



MYOCARDIA AFTER COVID-19, CONCLUSIONS OF THE AMERICAN COLLEGE OF CARDIOLOGY ALGORITHM

Yusupova Mamlakathon
Department of "Optional Therapy"
Fergana Medical Institute of Public Health

Abstract

The American College of Cardiology (ACC) has released a decision-making algorithm for the care of patients with the cardiovascular consequences of COVID-19. The document describes possible treatment plans for myocarditis and other heart conditions, subacute effects of coronavirus infection, the resumption of sports and intense training.

Keywords : Myocarditis, COVID-19, post- COVID syndrome, American College of Cardiology

Introduction

The ACC has released an expert consensus defining the cardiovascular consequences of COVID-19 and a decision algorithm. The paper focuses on conditions that clinicians have difficulty diagnosing and treating: myocarditis, subacute heart disease, and return to exercise.

Experts emphasize that the document does not provide the only correct solution, but encourages consideration of important factors when determining a treatment plan.

Main Part

Terminology and spectrum of myocardial injury after COVID-19

Myocarditis is recognized as a rare but serious complication of coronavirus infection. To limit divergences in interpretation, the experts clarified the terminology. The following ACC definitions describe the spectrum of myocardial injury in COVID-19.

Myocarditis **is a** condition defined by:

1. the presence of cardiac symptoms (chest pain, shortness of breath, palpitations, fainting),
2. elevated levels of cardiac troponin (cTn),
3. ECG changes (T-wave inversion, ST-segment elevation without reciprocal ST-segment depression, prolongation of the QRS complex), ECHO-KG (left ventricular contractility disorder), MRI and/or histopathological findings on biopsy or post-mortem examination (inflammatory myocardial infiltrates associated with myocyte





degeneration and necrosis) in the absence of blood-limiting coronary artery disease.

Depending on the number of signs present, possible, probable and reliable myocarditis are distinguished.

Possible myocarditis is patients with cardiac symptoms, elevated cardiac troponin levels , ECG and/or echocardiographic changes, but no evidence of acute myocarditis on endomyocardial biopsy or MRI, or biopsy and MRI were not performed.

Probable myocarditis includes all the features of possible myocarditis, but MRI and/or biopsy within 6 months of exposure to coronavirus show abnormalities consistent with prior myocarditis.

Reliable myocarditis includes all the features of possible myocarditis, while the results of MRI and/or biopsy during the period of coronavirus infection were consistent with active myocarditis.

Myocardial involvement - a broader term that includes myocardial abnormalities associated with coronavirus infection that do not meet the criteria for possible, probable, or certain myocarditis. Cardiac symptoms may be absent or present, and may be very diverse.

Myocardial damage is a condition in which cardiac troponin levels are above the upper 99th percentile and is associated with various mechanisms, from ischemia to cytokine storm.

Symptoms of myocarditis and their duration. The most common symptoms of myocarditis after COVID-19 are fever, shortness of breath, cough, and chest pain. Additional symptoms include chest discomfort , fatigue after exercise, palpitations, and fainting.

Symptoms may resolve within 3 months of COVID-19 or persist for 12 months or more.

In some patients, an increase in the level of cardiac troponin and pathology on MRI are detected shortly after infection. However, delayed onset of symptoms, elevated cardiac biomarkers , and cardiac imaging abnormalities are more common.

Importantly, symptom intensity correlates poorly with left ventricular ejection fraction (LVEF) and levels of cardiac troponin , natriuretic peptides, and C-reactive protein.



Prevalence of myocarditis after COVID-19

Viral infection is the most common cause of any myocarditis, with a frequency of 10-106 cases per 100,000 people.

The prevalence of myocarditis after COVID-19 is 450 cases per million people, a recent population-based study found. Myocardial dysfunction may be present in up to 40% of hospitalized patients with coronavirus infection.

Risk Factors

The identification of risk factors for myocarditis in COVID-19 is still an area of active research.

So far, risk factors include older age, male sex, concomitant cardiovascular diseases, obesity, diabetes mellitus, arterial hypertension, immunosuppression, and severe systemic diseases.

Mechanisms of myocardial injury

Direct viral invasion, inflammatory and immune responses, and microvascular angiopathy are among the mechanisms of myocardial injury in COVID-19.

New data point to the occurrence of an inadequate immune response with excessive activation of the innate immune system, the release of pro-inflammatory cytokines, thrombotic microangiopathy, and endothelial dysfunction. Other proposed mechanisms of myocardial injury are ischemia, stress cardiomyopathy, and hypoxia. coronavirus RNA found in the myocardium of 25-50% of those who died from COVID-19, mainly in the subendothelium, not in cardiomyocytes.

Decision algorithm

Suspicion of heart disease

Step 1 : ECG, cardiac troponin (cTn), ECHO-CG.

It is preferable to use a sensitive assay when assessing the cTn level.

Step 2 : Performed with normal LV contractility.

Additional studies for differential diagnosis are recommended:

acute coronary syndrome, stress cardiomyopathy - coronary angiography, pulmonary embolism - CT angiopulmonography,

cor pulmonale - saturation, chest x-ray,

distributive, septic shock - catheterization of the right heart, procalcitonin,

early diagnosed heart disease - anamnesis, medical record.

Step 3 : performed with cTn increase, ECG changes, ECHO-KG in step 1 - consultation with a cardiologist.

Step 4 : is performed in unstable patients with high-risk clinical signs (hypotension, cardiogenic shock, ventricular arrhythmias, atrioventricular block) - examination in a **specialized center, decision on the issue of right heart catheterization (±**





endomyocardial biopsy to confirm myocarditis and its specific types if unrelated with COVID-19 process).

Step 5 : performed after step 3 in clinically stable patients – MRI

Treatment and re-examination

Other lesions of the myocardium and pericardium

Patients with chest pain as the only symptom, preserved left ventricular systolic function, and no ventricular arrhythmias may be treated as outpatients.

Careful monitoring of symptoms and signs (shortness of breath, edema, syncope).

With damage to the pericardium - NSAIDs, colchicine.

Re-examination - after 3-6 months.

Mild to moderate myocarditis

Hospitalization is recommended (if not already done).

Treatment of myocarditis in stable patients should be based on standard treatment protocols.

Co-existing COVID-19 pneumonia with a need for supplemental oxygen should be treated with corticosteroids.

With concomitant damage to the pericardium - NSAIDs, colchicine.

With a decrease in the ejection fraction of the left ventricle - therapy for heart failure according to clinical recommendations.

Limitation of intense physical activity for 3-6 months, re-examination - after 3-6 months.

severe myocarditis

Treatment in specialized centers.

With concomitant severe lung damage - the appointment of corticosteroids.

Intravenous corticosteroids may be considered for suspected or confirmed hemodynamic myocarditis or adult multisystem inflammatory syndrome (MIS-A), a hyperinflammatory state with acute heart failure and/or cardiogenic shock in the absence of sepsis.

With a decrease in the ejection fraction of the left ventricle - therapy for heart failure according to clinical recommendations and continued on an outpatient basis.

Patients with cardiogenic shock, sustained ventricular arrhythmias, and/or severe atrioventricular block should be treated as in other forms of cardiogenic shock. Mechanical circulatory support and other advanced treatments are recommended.

After stabilization of the patient with cardiogenic shock or hemodynamic instability, an MRI should be performed (until discharge from the hospital).



Limitation of intense physical activity for 3-6 months, re-examination - after 3-6 months.

Conclusions

Post- COVID and Covid- associated myocarditis is a serious disease that is gaining relevance in the modern world. Using the algorithm of the American Heart Association may improve the course of this disease, improve the prognosis for further treatment of patients.

Bibliography

1. Зокиров М.М. & Касымова, С. А., & Рустамова, И. К. (2019). Нейропсихологическое исследование пациентов с длительной посттравматической эпилепсией. *Молодой ученый*, (4), 116-118.
2. Sarvinoz, T., & Muzaffar, Z. (2022). Rehabilitation aspects of water therapy in modern medicine. *Uzbek Scholar Journal*, 6, 102-106.
3. Sarvinoz, T., & Muzaffar, Z. (2022). Rehabilitation for childhood cerebral palsy. *Uzbek Scholar Journal*, 6, 97-101.
4. Nabievna, M. Y., & Muzaffar, Z. (2022). Literatural review of the relevance of the problem of neurosaids. *Modern Journal of Social Sciences and Humanities*, 4, 558-561.
5. Nabievna, M. Y., & Muzaffar, Z. (2022). Modern View on the Pathogenesis of Hiv Encephalopathy. *Spanish Journal of Innovation and Integrity*, 6, 478-481.
6. Muzaffar, Z., & Okilbeck, M. (2022). Dementia and arterial hypertension. *Modern Journal of Social Sciences and Humanities*, 4, 19-23.
7. Muzaffar, Z., (2022). Chronic Obstructive Pulmonary Disease in Combination with Cardiovascular Diseases. *European Multidisciplinary Journal of Modern Science*, 6, 150-155.
8. Зокиров, М., & Мухаммаджонов, О. (2022). Особенности развития тревожных и депрессивных расстройств при заболеваниях, сопровождающихся хроническим болевым синдромом. *Barqarorlik va yetakchi tadqiqotlar onlayn ilmiy jurnali*, 841-844.
9. Зокиров, М., & Мухаммаджонов, О. (2022). Вич энцефалопатия и его патогенетические аспекты. *Barqarorlik va yetakchi tadqiqotlar onlayn ilmiy jurnali*, 855-858.
10. Muzaffar, Z. (2022). HIV Encephalopathy and its Pathogenetic Aspects. *European Multidisciplinary Journal of Modern Science*, 4, 843-846.





11. Зокиров, М. М., Рустамова, И. К., Касимова, С. А., & Кучкарова, О. Б. (2019). Жарохатдан кейинги талвасада кечки нейровизуализацион ўзгаришлар. In *Современная медицина: новые подходы и актуальные исследования* (pp. 56-60).
12. Zokirov M., Mukhammadjonov, O. (2022). Cognitive Impairments in Patients with HIV-Associated Encephalopathy. *Central asian journal of medical and natural sciences*, 3(2), 401-405.
13. Zokirov, M. M., & Mukhammadjonov, O. (2022). Cognitive impairment in patients with Parkinson's disease and optimization of its treatment. *Eurasian Scientific Herald*, 7, 177-180.
14. Зокиров, М., & Туланбоева, С. (2022). Когнитивные нарушений у пациентов с ВИЧ-ассоциированной энцефалопатией. *Barqarorlik va yetakchi tadqiqotlar onlayn ilmiy jurnali*, 68-73.
15. Muzaffar, Z. (2022). Literature reviews on nervous system damage during hiv infection. *Barqarorlik va yetakchi tadqiqotlar onlayn ilmiy jurnali*, 2(9), 141-147.

