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Long-term results of a three-week intensive cardiac out-patient rehabilitation program in motivated patients with low social status

Summary  The short-term benefits of cardiac rehabilitation (CR) are well established. In contrast, well-documented long-term results are rare. The objective of this longitudinal multi-centre observational study was to examine the effects of intensive out-patient CR in a larger patient cohort, especially for patients with low social status. We present the final results 24 months after CR.

Methods  The study group of 327 patients (288 men, 39 women, aged 56.0 ±10.8 years, coronary artery disease in 295, other cardiac diseases in 32) participated in a 3-week CR programme followed by clinical re-evaluations 6 (III), 12 (IV) an 24 (V) months later.

Results  The improvement in mean maximal performance of 100.5 ±31.4 to 123.1 ±36.2 W (p<0.01) achieved during CR was further improved to 128.7 ±40.9 W (p<0.01) after 24 months. Of the patients, 61.2% reported regular physical activity during the 24 months of the study. The lipid management achieved by CR was maintained over 24 month. At I 65%, at II 84.4% and at V 82.4% of the patients with coronary artery disease (CAD) were undergoing lipid lowering therapy. BMI increased from 26.8 ±3.0 to 27.6 ±3.6 kg/m² (p<0.01) during follow-up. Of the patients, 23.2% were active smokers at V. Cardiovascular diagnosis remained unaltered in 74.3% of patients. The obtained results are interesting with respect to the social status of the patients since 68% were general laborers. The results confirm the long-term effectiveness of an intensive 3-week out-patient CR programme. Most of the benefits achieved by CR appear to be sustainable in this population for at least 2 years.

Key words  Cardiac rehabilitation – long-term results – labourers – risk factors modification – return to work

Introduction

The German cardiac rehabilitation system has some specific characteristics that make it different from rehabilitation measures in other European countries. According to German health law, patients have the right to in- or out-patient rehabilitation subsequent to myocardial infarction, percutaneous coronary intervention (PCI), heart surgery, or other severe cardiovascular diseases. Necessary measures are paid for by either retirement insurance or health insurance providers, or by social aid if no other provider is responsible. By law, phase II cardiac rehabilitation lasts for 3 weeks. In contrast to other European countries, in Germany approximately 95% of all phase II CR are carried out on a residential basis.
With demand and costs increasing, the governmental health authorities are demanding more flexible solutions for CR, asking for the establishment of an adequate, multi-level treatment system prioritising out-patient over in-patient treatment [6, 11]. The legal basis has already been set up. For certain groups of patients, first studies of intensive out-patient rehabilitation have shown that the residential programme can be transferred to the out-patient setting without loss of quality. However, these studies were performed on relatively small and stringently selected study groups, and still leave several questions unanswered. The studies included almost exclusively patients with higher educational and occupational status, suggesting that only this group of patients would prefer the out-patient setting. In addition, adequate long-term results are missing. The objective of this longitudinal multicentre observational study was to examine the long-term effects of cardiac rehabilitation programmes carried out on an out-patient basis in a larger patient cohort, especially for patients with low social status who were expected to be less willing and motivated to take part in out-patient programs [20].

Methods

Setting and sample

The study was supported by four constituents comprised of health insurance companies and national pension plan groups mainly responsible for blue-collar workers. Rehabilitation was carried out in six different centres: two in cooperation with rehab clinics, two in cooperation with acute medical care centres, and by two private medical practices. In these centres, for the 3-year period of the study, all out-patient cases from the participating health insurance companies and national pension plan groups were included in the study. Comparable to the in-patient setting, the out-patient program lasted 3 weeks (15.4 ± 1.8 days of treatment). The rehabilitation program followed within 14 days of discharge from hospital. The rehabilitation process included somatic, educative, psychological, and social elements and was implemented by an multi-disciplinary rehabilitation team supervised by cardiologists. Patients had to be mobile and able to reach the rehabilitation centre on their own. In a few exceptional cases (6.1%), the costs for taxis were paid. Most patients arrived by private car (78.6%) or by public transportation (16.2%). As prescribed by the legal regulations, patients came into the rehabilitation centres, five to seven hours every weekday and attended at least four to five therapy units each day. During CR the patients participated in 57.3 ± 16.2 therapy units. The study was set up as a longitudinal study. The patients were clinically examined in the rehabilitation centre as follows: directly before CR (I), directly after CR (II), 6 months (III), 12 months (IV), and 24 months after (V) completing the CR programme. The examination included, among others, clinical examination and analysis of several parameters (total-, LDL-, HDL-cholesterol, tryglycerides, blood glucose). Physical performance was assessed by incremental bicycle ergometry. The exercise test was performed until exhaustion or the occurrence of predefined cardiovascular end points as set out in the German guidelines [30]. Physical activity was assessed by a standardised questionnaire that included questions about exercise mode, frequency per week and time spent per exercise units. The statistical evaluation was carried out externally. This paper presents the final results 24 months after completion of CR.

The initial study group included 553 patients (479 men, 74 women mean age 56.0 ± 11.5 years). The drop-out rate during rehabilitation was 1.8% (n = 10). The baseline data and the short-term results have already been published [5]. We were able to include 327 patients (60.2%) in the re-evaluation 24 months after CR. The reasons for non-inclusion were: 21 patients (3.9%) had deceased, 10 (1.8%) prevented by other cardiac diseases, 7 (1.3%) prevented by occupational reasons, 63 (11.6%) refused to take part in the re-evaluation, 19 (3.5%) had changed their residence and from 96 (17.7%) patients we had no response to repeated invitations. To find out if the responders to the follow-up invitation were different from the non-responder group we used the initial data to analyse patients’ characteristics and compared the results of the rehabilitation period itself in the both groups. Data from patients who had died during the observational time were excluded. The results are summarized in Tables 1 and 2. Patients not responding were more likely to be younger (p = 0.002) and to be smokers (p < 0.05) but less likely to have history of hypertension (p < 0.0001) and hypercholesterolemia (< 0.001). No differences were observed regarding gender, educational and occupational status, cardiovascular diagnosis or indication for rehabilitation. Differences in response to the rehabilitation programme were only observed in BMI changes.

The study group at the 24-month follow-up included 327 patients (288 men and 39 women, aged 56.9 ± 10.8 years (see Table 3)). The cardiovascular indications for the rehabilitation measures included condition after post myocardial infarction (MI) in 110 patients, coronary artery disease without MI in 78 patients, condition after coronary artery bypass