Cardiac Rehabilitation: Does It Really Matter?

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Had you ever treated patients who survived a myocardial infarction (MI) by prescribing ‘complete bed rest’ for 3 to 5 days? Those days were gone, when the concept of cardiac rehabilitation (CR) drifted in. Nowadays, contemporary programmes have evolved into comprehensive multidisciplinary efforts that, in addition to exercise training, include modification of other risk factors as well as personal and vocational adjustment and education. However, in the United States, up to 90% of patients who could benefit from CR do not have it; of those who do, 25-50% drop out within weeks to months. Factors contributing to this rate include transportation issues, motivation, comorbidities, misunderstanding of the value, reimbursement issues, and suboptimal referral rates. Neither is it better, across the Pacific, in our own city. What has gone wrong? Is the concept not evidence-based, not relevant, or not practical at all? As a matter of fact, every party in the medical service (the patient, the public, the service provider, the insurance, and the administrator) has to be well informed of what CR is.

The Past and the Present

In the 1910’s, absolute bed rest for 6-8 weeks was the standard first step in recovery from MI. The rationale was that exertion could lead to ventricular aneurysm and ventricular rupture, and the hypoxia associated with exertion could lead to arrhythmia or recurrent MI. In the States, during World War II, successes in medical rehabilitation helped clinicians question the benefits of extended immobility. Early mobilisation first took the form of ‘chair therapy’ - patients to sit in a chair for 1-2 hours a day immediately after MI. This was gradually modified into the so-called phase I or inpatient CR, the goal of which was to condition the patient to carry out safely daily activities following discharge. The early programmes focused almost exclusively on exercise. CR has now broadened to include all relevant aspects of secondary prevention, including physical activity counselling, exercise training, cessation of smoking, management of lipid levels, hypertension and diabetes, weight reduction, as well as psychosocial management. Apart from risk factor management, the goals of such a programmes include reduction in symptoms, reduction of risk of premature death, and improvement in quality of life. The 2006 update on the AHA/ACC guidelines for secondary prevention for patients with coronary and other atherosclerotic vascular disease has provided a summary on the mentioned goals. Modern CR programmes include three stages: inpatient rehabilitation, outpatient rehabilitation, and maintenance. But the traditional terminology has described 4 phases.

Phase I CR, or inpatient CR, can be started as soon as a patient has been stabilised after initial treatment of an acute coronary syndrome (ACS) or coronary bypass graft surgery (CABG). It ranges from sitting in a chair, or take a few steps, to assisted walking, or even performing activities of daily living. Short stays nowadays in hospital make it difficult to do more than introduce patients to the disease process, the factors that maintain it, and strategies for reducing risk.

Phase II CR usually points to institution-based (usually hospital-based) programme conducted by a team of rehabilitation professionals. It lasts 2 to 3 months, and emphasises safe physical activity to improve conditioning with continued behaviour modification aimed at smoking cessation, weight loss, healthy eating, and other factors to reduce disease risk.

Phase III CR usually points to supervised rehabilitation lasting 6 to 12 months, preferably organised in a community service facility that can help establish a prescription for safe exercise and continue to emphasise risk factor reduction. This community-based approach allows a patient to have adjustment more geared towards his/her own real life situation, and is relatively less costly.

Phase IV CR points to long-term ‘maintenance’ programmes, often conducted in the same facilities as structured programmes provided in phase III, but with fewer staff. The model is usually a supervised health club, or a self-help patient group.

The traditional CR aims at patients who have experienced a MI or who have undergone CABG. In 1995, the Agency for Health Care Policy and Research Clinical Practice Guidelines also recommended CR for patients with chronic heart failure, and for those who have undergone heart transplantation and heart valve surgery. With the expanded use of percutaneous coronary intervention (PCI), the need of CR for patients undergoing PCI has arisen from the horizon.

Evidence Base for CR

Considerably less clinical research has been focused on CR than on many other areas of cardiology. Yet there is sufficient evidence to support recommendation for CR. Numerous randomised clinical trials of exercise-based CR have been conducted in North America and Europe.
Virtually all of these trials had insufficient statistical power to demonstrate the efficacy of CR. Early meta-analyses started to appear in 1988. In the latest meta-analysis, which included 48 trials with a total of 8940 patients, CR was associated with a significant reduction of 20% all-cause mortality and a significant reduction of 26% cardiac mortality. There were no significant differences in the rates of nonfatal MI and revascularisation. There were also greater reductions in total cholesterol level, triglyceride level, systolic blood pressure and self-reported smoking. Health related quality of life was similar among CR group and usual care group. The effect on total mortality was independent of coronary heart disease diagnosis, type of CR, dose of exercise intervention, length of follow-up, trial quality, and trial publication date. Many trials included in this meta-analysis were conducted in the last decade, in the present era of cardiovascular therapies and across the contemporary range of coronary artery disease (CAD) case mix, but these trials continued to report benefits of CR.

The risks associated with CR are low. Rates for cardiac arrest, acute MI, and cardiac death have been reported to be 8.9, 2.4, and 1.3 cases per million patient-hours of exercise. For a typical programme serving 200-300 new patients per year, these event rates represent only one cardiovascular event about every 10 years. Studies of CR have demonstrated a lower cost per year of life saved (US$4,950 per life-year saved) than other commonly accepted standards of care, including thrombolytic therapy, CABG, and cholesterol-lowering medications, with one death prevented for every 32 to 72 person treated with CR. In addition, CR has been shown to reduce costs associated with rehospitalisation.

The benefits of CR are multifactorial. Exercise itself appears to lower cardiovascular disease risk by effects on traditional coronary risk factors, as well as by improvement in cardiac physiology and biochemistry (fibrinolytic and endothelial function). In a review on exercise and the coronary circulation, it is found that in studies on CAD patients or in animal studies, exercise training can (a) improve endothelial dysfunction by restoring nitric oxide production; (b) lead to regression of arteriopathy, the diffuse atherosclerosis noted after heart transplantation. The published studies also do not address if CR can delay or prevent allograft arteriopathy, the diffuse atherosclerosis noted after heart transplantation.

The analysis on the existing trials of CR on chronic heart failure has shown that CR improves disease-related symptoms, quality of life, and clinical outcomes (including hospital re-admission and survival). Overall, prescribed exercise attenuates the fatigue and dyspnoea that limit exercise intolerance. Several mechanisms contribute to the improvement, including increased peak cardiac output, improved endothelial vasodilator function, and an improved neurohumoral axis. Exercise training also has direct effects on skeletal muscles. However, patients can still experience complications because of their overall increased risks due to LV dysfunction and an overactive sympathetic nervous system. To enhance safety, patients should undergo a period of supervised exercise to evaluate for potential heart failure related complications.
with controlled atrial fibrillation can participate safely in exercise, but patient education to avoid the complications of anticoagulation therapy has to be emphasised.

CR in Hong Kong

In Hong Kong, CR service first appeared in the 1980's, but structured CR programmes were developed only after the white paper for rehabilitation was released in 1992, which elaborated clearly the government policies and expectations in rehabilitation. Since then, CR programmes, though limited in volume, spectrum and access, had been set up in a few public hospitals under Hospital Authority and in the community by the Community Rehabilitation Network of the Hong Kong Society for Rehabilitation.

The development continued in the late 1990's. A survey on the CR service in Hong Kong had been conducted in 2002 to review the situation after 10 years20. There were 18, 11, 7 and 5 public hospitals that had recruited patients to phases I, II, III and IV CR services respectively in the year 01/02. The community-based phases III and IV services were provided by the Community Rehabilitation Network as well as some patient self-help groups. The number of patients who had participated in the 4 phases of CR in the year 01/02 amounted to 4225, 1391, 396 and 428 respectively.

Patient categories included in various CR programmes were: acute MI, angina, post-CABG, post-PCI, heart failure, post-heart transplant, post-heart valve surgery, and post-device implantation (pacemaker or implantable cardioverter/defibrillator). The majority were comprehensive rehabilitation programmes utilizing exercise training, education, counselling, behavioural modification, psycho-social intervention and vocational counselling. In particular, Chinese-style supervised exercise training such as Tai Chi was also incorporated. Apart from comprehensive programmes, case management model and home care had been provided to patients with special needs in pilot programmes, such as heart failure cases.

Another survey of a similar nature was conducted last year21. Only 14 public hospitals responded, and 10 of them had CR service. The result showed that the development on CR service had not gone further. Amongst these 10 hospitals, only 2025 patients had participated in CR programmes. The majority 1490 (73.6%) were CAD cases. The numbers participated in the 4 phases of CR in the year 2005 were 1088, 499, 206 and 222 respectively.

There was no formal survey on the provision of CR service in the private sector of Hong Kong until recently. A survey that was recently published demonstrated, however, that a small scale of service existed in the year 200522. 9 private hospitals responded to the survey, and among them CR service was provided in 1, while 3 others were planning to implement CR programmes in the near future. The same survey also evaluated on the practices of private cardiologists. Out of the 21 responders, 6 had referred patients to CR programmes in community-based institutes, private clinic settings or public hospitals. 17 (80.9%) cardiologists considered CR useful and 15 (71.4%) would consider referral of patients for CR should the service be available in more private hospitals.

The Barriers and the Way Forward

The proportion of patients that had participated in cardiac rehabilitation programmes remained low, if not very low, both globally and locally. The first potential barrier to CR participation is the failure of health-care providers (mainly doctors) to refer their patients to CR. A study23 had demonstrated that some patients were referred more by doctors for CR than the others, namely younger age (<75 years), men rather than women, white patients, uncomplicated rather than complicated MI, presence of risk factors such as smoking, hypertension and high cholesterol, in-patient rather than out-patient, and having insurance cover.

In Hong Kong, CR is available in the public sector, but the discharge system and the workload of in-charge doctors may hinder referral of cardiac patients for CR. Assessment of CR referral should be included as a compulsory component of discharge protocols for hospitalised patients who are eligible for CR. In the private sector, more availability and access to CR service has to be encouraged. This can be solved when more private rehabilitation centres (hospital- or clinic-based) are available, or when access to community-based institutes is established.

Another major barrier is the attitude of patients towards CR, and their readiness to join the programmes. It has been estimated that less than 1/3 of patients referred to CR actually enroll in24. Drop-off rates are also substantial. Accountable patient factors include age, pre-morbid state, perceived benefits of CR, self-motivation, distance and transportation, family composition, social support, self-esteem, and occupation. In Hong Kong, the unique Chinese culture and belief of many patients on the way of rehabilitation is also important to the success of CR. Thus, more public education in the forms of talks, workshops and media programmes is essential. The latest Public Conference on Cardiac Rehabilitation, in conjunction with the 1st Asian Preventive Cardiology & Cardiac Rehabilitation Conference, taken place in December 2006, was the first of its kind to empower the public with updated knowledge on this topic.

More innovative and effective models of service delivery wait to be developed to improve the participation. We are encouraged by the development of the community-based rehabilitation programmes in the last decade. Apart from the existing Community Rehabilitation Network which is a non-government organisation, patient self-support groups such as Care for Your Heart and the Heart Club have been taking the important roles in community rehabilitation and their services should be further enhanced.

Apart from cardiology specialists, primary care physicians should also play a more definite role in providing and reinforcing the primary and secondary prevention services. The training of specialised personnel, designated staff and teams, clinical paths for management and collaboration between the providers are also prerequisite for success. We have got to augment both prevention and rehabilitation which is the key to control the epidemic of cardiovascular disease of the twenty-first century in Hong Kong.
References


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