INTERNATIONAL MULTIDISCIPLINARY JOURNAL FOR RESEARCH & DEVELOPMENT
SJIF 2019: 5.222 2020: 5.552 2021: 5.637 2022:5.479 2023:6.563
eISSN 2394-6334 https://www.ijmrd.in/index.php/imjrd Volume 10, issue 12 (2023)

MYOCARDIAL INFARCTION AND SOME CORONARY ARTERY DISEASE ISSUES AFTER COVID 19

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ANNOTATION: Over the past almost 3 years COVID 19 has became most problematic disease around the world. It can be explained with difficult mutations with time to time it originating and troublesome creating proper vaccines. However nowadays scientists has launched so many ways to conquer the virus. Patients infected with the virus SARS-CoV-2 and its clinical disease COVID-19 are often minimally symptomatic or asymptomatic. More severe presentations include pneumonia and acute respiratory distress syndrome. [**11**]In some patients, the heart may be affected, and this can occur in individuals with or without a prior cardiovascular diagnosis. Evidence of myocardial injury, as defined as an elevated troponin level, is common among patients hospitalized with COVID-19, with putative causes including stress cardiomyopathy, hypoxic injury, ischemic injury (caused by cardiac microvascular damage or epicardial coronary artery disease), and systemic inflammatory response syndrome (cytokine storm). A minority of patients with an elevated troponin level present with symptoms and signs suggestive of an acute coronary syndrome.

Key words: COVID 19, SARS-CoV-2 virus, myocardial infarction, coronary artery disease, myocarditis,

Relevance. Patients with cardiovascular disease, hypertension, obesity, and diabetes are at increased risk of a poor prognosis. In addition, patients with myocardial injury, irrespective of cause, have a poorer prognosis. This topic will address our approach to the diagnosis and management of patients with either an acute coronary syndrome or stable coronary artery disease (CAD) who are suspected of or who have confirmed COVID-19 infection. Our approach and recommendations only apply during the pandemic and are superseded by routine care thereafter.The prevalence of CAD in particular, and cardiovascular disease in general, varies from population to population. Thus, among patients who are diagnosed with COVID-19, there is a broad range for prevalent CAD. Rates between 4.2 and 25 percent have been reported, with most series from China. [**11**] Among patients admitted to intensive care units or those who died [5], the percent is higher.The frequency of myocardial injury (as reflected by elevation in cardiac troponin levels) is variable among hospitalized patients with COVID-19, with reported frequencies of 7 to 28 percent. Decline in hospitalization and percutaneous coronary intervention rates — Multiple studies have found that the incidence of hospitalization for acute myocardial infarction (MI) and admissions for most diagnoses have decreased by as much as 40 to 50 percent during the pandemic. **[11]** The following three large studies are representative:

- A study from Northern California compared weekly incidence rates of hospitalization for acute MI (ST-elevation MI [STEMI] and non-ST-elevation MI [NSTEMI]) before and after March 4, 2020, when the first reported death from COVID-19 occurred in Northern California [8]. These data were also compared with data from the same time period in 2019. The weekly rates of hospitalization decreased by about 48 percent during the COVID-19 period (during the period of January 1 to March 3, 2020, the incidence rate was 4.1 per 100,000 person-weeks and from April 8 to April 14, the incidence rate was 2.1 per 100,000

person-weeks [incidence rate ratio 0.52, 95% CI 0.40-0.68]). This decrease occurred in patients with NSTEMI (incidence rate ratio 0.51, 95% CI 0.38-0.68) and probably in patients with STEMI (incidence rate ratio 0.60, 95% CI 0.33-1.08). Compared with 2019, the incidence of hospitalization for acute MI was significantly lower in 2020 only after March 4, demonstrating that the decrease could not be explained by seasonal variation.

- A study from Italy compared admissions for acute MI to coronary care units from March 12 to 19 in 2020 with those during the equivalent week in 2019 [9]. There was a 49.4 percent reduction ($p<0.001$ percent), and the reduction was significant for both STEMI and NSTEMI. The STEMI case fatality rate was higher, comparing 2020 with 2019 (risk ratio 3.3, 95% CI 1.7-6.6).
- A large database study from England compared hospital admissions for acute coronary syndromes (ACS) between mid-February and end of March, 2020 and also compared them with the weekly average in 2019 (3017 per week) [11]. There was a substantial reduction in the weekly numbers of patients with ACS admitted to hospitals in England by the end of March, 2020 (1813 per week; 40 percent reduction) compared with the 2019 weekly average. The trend was partially reversed by the end of May, 2020 (2522 per week; 16 percent reduction). Although the decline in hospital admissions was seen across all types of ACS (eg, STEMI, NSTEMI, unstable angina, and MI of unknown type), it was most pronounced for those with NSTEMI.

  Possible explanations for the decreased hospitalization rate include patient fear of being infected if hospitalized (avoidance of medical care) and a redistribution of health care.

Perhaps consequent to the decrease in hospitalization rates, at least three studies have documented a decline in the number of acute coronary syndrome patients referred for percutaneous coronary intervention. It is likely that COVID-19 directly and indirectly affects the cardiovascular system. Potential mechanisms of cardiovascular injury include direct myocardial injury from hemodynamic derangement or hypoxemia, inflammatory myocarditis, stress cardiomyopathy, microvascular dysfunction or thrombosis due to hypercoagulability, or systemic inflammation (cytokine storm), which may destabilize coronary artery plaques [15]. Studies suggest that COVID-19 increases the risk of acute MI [**11**]. In one study, there was an increased risk of acute MI in patients with a new diagnosis of COVID-19 compared to noninfected controls (0.03 versus 0.01 percent; adjusted odds ratio 1.22, 95% CI 1.08-1.38) [**11**].

The aim:

The clinical impact of SARS-CoV-2 infection is greater in those with prior cardiovascular disease (CVD) and increasing age. In one study, patients with prior CVD made up 22.7 percent of all fatal cases, and the case fatality rate was 10.5 percent [**11**].COVID-19 vaccination can cause cardiovascular disease (eg, pericarditis, myocarditis)

RESULTS AND DISCUSSION: Until more data with larger numbers of patients are available, it seems reasonable to consider all patients with history of CVD, hypertension, or diabetes at higher risk. We consider this risk likely to be highest for patients with these risk factors, older age, known history of heart failure, or clinically significant valvular disease. For now, there are no specific measures based on this risk stratification, but we advise all of our patients with these risk factors to be especially cautious regarding public health measures of social distancing, including with close family members. Furthermore, given the association with more severe

disease and increased risk for acute myocardial injury, we advise early clinical evaluation for any suspect symptoms.

The following two observational studies illustrate the magnitude of the relationship:

In a report from the Chinese Center for Disease Control and Prevention, 72,314 cases (44,672 confirmed) reported by February 11, 2020 were reviewed [25]. The crude mortality rate was 2.3 percent. For age over 80, the case fatality rate was 14.8 percent. History of coronary heart disease (CHD) was present in 4.2 percent of all cases, but in 22.7 percent of fatal cases. Case fatality rates were 10.5 percent for CHD, 7.3 percent for diabetes, and 6 percent for hypertension. Another report evaluated 1099 cases from 30 provinces within mainland China [**11**]. Of these, 15.7 percent were classified as severe, and 6.1 percent had a primary endpoint, defined as intensive care unit admission, mechanical ventilation, or death. The presence of diabetes (severe versus nonsevere disease, 16.2 versus 5.7 percent; primary endpoint versus no primary endpoint, 26.9 versus 6.1 percent), hypertension (23.7 versus 13.4 percent; 35.8 versus 13.7 percent), or CHD (5.8 versus 1.8 percent; 9 versus 2 percent) was significantly more frequent among patients with severe disease versus nonsevere disease and with a primary endpoint versus no primary endpoint. In a report of 191 patients from Wuhan province who were diagnosed before January 31, 2020, there were significant univariate associations with death outcome for diabetes (31 versus 14 percent, $p = 0.005$), hypertension (48 versus 23 percent, $p = 0.0008$), and CHD (24 versus 1 percent, $p<0.0001$) [3]. In a multivariable analysis, only advancing age, Sequential Organ Failure Assessment Score, and D-Dimer were associated with mortality.

Another study found that the presence of acute injury determined by troponin elevation was a significant factor in the association of CVD and mortality [26]. Among 187 patients with confirmed COVID-19, a history of CVD (defined as CHD, hypertension, or cardiomyopathy) was present in 66 (35 percent), and troponin was elevated in 52 (28 percent). Troponin elevation was more frequent in patients with CVD (55 percent, 36 of 66). Among patients with CVD and elevated troponin, the mortality rate was 69 percent (25 of 36). The mortality rate was 7.6 percent among patients without CVD and normal troponin, 13.3 percent among those with CVD and normal troponin, 37.5 percent among those without CVD and elevated troponin, and 69.4 percent among those with CVD and elevated troponin. Furthermore, troponin elevation correlated with elevations in C-reactive protein, and higher troponin elevations predicted higher mortality. Although the number of patients included limits the interpretation, there is a suggestion that patients with underlying CVD (including hypertension) are both at increased risk for acute injury and worsened survival in the setting of injury. The cause of this association and whether injury indicates increased risk for MI or myocarditis will require additional investigation.

RECOMMENDATIONS

●A relatively high percent of patients admitted with COVID-19 will have underlying coronary artery disease (CAD). For most, symptoms of CAD will not be present on admission.

●It is likely that COVID-19 directly and indirectly affects the cardiovascular system, causing or contributing to acute coronary syndrome (ACS), myocarditis, and electrical heart disease.

REFERENCES

1. Wang D, Hu B, Hu C, et al. Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel Coronavirus-Infected Pneumonia in Wuhan, China. JAMA 2020; 323:1061.
2. Madjid M, Safavi-Naeini P, Solomon SD, Vardeny O. Potential Effects of Coronaviruses on the Cardiovascular System: A Review. JAMA Cardiol 2020; 5:831.
3. Zhou F, Yu T, Du R, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. Lancet 2020; 395:1054.
4. Li B, Yang J, Zhao F, et al. Prevalence and impact of cardiovascular metabolic diseases on COVID-19 in China. Clin Res Cardiol 2020; 109:531.
5. Chen T, Wu D, Chen H, et al. Clinical characteristics of 113 deceased patients with coronavirus disease 2019: retrospective study. BMJ 2020; 368:m1091.
6. Garcia S, Albaghdadi MS, Meraj PM, et al. Reduction in ST-Segment Elevation Cardiac Catheterization Laboratory Activations in the United States During COVID-19 Pandemic. J Am Coll Cardiol 2020; 75:2871.
7. De Filippo O, D'Ascenzo F, Angelini F, et al. Reduced Rate of Hospital Admissions for ACS during Covid-19 Outbreak in Northern Italy. N Engl J Med 2020; 383:88.
8. Solomon MD, McNulty EJ, Rana JS, et al. The Covid-19 Pandemic and the Incidence of Acute Myocardial Infarction. N Engl J Med 2020; 383:691.
9. De Rosa S, Spaccarotella C, Basso C, et al. Reduction of hospitalizations for myocardial infarction in Italy in the COVID-19 era. Eur Heart J 2020; 41:2083.
10. Garcia S. Reduction in ST-segment elevation. J Am Coll Cardiol 2020; :2871.
11. Taxirovich, A. S. (2023). The Main Etiological Factors, Methods of Prevention and Treatment of Meningitis. Inter-national Journal of Scientific Trends, 2(2), 141-148.
12. Xiang D, Xiang X, Zhang W, et al. Management and Outcomes of Patients With STEMI During the COVID-19 Pandemic in China. J Am Coll Cardiol 2020; 76:1318.
13. Mohammad MA, Koul S, Olivecrona GK, et al. Incidence and outcome of myocardial infarction treated with percutaneous coronary intervention during COVID-19 pandemic. Heart 2020; 106:1812.
14. De Luca G, Verdoia M, Cercek M, et al. Impact of COVID-19 Pandemic on Mechanical Reperfusion for Patients With STEMI. J Am Coll Cardiol 2020; 76:2321.
15. Libby P, Loscalzo J, Ridker PM, et al. Inflammation, Immunity, and Infection in Atherothrombosis: JACC Review Topic of the Week. J Am Coll Cardiol 2018; 72:2071.
16. Modin D, Claggett B, Sindet-Pedersen C, et al. Acute COVID-19 and the Incidence of Ischemic Stroke and Acute Myocardial Infarction. Circulation 2020; 142:2080.
17. Bangalore S, Sharma A, Slotwiner A, et al. ST-Segment Elevation in Patients with Covid-19 - A Case Series. N Engl J Med 2020; 382:2478.
18. Bilaloglu S, Aphinyanaphongs Y, Jones S, et al. Thrombosis in Hospitalized Patients With COVID-19 in a New York City Health System. JAMA 2020; 324:799.
19. Katsoularis I, Fonseca-Rodríguez O, Farrington P, et al. Risk of acute myocardial infarction and ischaemic stroke following COVID-19 in Sweden: a self-controlled case series and matched cohort study. Lancet 2021; 398:599.
20. The Novel Coronavirus Pneumonia Emergency Response Epidemiology Team. The epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19): China. China CDC Weekly 2020; 2:113.
21. Wu Z, McGoogan JM. Characteristics of and Important Lessons From the Coronavirus Disease 2019 (COVID-19) Outbreak in China: Summary of a Report of 72 314 Cases From the Chinese Center for Disease Control and Prevention. JAMA 2020; 323:1239.
22. Liang W, Guan W, Chen R, et al. Cancer patients in SARS-CoV-2 infection: a nationwide analysis in China. Lancet Oncol 2020; 21:335.

23. Epidemiology Working Group for NCIP Epidemic Response, Chinese Center for Disease Control and Prevention. [The epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19) in China]. Zhonghua Liu Xing Bing Xue Za Zhi 2020; 41:145.
24. Guan WJ, Ni ZY, Hu Y, et al. Clinical Characteristics of Coronavirus Disease 2019 in China. N Engl J Med 2020; 382:1708.
25. Chow YW, Pietranico R, Mukerji A. Studies of oxygen binding energy to hemoglobin molecule. Biochem Biophys Res Commun 1975; 66:1424.
26. Guo T, Fan Y, Chen M, et al. Cardiovascular Implications of Fatal Outcomes of Patients With Coronavirus Disease 2019 (COVID-19). JAMA Cardiol 2020; 5:811.
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