Cardiac Rehabilitation Services during COVID-19 Pandemic

Bhargav Dave and Abhishek Jagtap

ABSTRACT

Cardiac rehabilitation is a much appreciated but underutilized treatment strategy for cardiovascular disease. Traditional center-based cardiac rehabilitation program has been suspended due to the concrete measures adopted to flatten the COVID-19 pandemic curve. The current situation of emphasis the need of alternative approach for cardiac rehabilitation. This review shed light on consequences of COVID-19 disease on cardiac rehabilitation, the alternative approaches of cardiac rehabilitation, its potential advantages, and limitations as well as future directions.

Keywords: Coronavirus disease-2019, SARS-CoV-2, rehabilitation.

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B. Dave*

MyraGe Scientific Laboratory, Dickinson, Texas, USA.

Memorial Hermann Katy Rehabilitation Hospital, Katy, Texas, USA.

University of St. Thomas, School of Nursing, Houston, Texas, USA.

(e-mail: bdave@divinecsrd.com)

A. Jagtap

MyraGe Scientific Laboratory, Dickinson, Texas, USA.

(e-mail: help@divinecsrd.com)

*Corresponding Author

I. INTRODUCTION

Cardiovascular disease (CVD) is one of the leading causes of disability worldwide. Given the current situation and expected rise in future, cardiac rehabilitation (CR) programs can be considered as an important treatment strategy for enhancing the acute and chronic care of the patients with CVD.

CR is a complex intervention which involves several aspects of treatment for optimization of care of the patients including patient evaluation, assessment, and management of modifiable risk factors for CVD, behaviour change, dietary advice, physical activity counselling and psychological support. Although several definitions of CR are available [1], [2] it can be more appropriately defined as follow: “*The coordinated sum of activities required to influence favourably the underlying cause of cardiovascular disease, as well as to provide the best possible physical, mental, and social conditions, so that the patients may, by their own efforts, preserve or resume optimal functioning in their community and through improved health behaviour, slow or reverse progression of disease*”[3]. Cardiac rehabilitation has primarily been offered as a center-based program. Participation in the CR program has been recommended to patients after myocardial infarction percutaneous coronary intervention, or coronary artery bypass graft surgery, heart valve surgery, cardiac transplantation or in the setting of chronic heart failure (HF) with reduced ejection fraction [4].

II. ADVANTAGES OF CARDIAC REHABILITATION

CR improves survival of the patients with effect sizes that are comparable to those of antiplatelet, lipid-lowering or blood pressure-lowering therapy as evident by reductions of cardiac (26-36%) and all-cause mortality (13-26%), reduction of morbidity (namely recurrent myocardial infarction) as well as reduction in costly unplanned readmissions (28-56%) [5]-[9]. While improving functional capacity of the patient, CR also restores confidence and thereby facilitates early resume to work and the development of self-management skills. Ultimately, it improves quality of life in patients with coronary artery disease [5]. These benefits of CR are compelling to consider it as an integral recommendation for secondary prevention in cardiac patients in several clinical practice guidelines. American Heart Association/ American College of Cardiology (AHA/ACC) recommends CR for individuals with an acute myocardial infarction or coronary revascularization (class Ia) as well as for patients with stable chronic systolic heart failure (class-IIa) [10], [11].

III. CURRENT STATUS OF CARDIAC REHABILITATION

Despite of these overwhelming evidence, the utilization of CR remains suboptimal. Moreover, a considerable proportion of the patients who attend center-based CR program in the beginning discontinue it before completion. Several studies have documented an association between early discontinuation of CR programme and the occurrence of adverse events at long-term follow-up. Beauchamp et al. observed more than two-fold increased mortality risk in patients who prematurely dropped CR programs needed after

an acute myocardial infarction or percutaneous coronary intervention [12]. Similarly, extended analysis of patients who participated in the OPTImal CARDiac REhabilitation (OPTICARE) trial revealed threefold higher incidence of major adverse cardiac events during prolonged follow-up [13]. Patient related factors including age, existence of multiple comorbidities, psychosocial factors, competing work, family obligations, socioeconomic status (suboptimal social support, inadequate insurance coverage and financial concern) and geographical distance (between residential area and CR center) are identified as factors that retard participation of the patient with traditional center-based CR program. Hence, efforts have been directed towards increasing participation and/or adherence to CR programs through the introduction of alternative approaches.

IV. COVID-19 DISEASE AND ITS CONSEQUENCES OF IN PATIENTS WITH CVD

The COVID-19 disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus soon become pandemic after its outbreak in China. As of 29th August 2020, a total of 24,587,513 patients become infected with COVID-19 disease [14]. Till date, the disease was responsible for more than 8 lakh deaths all over the globe [14]. There is no definite treatment or vaccine for the virus, till date. Hence, aspiring from influenza pandemic of 1918, large-scale social distancing (to maintain at least 2 meter/6 feet distance between individuals in public spaces) and quarantine has been imparted by the government during early phase of the pandemic. Only essential services (i.e. groceries, medicine, and health care) were allowed. Moreover, elective surgeries, non-emergent hospital admission or outpatient visits were also postponed to minimize spreading of the disease. Likewise, traditional center-based CR programs were also deferred.

Although these aggressive measures were found capable to curb the spread the disease, it has produced some deleterious consequences also. Imposed restriction of outdoor activities and confinement at home caused anxiety, anger and stress [15]. Unhealthy lifestyle behaviour, including a reduction in physical activity and an unhealthy diet, was also noted during this period [15]. It is noteworthy that progressive nature of CVD leads to adverse consequences including increased rehospitalizations, reduced adherence, poorer quality of life, and higher mortality in the absence of CR programs [16]. Vigorito et al. also observed that patients with HF avoided hospitalization despite of worsening of the symptoms [17]. It is noteworthy that the course of the COVID-19 disease is more severe in patients with comorbidities namely cardiovascular disease, diabetes mellitus, and obesity. The consideration of alternative approach of CR is of utmost important to serve crucial needs of the patient for rehabilitation especially when the growing body of evidences suggests a new onset of cardiac dysfunction during the course of the COVID-19 disease [18].

A. Novel Approaches of Cardiac Rehabilitation

Healthcare authorities also identified the need for alternative approach for CR programs during COVID-19 pandemic [19]-[21]. However, efficient alternate approach

can only be identified through the active involvement of the CR centers. Recently, to encounter the critical need of CR during the global crisis of COVID-19 disease, the Working Group of Cardiovascular Prevention and Rehabilitation of the Dutch Society of Cardiology has proposed practical recommendations – telerehabilitation programmes without face-to-face contact [20].

When everyone is looking for alternative approach for CR, the most investigated approach – home-based CR may prove convenient technique to deliver efficient care to the patient [21]. Home-based CR programs are delivered in a non-clinical setting. However, it includes same core-components as that of center-based CR programs. Systematic reviews also confirmed that home-based CR programs are as effective as center-based programs with regard to improvements in quality of life, functional capacity and hospitalizations [22]. Additionally, home-based CR programs exhibit several advantages including enrolment of the patients in the program without any delay, no additional travel to medical facilities, greater privacy (as compared to center-based CR), customized CR program as per the need of individual, personalized feedback, and flexible scheduling [4]. These documented benefits of home-based CR are adequate enough to consider it as the preferred approach to provide uninterrupted care to the eligible patients while holding the safety of the patient as well as the provider in the current scenario. Apart from above mentioned benefits, home-based approach can also accommodate significantly higher number of patients. This has been added advantage as healthcare professionals/resources of the closed CR centers have been allocated to COVID centers to accommodate unmet need of the healthcare professionals. So, rehabilitation to higher number of eligible patients can be achieved with the limited resources. Moreover, traditional center-based CR programs are of limited duration, after which a loss of effect on risk profiles and exercise capacity is to be expected. On the other side, the duration of home-based CR program can be extended.

While adopting this approach in routine practice, it should be kept in mind that home-based CR could not cope up the inherent advantages of center-based approach. For example, the patient does not benefit from the environment of a professional CR center, including the company of other patients who may provide peer support. Moreover, in case of medical emergency during the program, the unavailability of equipment during home-based CR may discourage its adoption. Fortunately, the risk of cardiac complications during activities of rehabilitation is very low [23]. Some of the practical issues need to be considered while adopting this approach during COVID-19 pandemic. In view of the unavailability of equipment at home, modifications of the exercise prescription with the involvement of calisthenics, chair-based exercises, resistance and balance exercises and yoga (of course with adequate prior training) are necessary [24]. Despite of its potential to serve the need of the patient, enrolment of new patients in home-based CR programs is still challenging during COVID-19 pandemic in view of initial patient evaluation, goal setting, and prescriptions as per current guidelines.

Implementation of simple novel strategies to home-based CR i.e. regular telephone calls to enhance personal

communication of the healthcare professional with the existing patient, involvement of social media (for the creation of social support groups) may prove useful [25]. The use of mobile phone technology has been increasingly studied for the remote delivery of CR to increase participation of the eligible patients [26], [27]. Percy et al. also emphasized the utilization of telehealth technology for the management of heavy patient flow at CR centers in the current scenario [19].

Babu et al. recently proposed a new approach namely “technology-driven CR” which includes the use of technology (smartphones, mobile apps, internet, messaging, e-mail, web sites, webcams, wearable sensors) for remote delivery of CR programs [24]. According to the proposed approach, the patients are initially assessed using telephone calls, video call or online survey/questionnaire followed by prescribing intervention (through technology only). The patient will not be needed to attend face-to-face during entire CR program as monitoring and follow-up can be accomplished with the use of technology only. This approach looks attractive in the current scenario. However, as clearly pointed out by the authors, it needs to face several obstacles for successful remote delivery of CR. Moreover, the development of new standard operating procedures and establishment of virtual connections with existing and new patients is time consuming.

V. CONCLUSION

The number of patients infected with COVID-19 disease continues to increase exponentially. However, it gives us an opportunity to find an alternative approach to center-based CR programs. Home-based CR offer benefits of rehabilitation by limiting exposure to others during group meetings which is particularly important in current crisis of COVID-19. However, we can utilize current latest technologies to overcome limitations of the current approach of CR and thereby improve its utilization even beyond the COVID-19 pandemic.

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Dr. Bhargav Dave, PT, DPT, DSc was born in Ahmedabad, Gujarat, India. He received his Bachelors of Physical Therapy from Srinivas University, Mangalore, Karnataka. One of the reputed University of India, followed by completion of Graduate Diploma in Sports and Exercise Science from Wintec, New Zealand. He received scholarship for his Masters in Physical Therapy and got groomed under Nobel Prize Nominee and Presidential award (U.S. Congress) winner Dr. Petrofsky at Loma Linda University. He later got his Doctorate in Physical Therapy from Utica, New York. Later, he got his Doctorate in Science from Aztec University with high honors of Magna Cum Laude. At the moment, He is pursuing his dream to be Family Nurse Practitioner by enrolling himself at ABSN program at well reputed University of St. Thomas, Houston, Texas.

Dr. Dave is the director and founder of MyraGe Scientific Laboratory, Dickinson, Texas, USA and SW Physical Therapy and Rehabilitation Clinic, Dickinson, Texas, USA. Currently, he is also working at Memorial Hermann Katy Rehab Hospital, Katy, Texas, United States while pursuing his ABSN. He is also APTA certified clinical instructor for Doctoral of Physical Therapy students. He has won awards for his previously published books Heat and Human Interaction and Stem Cells: A Hope in Cardiology. He has published numerous papers in scientific journals. Dr. Dave also invented an amphibious assistive device which got commercialized in its early phase of provisional patent status with USPTO.

Dr. Dave serves as a peer reviewer for 30+ international scientific journals. Additionally, he serves as an editorial board member for several international scientific journals. He was awarded with International Significant Achievement Award at very young age along with few other awards for his contribution in the field of Health Science.

Dr. Abhishek Jagtap was born in Ahmedabad, Gujarat, India. He earned his bachelor of physical therapy (BPT) and master of physical therapy (MPT) in neurological and psychosomatic disorders from Srinivas College of Physiotherapy, Mangalore, Karnataka, India. Dr. Abhishek has successfully earned certifications in the field of physical rehabilitation that includes Certified Mulligan Practitioner (CMP) from Mumbai, India, Vestibular Rehabilitation specialization from Emory University, Atlanta, Georgia, and Lee Silverman voice treatment (LSVT) BIG certifications for Parkinson's disease from LSVT Global at Jacksonville, Florida. He is currently pursuing his doctor of health science (DHSc) with a focus on global health from A.T. Still University of osteopathic medicine, Arizona, United States. He holds great interest in clinical research and believes that a significant contribution to physical rehabilitation can enhance the quality of patient care by reducing the overall cost of healthcare expenditure. One of the primary focus areas is developing strategies to prevent falls in the elderly in nursing facilities where re-hospitalization rates can be reduced in the future.

During his initial professional career in India, Dr. Abhishek co-owned a private out-patient physical therapy clinic in Ahmedabad, India. He also provided physical therapy treatments at Samutkarsh Trust Physiotherapy in Ahmedabad voluntarily. He has also provided manual therapy to patients with spinal disorders at the Gujarat Spine clinic in Ahmedabad, India. He performed freelancing home health physical therapy for a variety of patients with stroke, back pain and neck pain with radiculopathy, shoulder pain, and knee osteoarthritis with improving mobility, overall quality of life, and community re-integration. Currently, he is working at Avante at Ocala that is a skilled nursing facility in Florida. His primary focus re-mains on providing the highest quality of physical therapy treatments to geriatric patients with neurological, musculoskeletal, and cardiovascular disorders with a major emphasis on fall prevention, improving functional mobility, and regaining community re-integration to continue their quality of life. All together Dr. Abhishek holds 12 years of clinical experience in physical therapy and continues to perform his duties for his geriatric patients on a routine basis.