COMMENTARY

Cardiovigilance in COVID 19

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Abstract

The COVID19 (Corona Virus Disease: pandemic started in 2019) pandemic has created not only a public health problem, but as a clinical challenge as well. To the cardiologist, COVID 19 presents a wide spectrum of possibilities for clinical decision-making intervention and improvement. Cardiac dysfunction has been identified as a risk factor, a prognostic factor, a diagnostic tool, differential diagnosis, a complication of COVID 19, and a side effect of its treatment. Certain cardiotropic drugs have been implicated in the pathogenesis of COVID 19. The risk of transmission of COVID 19 is an occupational hazard which cannot be ignored by cardiologists. This review discusses the need and scope of cardio vigilance in COVID 19 management.

Keywords: Cardiovascular, Conduction defects, Coronavirus, Diabetes, Heart failure, Myocarditis.

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Risk Factor

COVID 19 has been found to be more common in persons with hypertension and preexisting cardiovascular disease (CVD). In a retrospective Chinese study, 30% of all indoor COVID19 patients had hypertension, while 8% had coronary heart disease.[1] The infection is also more common in the elderly, and in those with diabetes, who are prone to CVD. CVD thus emerges as a major risk factor for COVID 19.

Pathogenesis

The angiotensin converting enzyme 2(ACE2) which has a vital role in heart function and vascular homeostasis, has been implicated as a functional receptor for coronaviruses. The COVID-19 protein (SARS-CoV-2 spike protein) binds to ACE2, which is present in high concentrations in the heart and lungs. Since ACE2 is highly expressible in diseased human heart, patient with underlying heart disease remain at high risk for acquiring COVID19 infection.[2]

Clinical Features

Clinical features and laboratory findings in COVID19 patients show overlap with cardinal symptoms related to cardiac patient. Table-1 summarize the differential diagnosis of COVID 19 based on different clinical features and laboratory abnormalities.

Prognostic Factor

The presence of CVD is taken as a poor prognostic factor for COVID 19 outcomes. In a Chinese study, people with COVID 19 and concomitant CVD experienced more severe symptoms, and were less likely to survive than their peers without CVD.[3] Persons with acute coronary syndrome have reduced cardiac functional reserve, and this impacts outcomes. The infection acts as a precipitating factor for cardiorespiratory decompensation, and may cause death.[4] In resource-constrained settings, the presence of CVD may be used as a variable for triage of COVID 19 patients. It must be noted here that CVD is a heterogenous group of diseases: all persons with CVD need not necessarily have a poor prognosis. The duration of CVD, its nature, extent and severity, as well as current cardiorespiratory fitness, should all be factored in while performing a triage for COVID 19 treatment.

Cardio Vigilance With Pharmacotherapy

Concern has been raised regarding safety of angiotensin converting enzyme inhibitors (ACEi) and angiotensin receptor blockers (ARBs) and chloroquine/ hydroxychloroquine in the COVID19 pandemic. Treating physicians should practice appropriate cardio vigilance while administering such therapy.

Angiotensin Converting Enzyme Inhibitors (ACEI) and Angiotensin Receptor Blockers (ARBs) and COVID19

The use of angiotensin converting enzyme inhibitors (ACEi) and angiotensin receptor blockers (ARBs) has been linked with an increase in ACE2 levels in patients with diseased human heart, which puts them at risk of acquiring COVID19 infection more frequently. Also, this may decompensate the otherwise stable cardiac function. However, current expert advice recommends against discontinuation of these drugs. Recent statements by the ESC council on hypertension ". this speculation about the safety of ACEi or ARB treatment in relation to COVID-19 does not have a

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Table-1: Symptoms and Laboratory findings in COVID9 patients that may overlap with cardiac symptoms.

	COVID19	STEMI	Myocarditis	ADHF	Acute IE	PE
Fever	+++	+/-	++	-	++++	+/-
Chest pain	+	++++	++	+/-	+/-	++
SOB	++++	+	++++	++++	+/-	+++
Cough	++++	+/-	++	+++	+/-	++
ECG	Non-Specific ST-T Changes/ AF/APCs/VPCs	ST Elevation/ rhythm abnormalities	Nonspecific sinus tachycardia/ rhythm abnormalities	Tachycardia AF/VPCs	Sinus Tachycardia/ AF	Sinus Tachycardia/ AF
WBC	Low	High but usually limited to 20000/mm3	Viral Etiology:++ Bacterial:++++	Normal/Mild Increased	Very High	Normal/Mild Increased
Platelets	Low-Normal	Normal	Normal	Normal	Normal	Normal
TROP I	Increased if associated with myocarditis	Markedly Increased	Increased	Increased	Normal	Increased
BNP/NT-ProBNP	Increased if associated with myocarditis	Mildly Increased	Mild Increased	Markedly Increased	Normal	Mild Increased
D DIMER	Increased	Mildly Increased	Mild Increased	Normal	Markedly Increased	Markedly Increased

ADHF: Acute decompensated heart failure. AF: Atrial fibrillation, IE: Infective endocarditis, PE: Pulmonary embolism, STEMI: ST Elevation myocardial infarction.

sound scientific basis or evidence to support it. Indeed, there is evidence from studies in animals suggesting that these medications might be rather protective against serious lung complications in patients with COVID-19 infection, but to date there is no data in humans.." will give confidence to professionals regarding judicious use of drugs that have been tested in multiple RCTs.[5]

We suggest a 'Do not start, do not stop' policy, continuing these agents in patients who are stable on them, but choosing drugs of other classes to initiate or intensity cardiotropic therapy if needed.

Hydroxychloroquine/Chloroquine and COVID19

While there is no specific antiviral treatment for COVID 19, limited evidence has shown that drugs like hydroxychloroquine and azithromycin may be used to manage the condition. Both these drugs are known to prolong QT intervals and lead to life-threatening arrhythmias.[6,7] However, larger studies have demonstrated the cardiovascular safety and benefit of hydroxychloroquine.[8,9] Although needs to be consumed with caution the risk of life-threatening events is being dominated by mass fear perpetuating in the community due to COVID pandemic. Cardiovascular side effects of hydroxychloroquine and chloroquine may range from benign atrioventricular block, pulmonary hypertension, sick sinus syndrome to sudden cardiac death. Further significant drug interaction has been noted with concomitant use of digoxin (increase digoxin level) and other drugs resulting in prolongation of QT interval leading to torsades de pointes and lethal ventricular arrhythmias.

Impact of COVID-19 on Short- and Long-Term CV Health

Although the specific data related to long term follow up of COVID19 patients is lacking, hospitalization for pneumonia is associated with increased short-term and long-term risk of CVD.[10] Insight can also be gained from survivors of the severe acute respiratory syndrome (SARS)-coronavirus epidemic. A 12 year follow up survey revealed a high prevalence of cardiometabolic disorders: 68% dyslipidemias, 60% dysglycaemia and 44% cardiovascular dysfunction[11] in such survivors.

Impact of COVID-19 on Heart Care

In absence of guidelines for management of cardiac emergencies at the time of highly transmissible infection balancing cardiac emergencies and COVID19 is a global challenge. Focus is shifting from aggressive interventional approach to a more conservative strategy. The Sichuan protocol (Table-2 and 3) for managing ACS incorporate both COVID-19 prevention principles by World Health Organization and 'Save the heart, race against time' principle to the maximum.[12]

There is equipoise regarding the safety of offering heart transplantation during the COVID-19 pandemic. Expert recommendations suggest that donors with known or

Table-2: Management of suspected STEMI patients with potential risk of COVID-19 infection.

STEMI<12 hr with no contraindication for thrombolysis	Thrombolysis in Emergency room
STEMI<12 hr with contraindication for thrombolysis	Antiplatelets/Vasodilator/Nitrate
STEMI>12 hr	Antiplatelets/Vasodilator/Nitrate
Shifting from Emergency Room on stabilization	
Low risk for COVID19	Shift to CCU
High risk for COVID with test Negative	Shift to CCU
High risk for COVID with test positive	Shift to Dedicated unit for COVID management

Table-3: Management of suspected USA/NSTEMI patients with potential risk of COVID-19 infection.

High Risk NSTEMI/UA and low risk for COVID19	Shift to CCU/Invasive strategy
High Risk for COVID19/ Low risk NSTEMI	Antiplatelets/Vasodilator/Nitrate in ER. Shift to: (a)CCU if COVID19 negative. (b)Dedicated COVID19 unit if COVID positive
High Risk for COVID19/High risk NSTEMI	Antiplatelets/Vasodilator/Nitrate in ER. (a)COVID19 negative: Shift to CCU, pursue invasive strategy. (b)COVID19 positive: Shift to Dedicated COVID19

Table-4: Cardiovigilance in COVID-19: ten points to ponder.

- Cardiovascular disease (CVD) is a risk factor for COVID 19
- Cardiovascular mechanisms are implicated in the pathogenesis of COVID 19
- CVD is a differential diagnosis of COVID19
- Cardiovascular tests are used to diagnose COVID 19
- CVD can be a complication of COVID 19
- CVD can be a complication of COVID 19 treatment
- CVD is a prognostic factor for COVID 19 outcomes.
- COVID19 may impact long term cardiovascular health
- COVID19 impacts delivery of routine cardiovascular care services
- Exposure to COVID 19 infection is an occupational hazard for cardiologists

suspected COVID-19 be avoided, unless they have been demonstrated to be COVID-19free (by PCR) for at least 14 days. Transplant recipients who contract COVID-19 should be treated as per standard of care. Doses of mycophenolate or azathioprine may have to be reduced.[13]

Occupational Hazard

The risk of COVID 19 transmission from infected patients is all too real. Cardiologists must practice personal protective prophylaxis (PPE) as per standard guidelines, while dealing with patients.

Summary

COVID 19 presents multifactorial, complex associations with CVD and cardiological practice. Evidence supportive of the impact of COVID19 on the cardiovascular system is summarized in Table-4. The treating physician should be aware of these nuances while managing COVID 19.

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