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Cardiac Rehabilitation and the COVID-19 Pandemic

A Message from the President

Dear CACPR Members,

On behalf of the CACPR Board of Directors, I wanted to take this opportunity to wish everyone a Happy New Year! I have no doubt that 2021 will be an exciting year in the field of Cardiovascular Rehabilitation and Prevention.

As we continue to navigate through this global pandemic, it is more important than ever to stay connected. In the coming year, CACPR plans to offer you many opportunities to stay connected to your colleagues from across Canada. Stay tuned for exciting information coming your way around our monthly webinars, annual Spring Conference, as well as opportunities to participate in the newly launched CACPR registry.

I also want to give a huge thank-you to my fellow board members, CACPR volunteers and our management company, Secretariat Central. I am always amazed at the commitment you have, the national community you foster and your dedication to offering world class cardiac rehabilitation and prevention services.

Thank-you.

Sincerely,

Dylan Chipperfield
CACPR President

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A Message from the Editor

Dr. Warner Mampuya, MD PhD FRCPC

Dear friends,

It has been almost a year since the COVID-19 epidemic hit the world. On March 11th, 2020, the World Health Organisation declared the coronavirus disease 2019 (COVID-19) a pandemic. At the time of writing, over 99 million cases and 2 million deaths have been recorded in the world. In Canada, we have over 750,00 cases and 19,000 deaths.

No country in the world, including the richest ones, was prepared to face this tsunami.
The COVID-19 pandemic has brought challenges to the way we provide cardiovascular care in general and traditional cardiac rehabilitation in particular, affecting heavily the continuum of care for patients with cardiovascular disease.

The COVID-19 pandemic has led to the closure of many cardiac rehabilitation centers around the world resulting in many eligible patients unable to participate in their program.

Despite the current focus on the pandemic challenges, we should not neglect other interventions such as exercise-based cardiac rehabilitation programs which have been proven to provide substantial clinical benefits.

The cardiovascular rehabilitation community has been struggling to find ways to deliver cardiac rehabilitation, while minimizing the risk of COVID-19 transmission. Alternative rehabilitation methods are therefore needed to maintain the delivery of the core components of cardiac rehabilitation to cardiovascular disease patients.

Combining home-based programs with the multitude of possibilities offered by technological tools such as cardiac tele-rehabilitation may provide the best solutions for patients and help overcome the challenges of COVID-19.

On the scientific front, it is worthwhile noting that, there are to date on PUBMED over 92,967 publications on COVID-19, all written within a year. This makes it difficult for the already busy healthcare professionals to navigate the fury of publications on COVID-19.
In this edition, we discuss a few issues related to cardiac rehabilitation in the context of the COVID-19 pandemic.

The articles are written in a very accessible style for easy reading.
We hope that the content will help you get a global sense of what's happening in cardiac rehabilitation during these unsettling times.

I thank the authors for taking the time to write on this rapidly evolving subject on a very short notice.
The COVID-19 pandemic is far from over. We need to continue to show solidarity, mobilization, adaptability, imagination and flexibility.

Happy reading everyone.

Considerations for Cardiac Rehabilitation and Exercise Prescription for Patients with Cardiovascular Disease Amid the COVID-19 Pandemic.

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COVID-19 and Cardiovascular Disease

The novel coronavirus disease 2019 (COVID-19) pandemic has afflicted >37 million people globally, and >180,000 Canadians as of October 10, 2020. Adults with cardiovascular disease (CVD) are more likely to experience complications and die from this contagious virus. Regular exercise training improves CVD management and reduces respiratory virus infection rates.[1] The COVID-19 pandemic may pose substantial barriers to regular exercise among those with CVD as a result of the public health restrictions (e.g. self-quarantine; closure or reduced hours of exercise facilities; closure or reduced hours of face-to-face school and child-care premises) which may give rise to negative health consequences.

Exercise-based cardiac rehabilitation (CR) is a CVD management program comprising patient education, referral to support services based on individual patient needs, and on-site exercise training. Amid the pandemic, many exercise-based CR services have turned to virtual programs, where and when available. Although some CR programs have transitioned to an online platform amid the pandemic, not all programs have had the necessary resources. For example, limited internet connection; limited funds; limited technological platforms for virtual CR users; and, restrictions on changes in legislation may prevent many adults with CVD from accessing these critical supports.

Regular aerobic and resistance training are associated with numerous physical (e.g. lower blood pressure and higher cardiorespiratory fitness) and mental (e.g. reduced anxiety and depression) health benefits in patients with CVD.[2,3] Aerobic exercise is associated with a reduction in respiratory infection rates, respiratory symptom burden, and mortality,[4-6] highlighting the importance of an active lifestyle during the COVID-19 pandemic. However, access to exercise facilities has been limited and those with pre-existing health conditions such as CVD are urged to take additional precautions by reducing time outside their home.

These restrictions have led to a marked increase in web searches for exercise recommendations at home,[7] calling attention to the need for accessible and informative at-home exercise recommendations.

CR Programs and Exercise Prescription Considerations

During the COVID-19 pandemic, CR program and health care providers must consider innovative ways to prescribe and monitor exercise to patients with CVD that will enhance long-term participation. Important factors for consideration include (1) exercise enjoyment; (2) reduced time commitment; (3) a variety of activities with and without exercise equipment; and, (4) healthy movement behaviours.

Exercise Enjoyment: Exercise enjoyment increases the likelihood of adherence to exercise.[8] Efforts should be made to ensure that prescription is not only feasible (e.g. low-cost, offered in a variety of formats, personalized exercise prescriptions based on individual abilities and accessibilities), but also fun.[9,10] Group-based exercise may be perceived as more enjoyable than individual exercise to some patients due to social connectivity;[11] however, during the pandemic group-based CR programs are limited to a select few. To address this, patients who prefer exercising with a group should be encouraged to join a virtual CR offering (if available and accessible) or include family members and those in their social circle (depending on public health restrictions) in their exercise routine. Exercise enjoyment varies between individuals and adherence will be improved if prescription is a collaborative effort between the patient and health care provider prescribing exercise.[8]

Reduced Time Commitment: Lack of time is a frequently cited barrier to regular exercise participation and adherence to CR programs.[12] Household and care-giving responsibilities have increased during the pandemic among many patients with CVD, render finding time to exercise even more of a challenge. Virtual CR Programs that offer flexible class times or access to recorded classes may aid in increasing access to CR to those with a time-limited and/or conflicting time schedule. For patients without access to virtual CR, shorter duration and higher intensity structured exercise programming (e.g. 15-min interval training) that impose a lower time constraint could be considered among patients who can participate in higher intensity activity safely.

A Variety of Physical Activities: Including a diverse range of exercise types/activities (e.g. aerobic dancing, resistance training, recreational sports) in an exercise prescription has been shown to improve adherence.[13] CR programs should offer a wide array of exercises and these options should include modifications for those who may or may not have access to formal exercise equipment at home during the pandemic. Exercise equipment sales have increased drastically since the beginning of the pandemic, which may be beneficial for prescribing exercise as long as patients know how to safely utilize the equipment. For individuals without exercise equipment at home, health care providers should also consider exercise prescription using body weight and/or household materials (e.g. soup cans, water bottles).

Healthy Movement Behaviours: Engaging in regular exercise is one component of ensuring healthy movement behaviours in patients with CVD. Adequate sleep and reduced sedentary time should also be recommended to patients while at home during the pandemic. Canada's 24-hour movement guidelines suggest that adults between the ages of 18-64 years should set themselves up for 7 to 9 hours of good quality sleep regularly and those aged 65 and older should aim for 7 to 8 hours; consistent bed and wake up times are recommended for all adults.[14] Patients with CVD should be made aware of the importance of sleep on their heart health and be informed on the current Canadian guidelines.[14,15] Sedentary time should also be reduced (8 hours or less) and interrupted as much as possible.[14] Health care providers should incorporate the usage of tools to monitor exercise, sleep, and sedentary time (e.g. use an exercise diary, activity tracker, sleep diary) and strategies to increase motivation to achieve healthy movement behaviours regularly (e.g. set small and achievable goals, telephone coaching). Wearable technologies provide a variety of health-related data including heart rate, step count, exercise intensity, sedentary time, and sleep.[16] Patients should be encouraged to use their technology regularly to ensure they are meeting their individual health goals and to ensure their safety during exercise (e.g. monitoring heart rate). For those without access to wearable technology or virtual CR programs, health care providers should educate patients on goal-setting, fitness logs, and sleep diaries. Encouraging patients to set small attainable goals and tracking those goals with a log or diary can increase motivation and adherence to exercise and healthy movement behaviours.[17]

Conclusion

In summary, the pandemic has created substantial challenges for CVD patients to exercise regularly and ensure healthy movement behaviours. To address the issues COVID-19 has created from CR programs, many have adopted virtual platforms to reach patients; however, as the virus continues to alter the everyday lives and routines of CVD patients and CR programs exercise prescription needs to be flexible, enjoyable, accessible, and versatile in order to reach CVD patients in all communities.

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Exercise training within cardiac rehabilitation for post-COVID patients: some key considerations.

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The COVID-19 pandemic has presented significant challenges to cardiac rehabilitation (CR) services world-wide. The most prominent has been the need to apply a 'tele-rehabilitation' style service in the absence of face-to-face interaction for outpatients. There are considerable 'pros and cons' to tele-rehab, as many practitioners have now experienced in recent months. Monitoring of key vitals such as heart rate and blood pressure has been challenging even with the recent advent of technology such as smartwatches and automated BP devices. Many CR services will continue to apply tele-rehab post-COVID as an adjunct to the traditional outpatient format.

COVID infection appears to have a multitude of negative physiological effects on the body which need to be considered when designing CR exercise programming. First, and predominantly, many of our cardiac patients will have the added burden of respiratory and/or pulmonary dysfunction induced by COVID infection. Second, it is now becoming increasingly clear that many post-COVID patients also show sustained symptoms somewhat akin at this stage to a post-viral fatigue syndrome, particularly overwhelming lethargy and dyspnoea as well as an array of disparate symptoms (e.g. headaches, muscle pain, brain fog, loss of sense of smell and taste).[1]

This has been commonly termed 'long-haul coronavirus' in the lay media. Third, a minority of patients show additional cardiac dysfunction via a form of myocarditis, and subsequent acute cardiovascular syndrome, induced by the COVID infection.[2] Each of these negative effects can range from mild to severe and the long-lasting impacts are still to be fully examined.

As such, thoughtful, optimised exercise programming will be even more important for post-COVID patients within a CR service. This commentary will outline some considerations for exercise programming for the patients with COVID-induced respiratory/pulmonary dysfunction and/or 'long-haul' fatigue syndrome-type symptoms. Exercise training would not be recommended for patients with acute myocarditis until it has resolved, and the patient receives cardiologist approval for exercise.

Start conservative

Exercise training within CR needs to balance 3 key priorities: efficacy, safety, and sustainability. Clearly, exercise training within CR for patients with both the pre-existing cardiac dysfunction and COVID-induced respiratory/ pulmonary dysfunction or 'long-haul' fatigue syndrome-type symptoms will require added emphasis on the safety aspect, especially in the early stages of a program. Traditional exercise training within CR has been moderate-intensity continuous training (MICT), a staple of CR delivery for decades now. These patients could instead start off with a 'run-in period' of moderate-intensity interval training (MIIT) – keep the same intensity as traditional MICT (65-75% maximum heart rate, HRmax; rating of perceived exertion, RPE 12-13) and add in short recovery intervals (e.g. 1-2 min rest every 5-10min exercise).

This will increase patient safety (to minimise risk of a cardiac event or dyspnoea) and sustainability (to reduce the incidence of respiratory distress/discomfort or fatigue symptom exacerbation, therefore aiding in enjoyment) in the early stage of the patient's program, if at the expense of some degree of efficacy for improving cardiac function and cardiovascular-related risk factors. The practitioner can then graduate the patient on to MICT once the patient shows stable physiological (HR, RPE and blood pressure, BP) response during the session and no symptom exacerbation in the hours to days after the exercise sessions.

Interval training format may be especially important for the 'long-haul' fatigue syndrome-symptom patients – the patient can use the rest intervals to do an 'inventory' on any symptom exacerbation. We can take considerable guidance from research into myalgic encephalitis/chronic fatigue syndrome (ME/CFS), an extreme (> 6 months) form of fatigue syndrome (often post-viral) where patients typically report worsened symptoms after excessive exercise, termed 'post-exertional malaise'. The biological basis for ME/CFS and the post-exertional worsening of symptoms is still unclear, with many possible candidate pathophysiological mechanisms being examined (e.g. immune system; autonomic nervous system; hypothalamus-pituitary-adrenal axis system; skeletal muscle oxidative metabolism) without success to-date.[3] It is not yet clear if post-COVID 'long-haul' fatigue syndrome-type patients exhibit the phenomenon of post-exertional malaise, or will go on to develop diagnosable ME/CFS, but caution is clearly warranted at this stage for the exercise programming of these patients – start conservative with training intensity and overall volume (sessions per week etc) and apply 'pacing' principles (i.e. work below the threshold where symptoms become exacerbated).

High-intensity interval training (HIIT)

Once the patient has shown stable response to graduated MICT over the initial weeks of training, the evidence is now clear that a possible progression to high-intensity interval training (HIIT) should be considered for many CR patients. HIIT has become a popular exercise training format within the general population in the last decade or so. This can be largely attributed to its inherent time-efficiency – HIIT can induce health and fitness adaptations with a relatively low time commitment, thereby being a sustainable exercise format for many busy 'time-poor' people.

HIIT is also more effective than MICT for improving cardiorespiratory fitness (CRF), often termed aerobic fitness or VO_2max. CRF is perhaps the major efficacy measure for CR exercise training since it is a strong independent predictor of cardiovascular and all-cause mortality risk. Increasing a patient's CRF by 1 metabolic equivalent (MET; 3.5 ml oxygen per kg body weight per minute), which is roughly the typical improvement seen from an 8 week exercise training programme,[4] equates to a 10-25% reduction in cardiovascular -related mortality risk.[5] CRF is the function of cardiac output (transport of oxygenated blood to the working skeletal muscle) and arterial-venous oxygen difference (extraction of oxygen by the muscle from the blood supply) at maximal exercise intensity. Exercise training increases CRF predominantly by increasing maximal cardiac output, and specifically maximum stroke volume (rather than maximum heart rate, which stays steady or can even drop slightly).[6,7]

Traditional MICT has been shown conclusively to be reasonably effective for improving CRF and reducing overall cardiovascular risk (e.g. lower blood pressure; lower body fat levels) in a safe manner for patients within CR. However, many patients do not adhere to the full duration of the CR service,[8] suggesting that practitioners need to find ways to make the exercise training more appealing and enjoyable, and therefore sustainable in the longer-term.[9] Recent meta-analyses comparing matched comparison studies (applying the same overall amount of work performed) report that HIIT appears more effective than MICT for improving CRF,[10] due largely to its greater effectiveness for increasing stroke volume. In addition, HIIT appears at least as effective as MICT for improving other key cardiovascular-related risk factors including less body fat (lower risk of obesity), lower BP, less arterial stiffness, and improved insulin resistance/glucose control (lower risk of type II diabetes).[11-14]

Based largely on this evidence of efficacy, a large body of research has now been conducted on the application of HIIT within CR. The understandable concerns of practitioners about the safety risk of applying HIIT in patients with coronary artery disease and heart failure have been partially addressed. A systematic review by our team in 2018 showed that incidence of major adverse cardiac events directly linked to the exercise sessions was relatively low for HIIT (1 per ~17,000 training sessions) across research studies conducted up to that point.[15]

This was on the proviso that all studies had applied a baseline stress test, thoughtful HIIT programming and regular patient monitoring of HR, RPE and BP during the exercise sessions. These are prudent steps when applying HIIT in CR and are recommended, in addition to the 'lead-in' period of traditional MICT.

It should also be noted that exercise training can improve respiratory/pulmonary function concomitant to changes in CRF – an important consideration for the affected post-COVID patients. Our data from a study applying 6 weeks of HIIT in our cardiac patients showed an 11% increase in maximal minute ventilation (litres of air breathed per minute), corresponding with an 11% increase in CRF.[16] However, the comparative effectiveness of HIIT and MICT for improving respiratory/pulmonary function is still to be examined. Recent small-sample studies have shown supervised, thoughtfully-designed HIIT to be feasible for patients with respiratory and/or pulmonary disorders (e.g. chronic obstructive pulmonary disease, cystic fibrosis, asthma, interstitial lung diseases and lung cancer).[17] Inspiratory muscle resistance training may be an adjunct intervention for these patients, as applied recently in patients with heart failure.[18]

Sustainability (longer-term training)

Prominent recent data also suggests we need to be thinking longer-term with our CR patients – ensuring exercise training is a permanent habit, not simply a short-term fix for the cardiac issue. CR sites typically provide short-term (6 -12 weeks) exercise interventions as part of the outpatient (phase II) service, sufficient to induce a significant improvement in CRF typically in the region of ~10-15% increase or 1-2 METs.[4] However, recent data suggest that this increased CRF is predominantly due to haematological changes. Specifically, increased plasma volume is induced in the first days of starting training, peaking at ~4 weeks after starting training.[19] Increased production in red blood cells (RBC), the carriers of oxygen to the muscles and organs, is then observed over the following 2-8 weeks of training, thought to be due to the kidneys detecting the sudden decrease in haematocrit.[19] These haematological adaptations to exercise training act to increase CRF largely via the improved maximal stroke volume (via improved venous return and higher end-diastolic volume).[6]

However, these positive adaptations are transient – once the patient stops training (i.e. after the typical 6-12-week CR service has finished), the haematology reverts to essentially baseline levels and therefore the CRF improvements also disappear almost entirely.[6] Evidence suggests that left ventricular hypertrophy – a key and longer-lasting outcome from exercise training directly improving cardiac function and CRF – requires months of training before significant levels of growth are observed.[6] This is somewhat synonymous to adaptations to resistance training – strength increases are typically observed in the early weeks of training but are purely neural adaptations (e.g. motor unit recruitment and coordination), not due to muscle hypertrophy.

So, based on this evidence, how should we structure our CR service to ensure that patients maintain long-term (even life-long) exercise habits to receive long-term cardiac benefits, long after the outpatient (phase II) service has been completed? Patient education is obviously crucial, and CR sites should consider providing a follow-up home-based (phase III) exercise service if they are not already doing so, including tele-rehab follow-up sessions to help in ensuring patient adherence in this seemingly crucial but largely under-recognised phase of rehab.

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Impact de la COVID-19 sur le système cardiovasculaire et rôle de l'exercice

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Introduction

Alors que la majorité des personnes infectées par le SRAS-CoV-2 (*le virus qui cause la COVID-19*) présentent des symptômes similaires à ceux de la grippe, d'autres développent des complications beaucoup plus sévères d'ordre pulmonaire (jusqu'à 51 %) [1] et cardiovasculaire (jusqu'à 31 %) [2]. Les personnes âgées et celles présentant des comorbidités telles que les maladies cardiovasculaires (MCV) sont plus susceptibles de contracter la forme sévère de la COVID-19, et ont un risque de mortalité 4 fois plus élevé que la population générale [3]. À cela s'ajoute les complications cardiovasculaires induites par la forme sévère de l'infection au SRAS-CoV-2 [4]. Dans ce contexte, les objectifs de cet article sont donc de **1)** faire état du risque accru d'infection à la COVID-19 et de complications sévères en présence de MCV, **2)** décrire les manifestations cardiovasculaires cliniques associées à la COVID-19, **3)** synthétiser les mécanismes physiologiques expliquant ces manifestations cliniques et **4)** présenter le potentiel de la réadaptation précoce pour réduire les séquelles associées aux complications de la COVID-19.

COVID-19 et maladies cardiovasculaires préexistantes

De plus en plus de données scientifiques supportent le fait que les MCV préexistantes augmentent le risque de complications graves à l'infection au SRAS-CoV-2 et de décès. En effet, la présence d'une MCV avant l'infection et un taux élevé de troponine-I (cTnI) sont des déterminants indépendants d'une forme critique du COVID-19 [2, 5]. Il a aussi été rapporté que les décès des suites de la COVID-19 étaient plus fréquents chez les patients atteints d'une MCV avant l'infection (13,3 %), et augmentait de façon fulgurante en présence d'une concentration élevée de cTnI (69,4 %), comparativement à la population normale (7,6 %) [6].

Ces observations ont amené la communauté scientifique et médicale à questionner le rôle des inhibiteurs de l'enzyme de conversion de l'angiotensinogène (ACE-i), utiliser notamment pour le traitement de l'hypertension artérielle, de la maladie coronarienne et de l'insuffisance cardiaque chronique, à augmenter la susceptibilité au coronavirus SRAS-CoV-2 et la probabilité de complications sévères à la COVID-19 chez les individus ayant des MCV. Bien que cette hypothèse ne semble pas se confirmer [7] et continue d'être étudiée [8, 9], le fait que le SRAS-CoV-2 interagisse avec l'enzyme de conversion de l'angiotensine II (ACE-2) avant d'entrée dans les cellules suggère un lien biologiquement plausible [10]. Toutefois, certaines études tentent de démontrer que les ACE-i pourraient, au contraire, protéger lors de la phase de lésions tissulaires inflammatoires (revue dans [8]). Les évidences concernant ces deux hypothèses sont actuellement insuffisantes et continuent de faire l'objet d'étude.

Manifestations cardiovasculaires cliniques associées à la COVID-19

Les infections virales provoquent une augmentation de la demande métabolique et de l'inflammation systémique ainsi qu'une diminution de la réserve cardiaque [11]. De façon générale, il a été rapporté que la forme sévère de l'infection au SRAS-CoV-2 s'accompagne d'arythmies (11,7 %), de lésions du myocarde / d'insuffisance cardiaque (10 %), de myocardite (manifestation aiguë) et du syndrome coronarien aigu (17 %) [4]. Les troubles du rythme cardiaque peuvent être causés par l'altération de l'activité métabolique du cœur, une inflammation du myocarde, une hypoxie ou une activation du système nerveux sympathique.

Il a d'ailleurs été découvert que les palpitations sont un symptôme aigu de la COVID-19, au même titre que les difficultés respiratoires.[12]

Les arythmies les plus fréquentes sont les fibrillations ventriculaire et atriale, ainsi que la tachycardie ventriculaire. En ce qui concerne l'insuffisance cardiaque, l'ischémie semblerait associée à la combinaison des atteintes myocardiques et au syndrome de détresse respiratoire aigu (SDRA, tous deux induites par l'infection). Finalement, en plus de la dysfonction microvasculaire induite par l'infiltration du virus dans les péricytes (*cellules de Rouget*), la réponse inflammatoire peut rendre les plaques d'athérosclérose instables et entrainer leur rupture, ce qui pourrait causer un syndrome coronarien aigu [12].

Mécanismes physiologiques expliquant les effets du SRAS-CoV-2 sur le système cardiovasculaire

Sachant que les récepteurs ACE-2 sont hautement exprimés à la surface des péricytes qui tapissent, entre autres, la lame basale de l'endothélium des capillaires et des cardiomyocytes, le SRAS-CoV-2 possède une porte d'entrée directe au système cardiovasculaire, entrainant une apoptose des cellules affectées. Ces lésions au myocarde sont alors identifiables par une élévation des concentrations sanguines de cTnI, de créatine kinase et de lactate déshydrogénase [13]. En plus de l'infection directe des cardiomyocytes, les dommages au cœur peuvent aussi être causés par l'inflammation systémique induite par la tempête de cytokines associée à l'infection au SARS-CoV-2. Cette tempête de cytokines, d'abord localisée au niveau du tissu pulmonaire, mène éventuellement à une élévation systémique de l'activité inflammatoire causant des dommages à plusieurs systèmes [14]. D'ailleurs, des études cliniques ont rapporté des taux élevés de marqueurs inflammatoires (p.ex. Interleukine (IL)-6, TNF-α, et CRP) chez des patients atteints de la COVID-19 [15], aussi suggérés comme acteurs clés du développement de MCV en réponse à l'infection par le SRAS-CoV-2 [16]. Enfin, dans le cas où il y aurait une atteinte directe au myocarde, il est suggéré que les lymphocytes T et les macrophages activés puissent s'infiltrer dans le myocarde affaibli, et entrainer une myocardite fulminante et de graves lésions cardiaques. [17]

Possibles séquelles cardiovasculaires à long terme de l'infection au SRAS-CoV-2

Il est actuellement estimé que les effets délétères de la COVID-19 affecteraient environ 5 % des patients ayant été admis aux soins intensifs et que ces derniers seraient à risque de développer des complications cardiaques chroniques telles que la maladie coronarienne, l'insuffisance cardiaque chronique, la fibrillation auriculaire et des arythmies ventriculaires [17]. Des études effectuées sur des maladies respiratoires aiguës supportent les hypothèses concernant les dommages à plus long terme induits par le SRAS-CoV-2. Par exemple, une étude de suivi sur 12 ans chez 25 survivants du SRAS-CoV indique que 44 % présentent des anomalies cardiovasculaires contre 0 % pour le groupe témoin [18], alors qu'une autre associe les effets cliniques de la pneumonie sévère nécessitant des soins à un risque accru de MCV après 10 ans de suivi [19]. Sachant que même les individus ayant seulement vécu des symptômes bénins du COVID-19 peuvent développer des complications chroniques, la réadaptation et le suivi des patients se doivent d'être mis en priorité.

Réadaptation précoce et rôle protecteur de l'exercice

Une étude de cohorte prospective a montré que 52 % des survivants du SRAS avaient une capacité d'exercice significativement inférieure à ceux de témoins, 24 mois après la maladie [20]. Les études antérieures portant sur des virus à tropisme respiratoires ont permis à la communauté scientifique d'établir l'importance de la prise en charge rapide (c.-à-d. *dès que les symptômes aigus de la COVID-19 sont terminés et que l'état clinique est stabilisé*) pour diminuer le risque de développer des comorbidités à long terme. La réadaptation des survivants de la COVID-19 vise alors prioritairement la mobilisation ainsi que la récupération des fonctions respiratoires et cardiaques afin de récupérer une capacité fonctionnelle normale et réduire le risque de séquelles. Trois phases de soins sont suggérées (aiguë, subaiguë et long terme; Figure 1) et toutes encouragent en premier lieu la pratique d'activité physique et la mobilisation précoce des patients, en plus d'un suivi médical serré des conditions engendrées par la maladie [21].

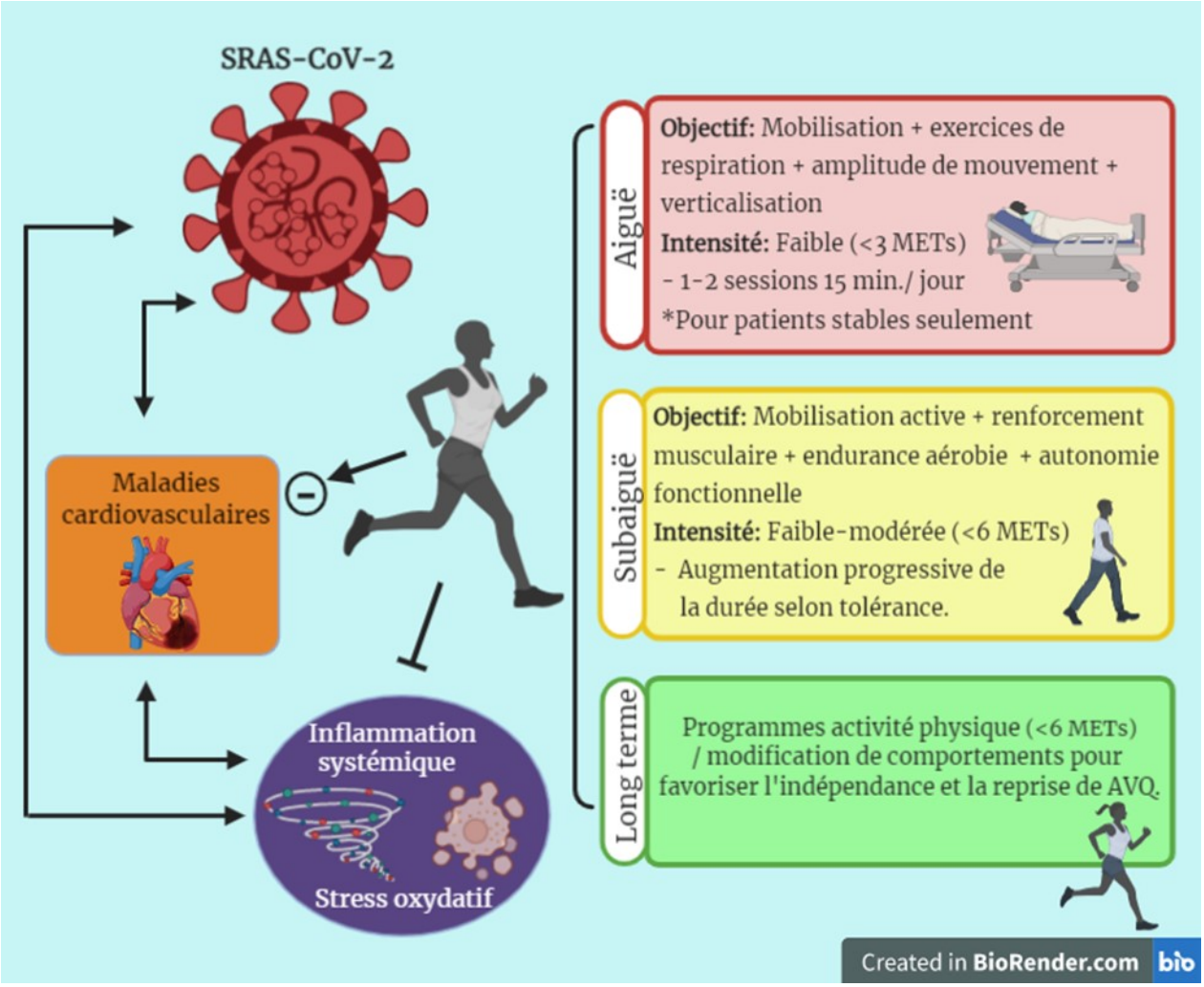
La phase aiguë est primordiale pour minimiser les complications liées à l'infection virale et à l'immobilisation prolongée. Elle s'amorce aux soins intensifs où l'objectif premier est de stabiliser la fonction pulmonaire et ensuite de prévenir le déconditionnement physique par la mobilisation passive ou active des muscles nécessaires à la verticalisation/locomotion [22].

La phase subaigüe vise prioritairement à améliorer la mobilité (surtout par la réintroduction graduelle d'activité physique) et la fonction respiratoire par des exercices spécifiques aux muscles inspiratoires [22]. Ces interventions encouragent le retour à l'autonomie au quotidien, après quoi, la phase de réadaptation à long terme débute. Idéalement, elle consiste en une prise en charge des patients par divers thérapeutes qui peuvent fournir des programmes d'activité physique à la maison, de la modification de comportements, de la réhabilitation cardio-pulmonaire ainsi qu'un soutien psychosocial. Sachant que l'exercice à intensité modérée entraine une réponse immunitaire positive, qu'elle a un effet anti-inflammatoire en contexte de maladies chroniques et qu'elle diminue le stress oxydatif [23], il s'agit d'une approche de choix pour faciliter le processus de réhabilitation des survivants, mais qui devra se faire progressivement, et sur une base individuelle en raison du fort risque d'intolérance à l'effort dû à des séquelles pulmonaires. D'ailleurs, l'International Task Force recommande aux survivants de la COVID-19 de pratiquer quotidiennement une activité physique d'intensité faible à modérée (entre 1,5 et 6 METs, selon la capacité à l'effort) pendant les 6-8 semaines suivant la décharge de l'hôpital [24].

Conclusion

Même si les symptômes respiratoires de la maladie sont les plus craints, force est d'admettre qu'une attention particulière doit être accordée aux personnes infectées ayant *a priori* des complications cardiovasculaires ainsi qu'aux impacts de la COVID-19 sur le système cardiovasculaire. Pour réduire le risque de séquelle à long terme, il est primordial d'avoir des programmes de réadaptation physique de qualité pour assurer aux survivants un maintien de leur capacité fonctionnelle et autonomie.

Figure 1 : Implication et effets prometteurs de l'exercice dans la prise en charge des complications et du risque de maladies cardiovasculaires liées à la COVID-19



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Current COVID-19 crisis has forced cardiac rehabilitation (CR) programs across Canada to suspend in-person services to minimize the risk of infection. To counteract the negative impact of inactivity that can increase the risk of cardiovascular events, depressive syndromes and anxiety, following studies have provided perspectives, guidance and statements on implementing alternative CR programs.

Home-based cardiac rehabilitation

Thomas RJ, Beatty AL, Beckie TM, et al. Home-Based Cardiac Rehabilitation: A Scientific Statement From the American Association of Cardiovascular and Pulmonary Rehabilitation, the American Heart Association, and the American College of Cardiology. Journal of the American College of Cardiology. 2019;74(1):133-153.

With the importance of alternative CR highlighted under COVID-19 pandemic, this joint scientific statement indicates that home-based CR is a viable option for selected clinically stable low-to-moderate risk patients. While the long-term impact of home-based CR on clinical events is still unclear, this statement highlights that short-term improvements in functional capacity, health-related quality of life and cardiovascular risk factors are similar between home-based and center-based CR.

The statement also reports that home-based CR is potentially advantageous over center-based CR in reducing enrollment delays, expanding capacity/access, delivering individually tailored programs, offering more flexible and convenient scheduling, removing travel/transport barriers, and promoting integration with regular home routine. Technology tools will help improve the efficiency of patient monitoring for safety and effectiveness, and expand the reach of CR professionals beyond the typical reach of center-based services and into a more home-based CR.

Cardiac rehabilitation during the COVID-19 era: guidance on implementing virtual care

Moulson N, Bewick D, Selway T, et al. Cardiac Rehabilitation During the COVID-19 Era: Guidance on Implementing Virtual Care. The Canadian journal of cardiology. 2020;36(8):1317-1321.

To minimize care gaps, this article proposes that all centres should consider developing and implementing a virtual cardiac rehabilitation (VCR) program.

VCR is home-based CR delivered by virtual mechanisms that includes telephone and videoconferencing communication, e-mail, mail, text or other messaging solutions, smartphone applications, online platform, and wearable devices. This article reviewed the challenges, limitations, and pragmatic guidance on the rapid transition to VCR.

Cardiac rehabilitation during quarantine in COVID-19 pandemic: Challenges for center-based programs

Besnier F, Gayda M, Nigam A, Juneau M, Bherer L. Cardiac Rehabilitation During Quarantine in COVID-19 Pandemic: Challenges for Center-Based Programs. Archives of physical medicine and rehabilitation. 2020;101(10):1835-1838.

This special communication reviews the need to maintain physical activity during confinement and proposes a viewpoint to facilitate physical activities at home during confinement.
The authors acknowledge the importance of leveraging the condition to promote a major shift in CR programs for the health of a larger number of individuals.

Continuity of care and outpatient management for patients with and at high risk for cardiovascular disease during the COVID-19 pandemic: A scientific statement from the American Society for Preventive Cardiology

Khera A, Baum SJ, Gluckman TJ, et al. Continuity of care and outpatient management for patients with and at high risk for cardiovascular disease during the COVID-19 pandemic: A scientific statement from the American Society for Preventive Cardiology. American journal of preventive cardiology. 2020;1:100009.

The American Society for Preventive Cardiology summarizes recommendations for management of patients with and at high risk for cardiovascular disease during the COVID-19 pandemic. The recommendations include: (1) continuing physical activity with safe distancing for outdoor activities and recommendations for several opportunities for exercise that can be done at home; and, (2) adaptive strategies for CR to be implemented, such as home-based CR involving innovative platforms to ensure continuity of this essential service.

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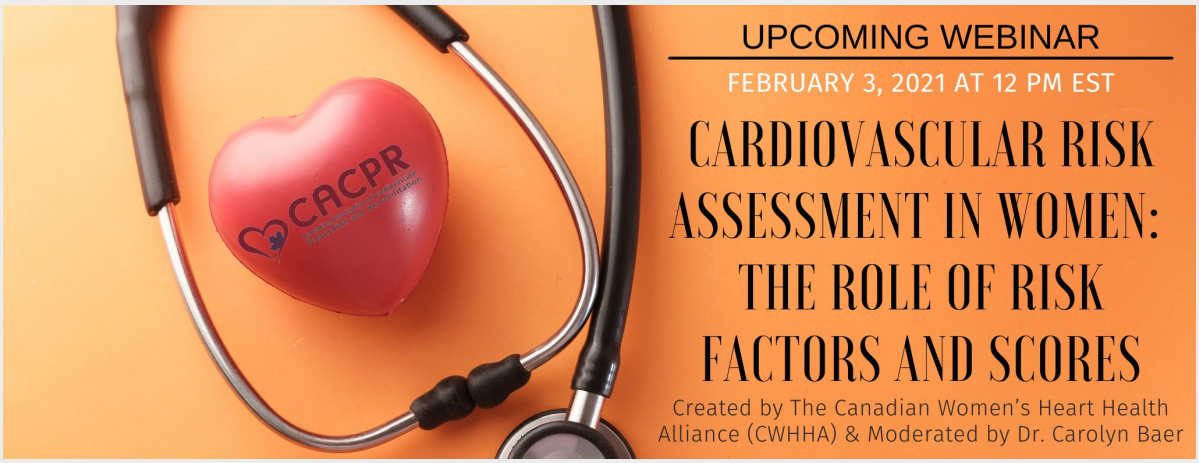

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