

Cardiology Consult Service Protocol—COVID-19 Cohorted Patients

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Patients admitted to the medical service with non-cardiac primary diagnoses who meet criteria for COVID cohorting will be geographically housed on COVID designated floors (initially SKY 5) and assigned primarily to a medical service (ICU or other). In the event cardiology consultation is requested by the primary service, the cardiology consult service will staff these patients. Consults requested in the ER on these patients will remain the responsibility of the CCU, consistent with current policy.

It is anticipated that there will be a significant increase in Consult requests based on the literature. In a recent publication from Wuhan, China who all had bilateral pneumonia (1), 16.7% of patients developed arrhythmias, 7.2% experienced acute cardiac injury (usually type 2 MI or myocarditis), and 8.7% developed shock although it is unclear whether these were cardiogenic or not. There is a high frequency of coexisting cardiac conditions in these patients including hypertension (31%), diabetes (10%), and cardiovascular disease (15%).

There is also clear risk to us as consultants with 40 out of 138 patients (29%) being hospital staff in this publication (1). Isolation precautions and personal protective equipment as defined by UTP/UHS policies will be employed

- (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. DOI: 10.1001/jama.2020.1585

CCU/Cardiology In-Patient Service—COVID-19 Cohorted patients

Allen Anderson, MD

Patients admitted with primary cardiac diagnoses (ex. Acute Myocardial Infarction, Acute decompensated Heart Failure, malignant arrhythmias) who meet criteria for COVID cohorting will be geographically housed on COVID designated floors and assigned primarily to the Cardiology CCU service who will direct care with appropriate consultation from other services. In the event these patients' cardiology problems are stably managed, care may be transferred to an appropriate medicine service with the agreement of transferring and accepting Attending Physicians.

Patients will be assigned to either ICU or ACU level of care as designated by the admitting Cardiology service.

University Health System Cardiac Catheterization Laboratory Contingency Plan for Patients with Suspected COVID-19. Version: 3-19-20

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Background

The following plan was created in concert with University Health System (UHS) administrative leadership. This document incorporates the best available 3/22/2020 recommendations from the American College of Cardiology (ACC) and the Society of Cardiovascular Angiography and Interventions (SCAI). <https://doi.org/10.1016/j.jacc.2020.03.021>

Coronavirus disease 2019 (COVID-19) is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The virus is transmitted by respiratory means and may survive on various surfaces for hours to potentially days. The virus represents a specific hazard to healthcare workers who are in contact with these patients. Given the subclinical/indolent nature of COVID-19, there will be a relatively low threshold for suspicion of COVID-19 exposure or active infection.

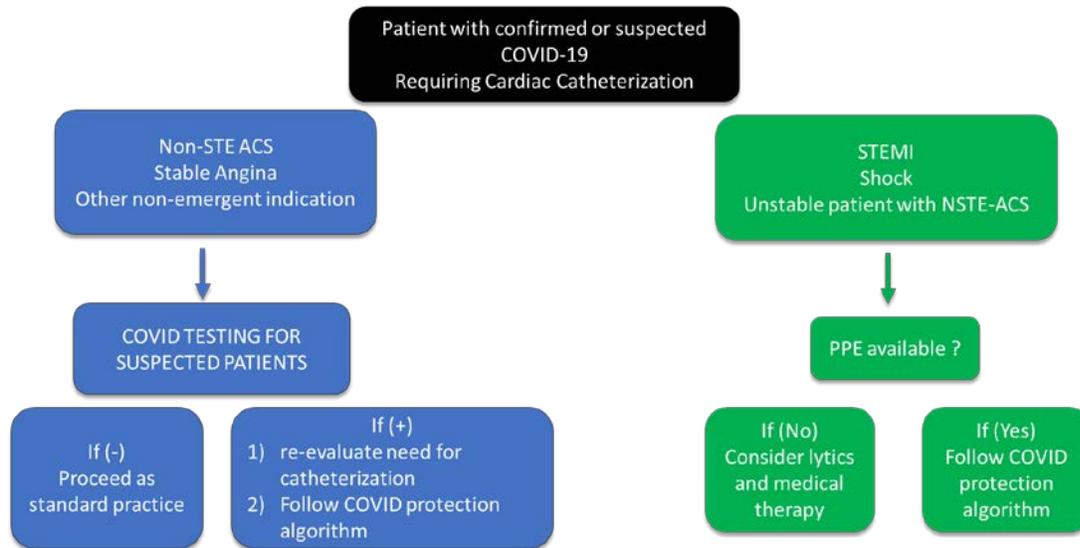
Specifically concern should be raised when a patient presents with recent travel to high-risk region in the United States or in another Country, has an unexplained fever over 100 F, new or recent onset cough or dyspnea that is not explained by another etiology, self-reports contact with a COVID-19 positive person(s), or has pulmonary infiltrates consistent with a respiratory infection.

Stratification of patients based on clinical presentation

- For patients with suspected COVID-19 who need *elective catheterization*, confirmatory testing should be performed prior to catheterization. For patients with confirmed positive COVID-19, elective catheterization for stable disease should be avoided unless the clinical situation demonstrates a failure of medical therapy.
- For patients with suspected COVID-19 who present with *non-ST segment elevation acute coronary syndromes (NSTEMI/ACS)*, who are hemodynamically stable and have no or controlled angina, an initial trial of medical therapy with confirmatory testing for COVID-19 is reasonable. Once confirmatory testing is completed, the decision to take COVID-19 positive patients for invasive angiography should be determined by a balance of clinical necessity, resource utilization (ability to discharge and clear beds), and staff safety (availability of personal protective equipment [PPE]). Particular attention should be paid in interpretation of troponin levels in these patients and when possible to differentiate Type I vs Type II NSTEMIs.
- Patients presenting with *ST segment elevation myocardial infarction (STEMI)*, cardiogenic shock, and post-ROSC arrest patients represent a particular challenge for

COVID risk assessment. In these cases, lead in time for viral testing will not be possible. The management of these patients is outlined in the flow diagram.

- COVID cath outcomes will be discussed at D2B meeting. D2B will move to a conference call format starting 4-3-20.



COVID Protection Algorithm

Emergency Department/ICU/Floor to Cath Lab:

- PPE with face masks for evaluation team (includes rapid response team, nurses, physicians, fellows, respiratory therapists). Default protection is droplet precautions. Aerosol precautions if CPR or intubation required
- Family will not accompany patient to the catheterization laboratory.
- Only minimal number of healthcare workers needed to transport patient should enter room and interact with the patient
- A surgical mask should be placed on the patient
- If the patient is in respiratory distress then intubate prior to transport to Cath Lab; low threshold for intubation

In cath lab plan:

- Charge Nurse to notify House Supervisor and get a bed assignment ASAP
- To maintain infection control, Lab 1 will be preferentially used, followed by Lab 3 or 2 depending on availability
- All three labs are positive airflow
- No outside staff/vendors or unnecessary people in the room
- When possible one person can be stationed outside room to document who enters, hand items to team, monitor and coach proper donning and doffing

In cath lab PPE and infection control:

- A COVID cart has been created and is stored in the fellow's room. The cart is only to be used in the case of a suspected or positive COVID patient.
- The cart contains PPE to support 10 individuals: isolation gowns or procedure gowns, N95 masks, gloves, and face shields.
- To get restocked we will contact Materials Management via email to Bobby Ward or notify leaders of shortages @ Leadership Huddle.
- A terminal clean will be performed at the end of the case

UHS Cath Lab Outpatient Triage and Deferral Protocol

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Rationale and CDC recommendations:

During this period of COVID-19 transmission, we have been advised by the Centers of Disease Control to limit all non-essential elective procedures (see Figure). This direction applies to procedures performed in the cardiac catheterization laboratory. The rationale for limitation of elective procedures has many aspects including:

- Preserving personal protective equipment (PPE)
- Avoiding inpatient or ICU bed utilization
- Avoiding exposure of patients to potential sources of COVID-19 in the hospital
- Avoiding exposure of healthcare providers to COVID-19 from patients
- Avoiding overburdening healthcare workers and health systems with non-COVID patients during this pandemic

Balancing these issues with the need to continue to take care of chronically ill patients is important. The classification by the CDC is shown in the figure below. This scheme is a guide. Center specific criteria and algorithms will be needed to tailor the triage process for each health system.

Tiers	Action	Definition	Locations	Examples
Tier 1a	Postpone surgery/procedure	Low acuity surgery/healthy patient- outpatient surgery Not life threatening illness	HOPD* ASC** Hospital with low/no COVID-19 census	-Carpal tunnel release -EGD -Colonoscopy -Cataracts
Tier 1b	Postpone surgery/procedure	Low acuity surgery/unhealthy patient	HOPD ASC Hospital with low/no COVID-19 census	-Endoscopies
Tier 2a	Consider postponing surgery/procedure	Intermediate acuity surgery/healthy patient- Not life threatening but potential for future morbidity and mortality. Requires in-hospital stay	HOPD ASC Hospital with low/no COVID-19 census	-Low risk cancer -Non urgent spine & Ortho: Including hip, knee replacement and elective spine surgery -Stable ureteral colic -Elective angioplasty
Tier 2b	Postpone surgery/procedure if possible	Intermediate acuity surgery/unhealthy patient-	HOPD ASC Hospital with low/no COVID-19 census	
Tier 3a	Do not postpone	High acuity surgery/healthy patient	Hospital	-Most cancers -Neurosurgery -Highly symptomatic patients
Tier 3b	Do not postpone	High acuity surgery/unhealthy patient	Hospital	-Transplants -Trauma -Cardiac w/ symptoms -limb threatening vascular surgery

*Hospital Outpatient Department
 ** Ambulatory Surgery Center
 Created by: Sameer Siddiqui MD (used with permission)
 Version 3.15.20

Definition of ‘Elective’

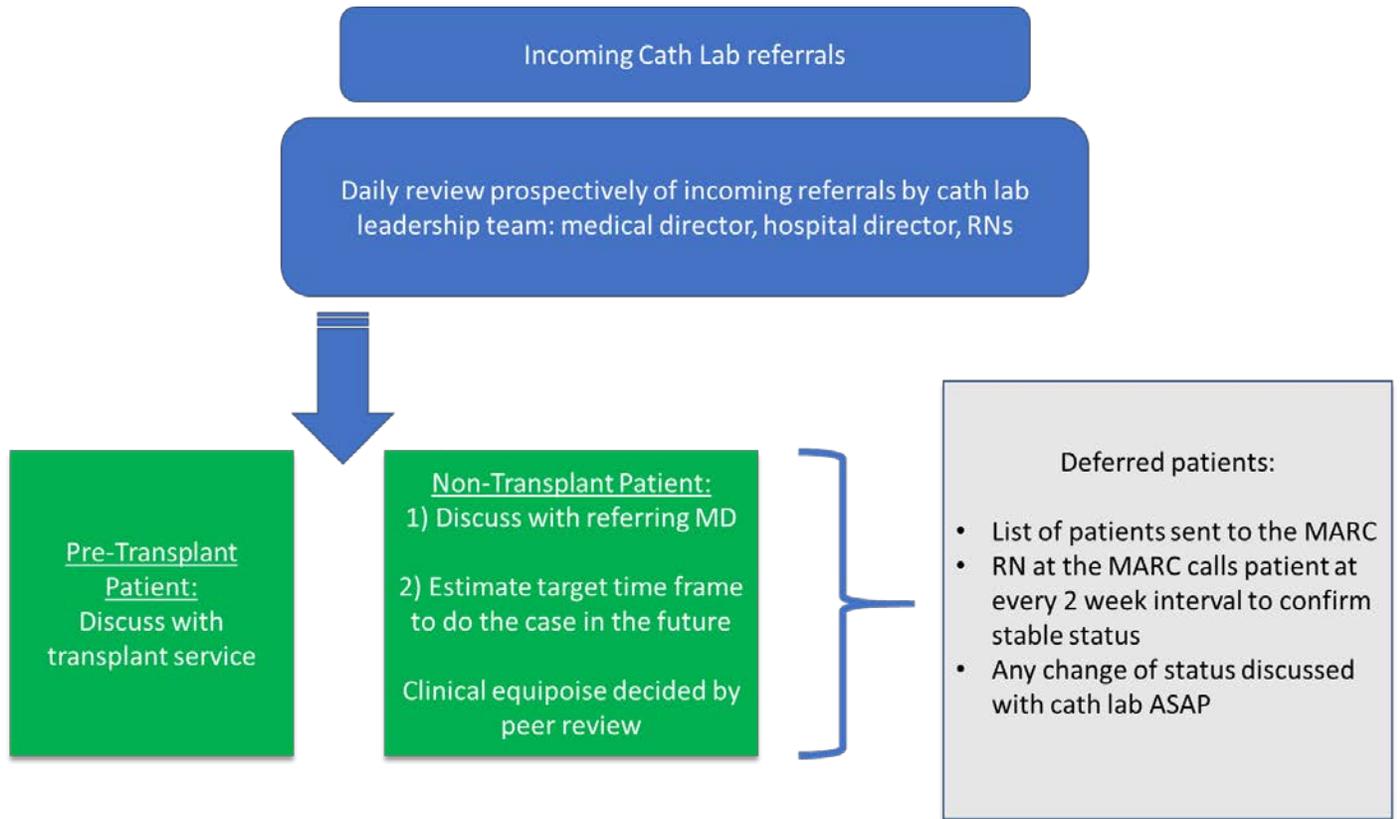
According to the CDC guide, elective PCI is mentioned in the Tier 2a group (consider postponing) and Tier 3b (do not postpone if symptomatic). Limb threatening presentation for vascular procedures is Tier 3b as well.

For our patient population here are some considerations:

- Stable chronic CAD on medical therapy with no symptoms, silent ischemia, or CCS I/II angina with room to titrate medical therapy, catheterization for pre-operative risk stratification for a surgery that will be deferred and staged PCI in a patient without symptoms can be deferred
- Known CAD with unstable symptoms (increasing angina, rest pain, ER visits, pain despite adequate medical therapy) likely needs to be treated sooner.
- Pre-transplant catheterization referrals should be coordinated with the transplant service
- Lower extremity vascular disease resulting in Rutherford 1,2 or 3 claudication can be deferred.
- Lower extremity vascular disease with rest pain (Rutherford 4) or ulceration/gangrene or acute onset should be treated
- Structural heart disease: Most MitraClips, PFO closure, Watchman devices, stable minimally symptomatic AS can be deferred
- Significantly symptomatic AS (as decided by a heart team) should be treated
- Electrophysiologic procedures (Atrial fibrillation ablation, SVT ablation for arrhythmia controlled with medications, PVC ablation) can be deferred.
- VT ablation for high risk patients, end of life generator changes, PPM placement, BIV upgrades for highly symptomatic patients, ICD implants may be reasonable

Deferring catheterization or intervention for patients requires tight coordination with the patients, clinic, referring MD, and catheterization laboratory. Patients being deferred who do not wish to be delayed should be given a choice to have their procedure done at another facility if they so choose. They should also be educated on the risk and benefits of elective procedures in the COVID pandemic.

The following structure has been developed for triage, deferral, monitoring and scheduling of elective patients referred to the UHS catheterization laboratory:



Cath lab work schedule

It is likely with the change of the workflow, there will be a change in faculty, fellow, nursing, and tech schedules for cath lab coverage. A potential downsizing of staff is a possibility. This potential change would be discussed in real time as events unfold related to COVID. The goal will be to treat inpatients and unstable patients in a timely manner.

Heart Station UHS COVID Protocol

John Erikson, MD, PhD and Ildiko Agoston, MD

Physical Plant:

1. The Heart Station will be locked but accessible via UHS badge. All doors in the Heart Station should remain closed and consultants are asked to contact the readers by phone – please, no face-to-face visits, no “dropping by to see how things are going”.
2. Whenever possible outpatient echos will be performed in the echo room next to the UMA cardiology clinic (R2-R07A). An echo machine has been dedicated to exclusive use in this room.
3. COVID/PUI TEEs will only done bedside – no transporting the patient. One echo machine has been designated COVID/PUI and will be stored in the 9th floor echo room. It will not be brought to the 2nd floor or used for routine imaging.
4. To maintain social distancing, the small room outside the Heart Station (R2-A08R) is the designated reading room. The door combination is: 1-5-7-1. The room has been cleaned and dusted and I have procured a fan to help with the temperature. The computer system is old; I have asked Mike Sloan to upgrade to a contemporary workstation with nuclear. The telephone is not operable but I have asked that it be replaced. Wipes and hand sanitizer have been provided. This room will remain locked at all times.
5. Given the nature of remote reading, housestaff/CT surgery/cardiorenal electives are cancelled until further notice.
6. All non-invasive faculty and fellows should have access to Prosoolv. If not, contact Mike Sloan for instructions (you must have a PC for this to work). Remote desktop access for nuclear has been set up and instructions will be distributed soon.

Physician Presence:

1. All Non-Invasive Faculty and Fellows are encouraged to read “remotely” if their presence is not required in the heart station. Please be conscious of social distancing – that can be a fellow in the main reading room and attending in the hall, or the fellow in the hall and the faculty at their office at the medical school. Fellows not assigned to the heart station can read from home.

The preferred faculty venue will be their UTHSCSA office so they are in the vicinity, readily available to cover stress tests or discuss TEE with providers, and able to promptly render assistance to the fellow. In addition, internet connections are likely faster at the school than at home and most of us have the advantage of dual monitor systems. If Mac only, contact Edward Garcia to discuss a UHS laptop. PC Laptops may be available at the school through the department.

2. If physician presence is required for a stress test, Faculty will provide coverage. Fellow participation will be determined by Dr. Tsai, Dr. Phillips, and the Chief Fellows. When staffing stress tests use the reading room or small room outside the Heart Station (R2-A08R).

3. Non-invasive fellows are expected to participate in non-COVID/non-PUI TEEs and stress tests per usual; the attending will also be present during the studies for education and guidance.

If the patient is COVID or PUI, then attending only to minimize the number of people exposed and conserve PPE.

Scheduling:

1. Inpatient stress echo and TEE requests will be relayed to the fellow/attending via telephone for review (we are discouraging handling paper slips); in general, all requested TTEs will continue to be performed after the usual level of review but, when appropriate, routine exams will be focused but sufficient to answer the clinical question. To minimize exposure time for the echo techs, measurements can be done outside the patient room or off-line in ProSolv.
2. Once rapid test results are available (anticipated the week of March 23), if an echo is requested on a COVID/PUI patient every effort should be made to confirm the result before proceeding with a study.
3. Acknowledging provider and tech concerns, we will adhere to hospital policy and direction regarding personal protective equipment.
4. Elective studies at the MARC and RBG Heart Stations are being reviewed and rescheduled if appropriate. If a patient cannot be postponed or rescheduled, every effort will be made to either batch them or move them to the hospital, reducing the need for staff/MDs at the clinics. Coverage for stress is in flux at this time but will likely be covered by a skeleton staff at each site or the faculty assigned to that heart station on that day.
5. Patients are scheduled out approximately 3 weeks and Darlene can provide a list of all patients/procedures currently scheduled. Whenever possible patients should be rescheduled, ideally in 3-6 months (obviously fluid).
6. We ask the non-invasive faculty, if not otherwise engaged, to assist in this effort. Ideally, there is either a phone conversation or secure health message discussion with the provider and a brief note in the chart.

Electrophysiology Service—COVID-19 Protocols

Manoj Panday, MD

- Convert routine in-person device interrogations to remote interrogations. Current guidelines state that only one in-person device interrogation is necessary per year when remote interrogations are performed, even under normal circumstances.
- Avoid elective EP procedures for patient safety, staff safety, and to minimize elective hospital resource utilization. The necessary procedures that we would continue to perform would include device generator replacements on pacemaker-dependent patients, pacemaker implants for high-grade AV block or prolonged asystolic sinus pauses, ICD implants for certain secondary prevention patients, and ablations for persistent unstable tachyarrhythmias that are not responsive to medical therapy.
- Convert as many of our EP clinic visits to patient calls and telemedicine visits as possible.
- Continue coverage of necessary inpatient EP consultations with appropriate precautions to minimize exposure to COVID-19
- Continue use of ambulatory monitoring when needed with the use of home monitor delivery (which is now being offered by both our vendors, iRhythm and BardyDx).
- Temporarily suspend clinical research protocol related visits. Most of our study sponsors are already anticipating that this will need to occur.