

COVID-19 Pandemic and Cardiac Electrophysiology: Guidance Protocol From a UK Tertiary Cardiac Center

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Abstract: Since December 2019, the COVID-19 pandemic has resulted in more than 2,160,000 positive cases and more than 145,000 deaths until April 18, 2020. The pressure to the health services worldwide has been unprecedented. The redeployment of staff and resources to treat more efficiently COVID-19 cases along with the need to reduce disease transmission has affected the field of electrophysiology among many others. Amendments to clinical pathways are obligatory in this perspective to continue to provide the necessary health services to the people who need them, although at the same time, infection control and prevention are not compromised by inadvertent disease transmission or unnecessary use of resources. We aim to provide a guide of the logistic aspects of electrophysiology procedures derived from our tertiary cardiac center during the current COVID-19 pandemic.

Key Words: ablation, COVID-19, personal protective equipment

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SARS-CoV-2 is a beta coronavirus, responsible for the COVID-19 pandemic. Even though the morbidity and mortality rates seem to be lower than the SARS-CoV-1 and MERS coronaviruses^{1–3} that lead to the relevant epidemic breaks in 2003 and 2012, due to its high transmission it has evolved to a pandemic. The challenges imposed to the healthcare systems worldwide are unprecedented, and resources have been redirected toward the prevention of disease transmission and treatment of COVID-19 patients affecting many, if not all, medical specialities.

GENERAL CONSIDERATIONS AND PATHWAY PROPOSED

Given the emerging needs, Health Organizations, Ministries of Health and Scientific Associations provided guidance regarding infection control and reallocation of resources. Cardiac electrophysiology is a field that has been readily and immensely affected, and the Heart Rhythm Society has produced a consensus document⁴ regarding, among others, a classification of ablation procedures according to urgency. Moreover, NHS England has provided guidance regarding the management of cardiac patients including recommendations relevant to electrophysiology procedures.⁵ Based on these 2 documents, catheter ablation procedures that are considered urgent or emergent are (1) ablation of ventricular tachycardia that cannot be controlled with medication and leads to hemodynamic compromise, (2) ablation of an incessant, hemodynamically significant, severely symptomatic tachycardia (SVT/atrial flutter) not responding to antiarrhythmic drugs, rate control, and/or cardioversion, and (3) ablation for preexcited atrial flutter with syncope or cardiac arrest.

Given that viral diseases can trigger arrhythmias via inflammatory processes and adrenergic activation, on many occasions, the patients requiring these procedures might be COVID-19 positive. Indeed, early reports suggest that COVID-19 can be complicated by arrhythmias^{6,7} and that severe cases show evidence of cardiac involvement.⁸ The most prevalent mechanism is believed to be ischemia induced by the inflammation process, but also direct myocyte injury and myocarditis has been reported.^{9,10} So, on many occasions, anesthetic support might be needed during an ablation procedure and guidance regarding anesthetic aspects of treating patients with COVID-19 has already been proposed.^{11,12}

The type of personal protective equipment (PPE) required is determined by whether the patient having the procedure is positive/suspected COVID-19 and whether the procedure is considered an aerosol-generating procedure. According to Public Health England intubation/extubation and related procedures, open suctioning of the respiratory tract, noninvasive ventilation, and high-flow nasal oxygen are considered aerosol-generating procedures,¹³ so by default in such a case full PPE is recommended in a positive/suspected COVID-19 patient because, at a minimum, conscious sedation might be needed which may prompt the need for high-flow nasal oxygen. Full PPE comprises gloves, disposable fluid-repellent long-sleeve gown/coverall, filtering face piece class 3 respirator, and full-face shield or visor.¹³ It is also noted in the same guidance document that “Subject to local risk assessment, the same precautions apply for all patients regardless of case status in contexts of sustained COVID-19 transmission.” Based on that and taking into consideration that (1) there might not be enough time for testing due to emergency conditions and (2) there is a considerable percentage of false-negative test results, we opted for full PPE in all ablation cases performed in the laboratory.

Moreover, measures should be taken to minimize transit times and patient–healthcare environment interaction. This can be achieved for the inpatients by doing all the checks in the ICU/ward before the procedure or inside the laboratory bypassing any unnecessary staying in interim areas. Also, after the procedure, the recovery of the patient should be done in the laboratory or the ICU/ward. For patients needing general anesthesia, intubation and extubation are recommended to be performed in the ICU/ward to minimize aerosol generation and contamination of the laboratory which ideally should have a negative pressure ventilation system. For the same reason, intracardiac echocardiography is preferred over transesophageal echocardiogram depending on availability and operator expertise. Regarding the outpatients, separate designated areas should exist for confirmed/suspected COVID-19 patients and confirmed negative COVID-19 patients and the target should be same-day discharge if possible. If hospitalization is needed, the patient should remain in the designated preoperation day case unit to reduce the transmission of the virus.

Finally, efforts should be done to minimize the number of staff members taking part in the procedure without compromise patient safety. This means reducing staff nurses to one for both monitoring vitals and administering drugs, a dedicated cardiac physiologist certified in the use of the selected mapping system avoiding the need for the presence of a company representative, a radiographer, a single operator, and only in anticipated complex procedures a second operator should be available onsite if needed, and in case of anesthetic support, the operating department practitioner should also take over

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monitoring and drug administration. There should be separate donning and doffing areas, and after the procedure, all staff not helping in the transport of the patient should doff as required.

Taking all the above into account, we propose the following pathway for inpatients and outpatients as outlined in Figure 1. After the procedure, deep cleaning of the laboratory should be performed according to local protocols.

CONCLUSIONS

COVID-19 pandemic is likely to affect our daily practice, and adaptation to this new era is necessary. We propose here a pathway relevant to ablation procedures taking into account current guidance on PPE and indications for emergent/urgent procedures,

acknowledging the fact that these might be subject to change following better awareness of COVID-19 behavior.

DISCLOSURES

Nothing to declare.

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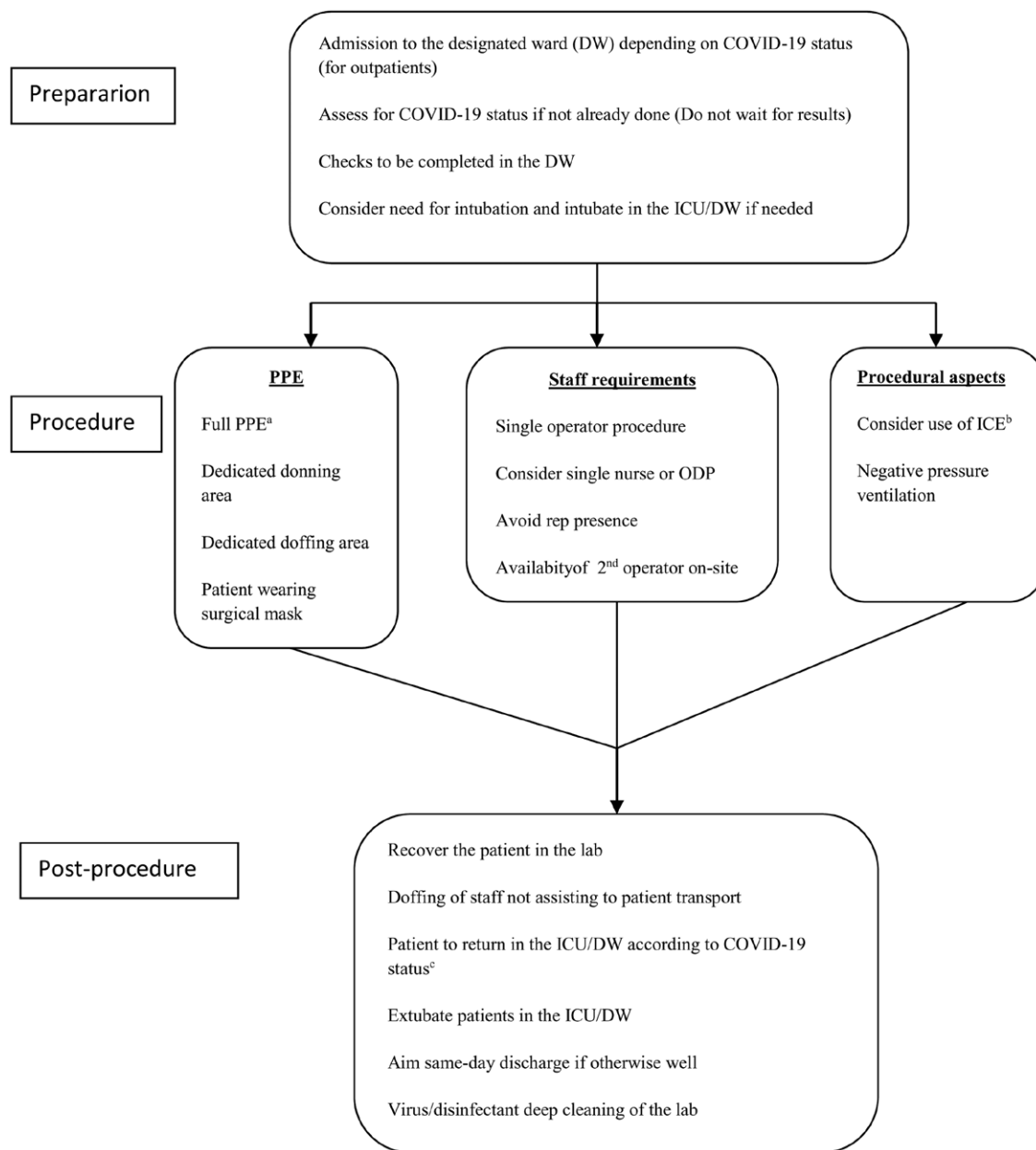


FIGURE 1. Ablation pathway. ^aThis includes gloves, fluid-repellent gown, filtering face piece class 3 (FFP3) respirator, and full-face mask. ^bIntracardiac echocardiography. ^cA patient tested positive will need to be transferred to the COVID-19 positive/suspected designated ward. ODP indicates operating department practitioner.

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