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# ANMCO POSITION PAPER: Network Organization for the Treatment of Acute Coronary Syndrome Patients during the Emergency COVID-19 Pandemic

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## KEYWORDS

STEMI;  
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The COVID-19 pandemic has become a global health emergency. In Italy, the number of people infected by SARS-COVID-2 is rapidly increasing and what emerges from the current data is that the majority do not present any symptoms or only minor flu-like symptoms. In about 20% of the patients, the disease progresses towards more complex forms (interstitial pneumonia to acute respiratory distress and multiple organ failure) with the need of hospitalization in CICU and advanced ventilator assistance. The transmission of the virus occurs very easily from the symptomatic patient's droplets from coughing and sneezing and from direct contact with persons or surfaces. In a patient presenting with ST elevation (STEMI) myocardial infarction or STEMI-like, if positive to COVID-19, the reperfusion therapeutic strategy depends on the local

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organization and on the possibility to access without delay a PCI COVID Center, on the basis, obviously, of the risk/benefit assessment of the individual case. However, we advise to try pursuing, in the first instance, the mechanical revascularization strategy, according to the available local possibilities.

The COVID-19 pandemic has become a global health emergency.<sup>1,2</sup> In Italy, the number of people infected by SARS-COVID-2 is rapidly increasing and what emerges from the current data is that the majority do not present any symptoms or only minor flu-like symptoms.<sup>3</sup> In about 20% of the patients, the disease progresses towards more complex forms (interstitial pneumonia to acute respiratory distress and multiple organ failure) with the need of hospitalization in cardiac intensive care unit and advanced ventilator assistance.<sup>3-5</sup> The transmission of the virus occurs very easily from the symptomatic patient's droplets from coughing and sneezing and from direct contact with persons or surfaces.<sup>6,7</sup>

The transmission can occur, even in the absence of clear symptoms, during the incubation phase from persons who will never present symptoms or following clinical healing but not yet serological.<sup>8-10</sup>

Among the risk factors associated with increased mortality from COVID-19—besides male gender and age—the following are to be considered risk factors: hypertension, diabetes mellitus, a history of cardiovascular, and cerebrovascular events.<sup>11,12</sup> The mortality rate for acute myocardial infarction during SARS by coronavirus was 2.6%, on an overall mortality rate linked to the infection of 6.6%.<sup>13-15</sup> In consideration of the epidemiological framework described, we have to consider all the patients that we examine for acute coronary syndrome (ACS) as potential COVID-19. This aspect is particularly important for the safety of the other hospitalized patients, of our hospitals and of our healthcare professionals (physicians, nurses, residents, social healthcare workers, and radiology technicians) who are directly involved in the management of the patient. Therefore, the cardiologist must be ready to manage any cardiac emergency by guaranteeing the adequate therapy but at the same time, must protect the healthcare professionals from the risk of infection and optimize the available individual protection resources.<sup>16,17</sup>

In a patient presenting with ST-elevation (STEMI) myocardial infarction or 'STEMI-like', if positive to COVID-19, the reperfusion therapeutic strategy depends on the local organization and on the possibility to access without delay a Coronary Angioplasty (PCI) COVID Center, on the basis, obviously, of the risk/benefit assessment of the individual case. However, we advise to try pursuing, in the first instance, the mechanical revascularization strategy, according to the available local possibilities.<sup>14,16-18</sup>

## STEMI-NSTEMI network

### Territorial phase

Encourage patients with chest pain to always call 118 or other available emergency numbers. This will diminish the

number of spontaneous referrals to the Emergency Room (ER) helping to reduce pre-hospital delay.

The regional STEMI-NSTEMI network for the management and treatment of COVID-19 or suspect COVID-19 patients should be characterized by the existence of at least 1 HUB-COVID Center with the following features:

- Two cath labs, one exclusively for COVID-19 or suspect COVID-19 patients;
- A dedicated zone and an intensive care unit (not necessarily cardiologic) for the isolation and treatment of COVID-19 or suspect COVID-19 patients and in network with a COVID Unit.

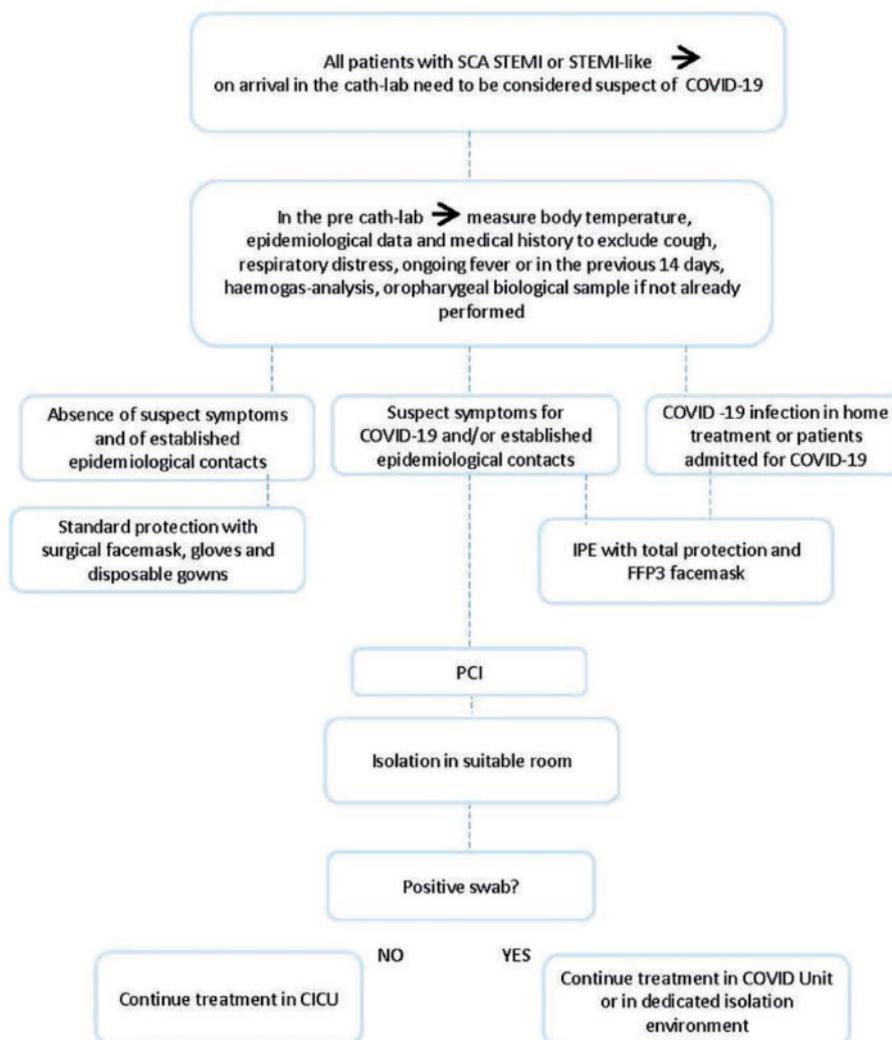
If the HUB-COVID Center is not available for COVID-19 or suspect COVID-19 patients, the Spoke Center must alert the catheter room of a HUB-NO COVID Center. In this case, provisions must be made to transfer the patient to a COVID Unit after the procedure; the cath lab and the rooms utilized will obviously have to undergo sanitization before performing any further procedures.

In case of a suspect COVID-19 patient who, of his own accord, refers to the ER of a NO-COVID Center with a H24 cath lab, all safety precautions must be activated, both in the catheter room and along the entire patient's route, as per local protocol. Subsequently, the patient must be transferred to a COVID Unit or admitted to a specific therapeutic intensive unit (not necessarily cardiologic) dedicated to the isolation and treatment of COVID-19 patients.

The COVID-19 patient who comes from a Spoke Center, must be hospitalized after the procedure and then transferred to a COVID Unit in a specific isolation area of the HUB-COVID Center of reference.

Thrombolysis, after a careful evaluation of the risk/benefit ratio can be considered as an alternative to primary PCI in patients with a STEMI, keeping in mind that thrombolysis in COVID-19 patients could worsen the prognosis by causing an onset of disseminated intravascular coagulopathy. Therefore, this therapy should be taken into consideration only when a primary PCI cannot be performed within the timeline provided by the guidelines.

In suspect intermediate-low risk COVID-19 patients with myocardial infarction without ST-segment elevation (NSTEMI) admitted to a Spoke Centre, and when urgent coronagraphy is indicated, a nasopharyngeal swab or other diagnostic methods like chest radiography, transthoracic computed tomography, must be performed. In case of positive testing for COVID-19, the patient must be transferred to a HUB-COVID Center and subsequently to a COVID-19 Unit. In case of negative testing for COVID-19, the patient can be transferred to a HUB-NO-COVID Center.



**Figure 1.** ACS patient management algorithm during COVID-19 pandemic. CICU, cardiac intensive care unit; IPE, individual protection equipment; STEMI, ST-elevation myocardial infarction; PCI, Coronary angioplasty.

About 20-30% of patients positive for COVID-19 suffer from myocardial damage with an increase of troponin, indicating a Type 2 myocardial infarction. Specifically, respiratory distress, multi-organ impairment, and the patient's age, associated with an increase of troponin. Therefore, in these patients, the risk/benefit ratio of an invasive procedure must be appropriately assessed—especially in patients who do not present haemodynamic instability. In this case, an optimal drug therapy is a reasonable choice, deferring the indication of a coronary angiography to a later stage.<sup>16,18-20</sup>

The Territorial Emergency System personnel provides the results of the electrocardiogram, collects and communicates a detailed anamnesis on any potential contact with persons suffering from COVID-19 and on any suspect symptomatology (cough, cold, fever, dyspnoea, etc.) that the patient has had during the 14 days prior to hospitalization. The same screening must be performed on patients who refer to the ER or are admitted from other centres. All

patients must be provided with surgical masks until the diagnosis is determined.

### Hospital phase

The patients can be divided into five categories:

- (1) STEMI-NSTEMI at very high-risk (STEMI-like) in the absence of COVID-19 symptoms and established epidemiological contacts: all the personnel must wear personal protective equipment including surgical facemasks, gloves, and disposable gowns or in accordance with the current protocols.
- (2) STEMI-NSTEMI at very high-risk (STEMI-like) with suspect COVID-19 symptoms and/or with established epidemiological contacts: the healthcare personnel must wear total individual protective equipment (IPE) including FFP2 or PPF3,<sup>22-25</sup> face-mask or in accordance with the current protocols—in case of both intubated patients or not. Should

the PPF3 facemasks result unavailable, the use of a surgical facemask placed over an FFP2 to reduce the risk of inhalation contagion can be taken into consideration, as per recent reports.

- (3) STEMI-NSTEMI at very high-risk (STEMI-like) infected with COVID-19 in-home treatment: the healthcare personnel must wear total IPE and FFP3 mask,<sup>21-24</sup> or in accordance with the current protocols—both in case of intubated patients or not.
- (4) STEMI-NSTEMI at very high-risk (STEMI-like) in hospitalized COVID-19 patients: the healthcare personnel must wear total IPE and FFP3 mask, or in accordance with the current protocols—both in case of intubated patients or not.
- (5) STEMI-NSTEMI complicated by out-of-hospital cardiopulmonary arrest: the healthcare personnel must wear total IPE AND FFP3 mask, in accordance with the current protocols—both in case of intubated patients or not.

The patient, on arrival in the catheter room must undergo a check of the vital signs (particularly body temperature and oxygen saturation) for the detection of the virus and a haemogas-analysis and biological sample, or other available option, must be performed. The personnel who performs the procedures must use the protective system associated with the severity of the respiratory symptoms and to the history of the patient, in accordance with the current protocols (see above).

The diagnostic and interventional procedures must be performed in accordance with the Centre's standard protocol.

On completion of the procedure and while waiting for the diagnostic result for COVID-19, the patient must be considered a carrier of the COVID-19 virus, and must be monitored in an isolated environment and attended to by dedicated personnel, who will take all the necessary precautions (see above).

In case of positive diagnostic results for COVID-19, the patient must be hospitalized in the COVID-19 Unit, organized on the basis of the intensity of care, in an appropriate clinical care context in accordance with the patient's clinical conditions (stable: sub-intensive; unstable: intensive care). In hospitals not equipped with a COVID-19 Unit organized on the intensity of care, the patient must however be hospitalized in areas dedicated to COVID patients and attended to by dedicated personnel.

Asymptomatic patients with a negative diagnostic response for COVID-19 will follow the standard pathway and be hospitalized in the relevant cardiological intensive care No-COVID unit (Figure 1).

Patients with a negative biological sample but with highly suspect COVID-19 symptoms will be monitored in an isolated room (possibly with negative-pressure) and will undergo a second swab test, in accordance with the current local protocols and which result will determine the next hospitalization setting.

Should a hospitalized patient in a COVID Unit manifest a clinical and electrocardiographic situation compatible with ACS STEMI, it will be necessary to assess the risk/benefit ratio of a potential mechanical revascularization in

relation to the clinical conditions of the patient and of the risk determined by patient transport for PCI, promoting where indicated, a fibrinolytic therapy.<sup>16,17</sup>

In regards to the dressing procedures, reference can be made to both the GISE Document and to the National Institute of Health Document.<sup>21-24</sup>

In regards to the sanitization of the contaminated areas refer to the current hospital protocols.

## Data availability

The data that support the findings of this study are available from the corresponding author, FSdU, upon reasonable request.

## Disclaimers

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