Rehabilitation Practice Patterns for Patients with Heart Failure

The United States Perspective

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KEYWORDS

• Heart failure • Heart failure with reduced ejection fraction
• Heart failure with preserved ejection fraction • Exercise training • Cardiac rehabilitation • Adherence

KEY POINTS

- The United States is a leader among worldwide research initiatives showing benefits of exercise training for heart failure.
- Enrollment in cardiac rehabilitation in the United States remains poor.
- There are many impediments to cardiac rehabilitation enrollment and adherence in the United States that seem likely to persist irrespective of the fact that heart failure has recently been approved as an eligible diagnosis for cardiac rehabilitation.
- There are predominant shifts in the health care environment in the United States, particularly an increase in Accountable Care Organizations, which are placing greater priority in value of care (ie, changes that seem likely to bolster the application of cardiac rehabilitation for heart failure).

INTRODUCTION

Although many anticipate the recent decision of the US Center for Medicare Services (CMS) to expand cardiac rehabilitation (CR) reimbursement to include patients with systolic heart failure (HF) as a likely catalyst to expand use of exercise therapy for eligible HF patients,[1] this still remains uncertain. Although the United States has played a prominent role amid worldwide research and clinical evolution of CR for over 50 years, US patterns of referral to and enrollment in CR have remained poor.[2–4] Multiple studies show a generally consistent pattern of significant under-referral, under-enrollment, and high attrition. Patients with acute coronary syndromes (ACS), chronic coronary heart disease (CHD), revascularization, valvular heart disease, and heart transplant have all been eligible for CR for years (ie, eligible for enrollment and backed by insurance/Medicare), but only a small fraction of the suitable candidates participate. Such relatively ineffectual application and clinical impact of CR for CHD suggest that there are entrenched obstacles that limit the uptake of CR in the United States that may undercut its conceptual potential to benefit HF patients.[5,6]

Many specific reasons for the historical underuse of CR for CHD in the United States have been identified: logistic barriers, high co-payments, and inadequate patient understanding of potential benefits have all been implicated and particularly affect women, minorities, elderly, and those with lower socioeconomic status.[7] Commitment to CR by many administrators may also be undermined by the high costs required for the CR infrastructure and staff. Only exceptional CR programs achieve high enrollment and patient retention; more typically, programs are

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undersized, fail to enroll many eligible candidates, and often struggle with the threat of closure amid financial deficits.[8] Given all these complicated dynamics, CR is often regarded by providers and patients as a superfluous adjunct to care rather than as essential component of therapy.

However, the future potential of CR is also fortified by dynamic changes in contemporary US health care. Growing emphasis on "value" of care, accountable care, patient-reported outcomes, and goals to minimize rehospitalizations are all contributing to increased interest in CR among a wide spectrum of providers, administrators, and even policyleaders.[9] These shifts portend greater prioritization and application of CR for HF patients in the near future, and even the potential to overcome many entrenched logistic, financial, and behavioral barriers.

A CARDIAC REHABILITATION LEGACY IN THE UNITED STATES

As an international academic and clinical frontrunner, the US role has fostered the science and implementation of CR for CHD and HF. The seminal research of Levine and Lown[10] to mobilize ACS patients led, for example, to the fundamental shift away from what had been strict bed rest and immobility for weeks after a myocardial infarction, and toward early mobilization and progressive activity. Likewise, the conspicuous and controversial exercise treatment used by Paul Dudley White for his renowned patient, President Dwight Eisenhower, after a myocardial infarction (during his first term in office)[11] served as a prominent endorsement of exercise therapy for ACS, and bolstered the concurrent efforts of Hellerstein and Ford,[12,13] Wenger,[14] and other US CR pioneers to organize and implement the original in-patient and out-patient CR programs.

More recently, the prominent of role of the United States in relation to exercise and HF was evident when the National Institutes of Health sponsored the large and expensive HF-ACTION trial (Heart Failure: A Controlled Trial Investigating Outcomes of Exercise Training).[15] Although CR for CHD has relied primarily on meta-analyses as the basis for claims regarding CR survival benefits,[16–18] raising criticisms of selection bias and exaggerated treatment effects, HF-ACTION attempted to provide a much more definitive and reliable analysis of exercise benefits for HF.

HF-ACTION assessed safety and efficacy of exercise training for medically optimized and stable patients with systolic HF (left ventricular ejection fraction [LVEF] $\leq$35%). The structured-exercise group began with 36 supervised training sessions for 30 minutes of exercise 3 times per week.[15] Halfway through this period, patients were given a treadmill or stationary bicycle to use at home along with a heart-rate monitor and were advised to work out 5 times per week at moderate intensity for 40 minutes. The usual-care group, by contrast, was told at the study outset to try to exercise at moderate intensity, 30 minutes per day, as recommended by the current American College of Cardiology/American Heart Association (AHA) guidelines of the time,[19] but which were not supervised or encouraged along the way.

The composite primary endpoint of the study was all-cause mortality or all-cause hospital stay. Subjects with New York Heart Association functional class II to IV symptoms (n = 2331) were randomized to either 36 sessions of supervised, moderate-intensity training (60%–70% HR reserve) followed by home-based training or usual care. All subjects were followed for a median of 30 months. Outcomes included a nonsignificant reduction in the primary combined endpoint of all-cause mortality or hospital stay (hazard ratio: 0.93; $P = .13$). However, after adjustment for prespecified predictors of mortality (duration of the cardiopulmonary exercise test; LVEF; Beck Depression Inventory II score; history of atrial fibrillation), the primary endpoint became significant (hazard ratio: 0.89; $P<.03$).

Although these data were regarded as disappointing to some who had anticipated a more definitive attestation of exercise training mortality benefits, the fact remains that many key critical attributes of exercise training for HF were demonstrated. Indeed, adjusted data showed that exercise therapy reduced cardiac mortality and hospitalizations.[15] Moreover, total hospitalizations were reduced by 15% in the exercise group and safety of exercise training was demonstrated in the large, diverse HF study population. Furthermore, in a related study, Flynn and colleagues[20] reported significant improvements in self-reported health status in those in the exercise arm based on relatively greater improvements in the Kansas City Cardiomyopathy Questionnaire scores (mean, 5.21; 95% confidence interval, 4.42–6.00) compared with usual care alone (3.28; 95% confidence interval, 2.48–4.09) ($P<.001$).

Perhaps even more important, in a study published years after the original HF-ACTION report, Keteyian and colleagues[21] demonstrated the unambiguous survival benefits of exercise therapy for HF when exercise was assessed quantitatively. Exercise volume was a significant ($P = .001$) linear and logarithmic predictor of reduced all-cause mortality or hospitalization and cardiovascular mortality or HF hospitalization. Moderate exercise