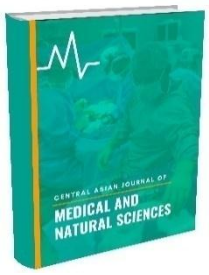
CENTRAL ASIAN JOURNAL OF MEDICAL AND NATURAL SCIENCES



Volume: 03 Issue: 06 | Nov-Dec 2022 ISSN: 2660-4159

http://cajmns.centralasianstudies.org

Features of Management of Patients with Acute Coronary Syndrome After Suffering Covid-19

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Received 7th Oct 2022,
Accepted 8th Nov 2022,
Online 9th Dec 2022

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Summary: The novel coronavirus infection (COVID-19) pandemic, spread by the SARSCoV-2 virus, is a challenge to healthcare systems around the world. The most common manifestation of COVID-19 is the respiratory system. However, this disease is characterized by high activity of inflammation and thrombotic complications leading to multiple organ damage. Management of a patient with COVID-19 includes not only the treatment of pneumonia and respiratory failure, but also the timely recognition and treatment of damage to other target organs. An analysis of the factors associated with the severe course and poor prognosis of COVID-19 indicates the important role of comorbid pathology. Conditions that are associated with poor prognosis include cardiovascular disease in particular and acute coronary syndrome. This means that preventive measures during the COVID19 pandemic should consist of both measures to prevent infection and measures aimed at optimal control of these conditions. In our article, we outlined our point of view on this pathology.

Key words: SARSCoV-2, hemodynamic criteria, immunological features, acute coronary syndrome.

Relevance. ACS is any combination of clinical signs or symptoms suggestive of acute MI or unstable angina. The Chinese expert consensus on the diagnosis and treatment of acute MI in the context of COVID-19 prevention and control identifies 5 key principles for the diagnosis and treatment of ACS in a pandemic: proximity to the point of care, ensuring the epidemic safety of patients and staff, transportation to designated medical facilities, remote consultations, priority of thrombolysis in treatment [1,7]. In general, the tactics of managing patients with ACS should not differ from the standard accepted [6].

Patient routing. Patients with ACS and suspected COVID-19 should be referred to hospitals that have the ability to perform percutaneous coronary intervention (PCI) [5]. If there are several PCI centers in the region located at a short distance (for example, within the same city), the possibility of referring patients with confirmed COVID-19 or a high risk of infection (symptoms, established contact with the patient) and ACS to one isolated PCI center should be considered. If there is only one PCI center with

several X-ray rooms, one of them should be allocated to an isolated area for infected patients, with strict separation of the flows of patients with COVID-19 (or a high probability of it) and not infected, including separate intensive care and intensive care wards.

If there is one PCI center with one X-ray operating room, it is necessary to separate patient flows depending on the epidemiological status, including separate resuscitation and intensive care wards, and implement a protocol for interventional interventions for infected patients with the necessary protective measures and final disinfection. When changing the order of routing of patients with ACS, it is necessary to take into account the existing regional features (available opportunities for reperfusion therapy, additional bed capacity, the possibility of outpatient monitoring in case of early discharge), the current epidemiological situation and its predicted dynamics [2,3]. Ensuring the epidemic safety of patients and staff. An assessment of the epidemiological history, the presence of symptoms characteristic of COVID-19 (especially shortness of breath), the measurement of body temperature should be carried out at the earliest possible stages of care, optimally at the prehospital stage. Patients with a high probability of having COVID-19 should be hospitalized in specialized hospitals, if available in the region. Evaluation of incoming ACS patients, more detailed in patients in stable condition, should be organized at the admissions level. The streams of patients with ACS without symptoms of a viral infection or pneumonia, with a low probability of COVID-19, and patients with known contact with infected and / or symptoms of COVID-19 should be divided from the moment of admission to the hospital, however, all patients urgently admitted to the hospital, up to laboratory exclusion of COVID-19 should be considered infected. Emergency care for patients should be provided with strict adherence to epidemiological protection measures, and special training of personnel is necessary to minimize the delays associated with these measures. Patients admitted to hospital urgently with a presentation of ACS should undergo in-hospital testing for COVID-19. In stable patients who test negative, early discharge from the hospital for outpatient follow-up should be considered to increase bed availability and reduce the risk of infection in the hospital setting.

Transportation. Direct transportation of the highest risk patients to regional vascular centers, even from remote areas, should be considered. Stable patients with non-ST elevation ACS (ST-ACS), as well as stable patients with ACS with concomitant COVID-19, can be referred to regional hospitals without the possibility of invasive interventions in order to reduce the load on the region's leading hospitals providing high-tech care, with subsequent transfer for PCI in case of destabilization or a recommendation for a delayed intervention in case of the effectiveness of conservative therapy [4].

Diagnostics and remote consultations. Specific myocardial damage, characteristic of COVID-19 and often accompanied by an increase in troponin levels, can create difficulties in differential diagnosis and contribute to the over diagnosis of ACS against the background of COVID-19 [5,9]. It is recommended to organize regional advisory centers for the distribution of patient flows, incl. depending on the likelihood associated with COVID-19, conducting remote consultations, including the transmission of an ECG to decide on the appropriateness of thrombolytic therapy and make a decision on the route of hospitalization. It is recommended to organize outpatient monitoring of patients discharged from the hospital using remote technologies in order to support early discharge from the hospital of patients who are in a stable condition [10].

Medical advice. When caring for patients with ACS associated with COVID-19 or when COVID-19 is suspected, the principles of the current clinical guidelines for the diagnosis and treatment of ACS should be followed, both in terms of determining the tactics of treatment and in relation to drug therapy. Consideration should be given to the possibility of significant drug-drug interactions when antiviral drugs are Coad ministered with statins, antiplatelet drugs, and oral anticoagulants; however, this problem has not been studied enough to justify practical recommendations [11]. ACS with ST segment elevation (ACS ST).In ST ACS, primary PCI should be considered as the optimal method of

reperfusion therapy in the early stages of the disease, if timely transportation of the patient to an invasive hospital is possible. The high frequency of the absence of obstructive coronary lesions according to coronary angiography in patients with ST ACS in combination with COVID-19 and the need for strict anti-epidemic measures should not serve as a limitation for coronary angiography in a patient with convincing clinical manifestations of the disease. However, in the case of a severe course of COVID-19, the presence of 7 pneumonia requiring observation in the intensive care unit, respiratory support, the likelihood of developing type 1 MI is low, and coronary angiography, in most cases, is inappropriate [12]. The recommendations of an international group of interventional cardiologists and specialists in acute cardiac care note that it is desirable first of all to try to apply a strategy of mechanical revascularization in accordance with local capabilities [18]. However, it is noted that about 20-30% of patients with COVID-19 have myocardial damage with an increase in the number of troponins I and T, which leads to type 2 MI. In particular, the greater the respiratory and multiple organ failure, the older the patients, the greater the increase in troponin, therefore, in this category of patients, the risk-benefit ratio of an invasive procedure should be appropriately assessed, especially in patients who do not have hemodynamic instability, and therefore , optimal medical therapy in such situations is reasonable [1].

Thrombolytic therapy should be considered if it is impossible to timely transport a patient with ST ACS to an invasive hospital or the resources of the PCI center are limited, incl. the inability to safely perform the intervention within the recommended time frame for a patient with confirmed COVID-19 or a high probability of it. The limited possibilities of performing primary PCI by invasive hospitals in an unfavorable epidemiological situation should be considered as a basis for expanding the use of thrombolytic therapy at the prehospital stage [5]. The complex of standard drug therapy includes ASA, unfractionated heparin (UFH), statins, nitrates in the presence of chest pain, if hemodynamics allows [2]. OKS ST. In patients with ST ACS associated with COVID-19, careful differential diagnosis and risk stratification should be performed to determine indications for coronary angiography. In very high-risk patients, current guidelines should consider short-term coronary angiography (an early invasive strategy). In patients with confirmed or suspected COVID-19 associated with intermediate-risk ST ACS, in clinically stable high-risk patients, and in suspected type 2 MI, an initial conservative strategy is preferred, with coronary angiography performed if the condition is destabilized, or delayed after recovery from oral infection coronavirus. Compared to stress testing, computed tomography (CT) coronary angiography is more preferable to rule out obstructive coronary artery disease in patients hospitalized with ST ACS [5].

The complex of standard drug therapy includes ASA, UFH or LMWH, statins, if hemodynamics allows - BB and nitrates in the presence of chest pain [20, 21]. Issues of anticoagulant and antiplatelet therapy in patients with COVID-19 are considered in a review by American scientists [9]. Patients suffering from ACS, in the absence of contraindications, should immediately receive ASA (160-325 mg) without enteric coating, followed by a low dose (80 mg) for a long time. P2Y12 inhibitors (clopidogrel, ticagrelor or prasugrel), dual and triple antiplatelet therapy are prescribed in accordance with international recommendations.

Conclusions.

1. Mortality from acute MI is 40% of the total mortality of patients with COVID-19.
2. When organizing medical care for patients with ACS in a pandemic, clear routing and transportation of patients, ensuring the epidemic safety of the patient and staff, and the possibility of remote advisory assistance to patients are necessary.

3. When caring for patients with ACS who are suspected of having COVID-19 or in combination with COVID-19, it is advisable to follow the principles of the current clinical guidelines for the diagnosis and treatment of ACS both for determining treatment tactics and with regard to drug therapy.
4. In ST ACS, primary PCI should be considered as the optimal method of reperfusion therapy in the early stages of the disease, if timely transportation of the patient to an invasive hospital is possible.
5. In the context of the COVID-19 pandemic, it is advisable to expand the use of thrombolytic therapy.

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