencję do zmniejszenia śmiertelności całkowitej, z powodu NS oraz liczby nagłych zgonów.

Słowa kluczowe: przewlekła niewydolność serca, program opieki wielodyscyplinarnej, Poradnia Niewydolności Serca, śmiertelność, hospitalizacje, jakość życia, samokontrola chorych

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