Your Questions Answered from the
Pediatric, Fetal, and Congenital Heart Disease Statement on COVID-19 Webinar (April 9, 2020)

Expert panelists discuss the Specific Considerations for Pediatric, Fetal, and Congenital Heart Disease Patients and Echocardiography Service Providers During the 2019 Novel Coronavirus Outbreak: Council on Pediatric and Congenital Heart Disease Supplement to the Statement of the American Society of Echocardiography.

1. Can you share listserv information please?

Enroll onto the listserv by emailing Mark Lewin (mark.lewin@seattlechildrens.org), or his administrative assistant Janna Hendrickson (janna.hendrickson@seattchildrens.org). This listserv supports questions and comments nationally and international in regards to the COVID-19 crisis and pediatric impact.

2. What types of portable devices have Dr. Lewin and his team been utilizing for COVID positive/suspected patients?

We use the same equipment, but follow infection control practices at our institution in order to ensure a safe work environment for staff and patients.

3. Can Dr. Lewin (and others) review if his sonographers use face shields in low risk, outpatient echoes since children have high rates of asymptomatic transmission?

Because of both the high rates of asymptomatic transmission for both adults and children, our protocol is to use goggles or face shields, as well as masks for all face-to-face patient interactions.

Dr. Donofrio's team takes a similar approach. There are institutional differences in PPE guidelines in these scenarios, however, and this is not a universal practice currently.

4. For post op TEE, in patients with unknown COVID-19 status, when probe was placed at the beginning of the case, do we need to wait 20 min after doing TEE before leaving room?

We have decided that based upon the fact that in pediatrics most anesthesiologists use a cuffed endotracheal tube, that when TEE probe is removed at the end of the case, it is likely that dangerous aerosolization will not occur.

5. If COVID-19 status unknown and patient already intubated before going into the OR, the TEE algorithm suggests standard precautions for TEE placement. I've read concerns that TEE movement or ETT movement or airleak may produce aerosolized particles. Isn't this a concern?

Risk for exposure to aerosolized virus during TEE is an evolving topic. The recent Council on Perioperative Echo addresses this topic as well in their supplement. Certainly airborne precautions are necessary throughout the procedure for patients under investigation or with a confirmed positive COVID-19 result, including during TEE probe removal. Choice of airborne vs. droplet precautions for a patient with unknown status, already intubated with an inflated cuffed endotracheal tube, is likely best decided on an institutional level with discussion weighing low but likely non-negligible risks vs. availability of PPE.

6. Are hospitals using n95 masks for sonographers when patient has been tested but results are not back yet?

At our institution, we are using face shields and standard surgical masks in this scenario. If there is a suspected or confirmed COVID-19 positive patient, then institution-specific PPE should be utilized.

7. For COVID positive patient that presents with shortness of breath and positive troponin, is it important to perform echo in order to rule-out myocarditis?

The data associated with COVID-19 associated myocarditis is limited, although a small number of cases have been reported. Any patient with a viral illness, and elevated cardiac enzymes should have an echo performed in order to assess myocardial function and pericardial effusion.

8. Head and shoe covers for COVID-19 positive patients?

We are using PPE only for care providers, and not for patients or their families. This serves to protect the staff and well as those whom they are in contact with.

9. How are they sterilizing the goggles?

We use standard infection control guidelines, which at our institution entails Clorox (or similar) wipes.

10. **Pediatric TEE. Are institutions testing everyone prior to cardiac surgery or treating all patients as positive**?

For Pediatric TEE, most centers are moving towards uniform testing of all patients scheduled for anesthesia procedures (cardiac surgery, catheterization, etc.) whenever possible. For those that are not able to be tested before entering the OR/Cath lab, tests are sent in the procedure suite. For neonatal patients, many centers are also now testing all maternal admissions to guide determination of neonatal COVID-19 risk.

11. **Is complete heart block a manifestation of COVID-19?**

There has been a verbal communication of a pediatric COVID myocarditis patient with complete heart block. Arrhythmias may occur with any viral myocarditis.

12. **Do you have any statistics specific to infection rates among sonographers?**

We are not aware of any data reported on infection rates among sonographers as a group. Additional sonographer recommendations are presented in the recently released Sonographer supplement.

13 **Do you think in an "adult" hospital the echo exams for newborns with heart murmurs without hemodynamic alterations could be deferred?**

It is reasonable to consider deferring neonatal echocardiograms based on available AUC and with reassuring results of pulse oximetry screening for critical congenital heart disease. If echocardiography is required, then knowing the maternal COVID-19 status will be helpful to assess risk of sonographer exposure, and scanning using a dedicated or "cleanest" machine will minimize infant risk of infection from fomite transmission.

14. **If you have just one window to use in TTE, do you consider the subcostal view enough to get the main information needed?**

Yes – provided the patient age and size permits, the subcostal window should provide adequate at least initial information on anatomy, function, aortic and pulmonary flow and presence of a pericardial effusion. As for all scans, planning on which details need to be imaged before entering the room is critically important as it will drive choice of window if subcostal views are not available.

15. Are any of you using LV myocardial strain? post-processing only?

We have not seen reports of LV strain used for COVID-19 pediatric patients, although we expect that it is being used extensively for adult patients with their expected greater functional abnormalities. As with all measurements in a COVID-19 positive patient, these measurements should be done after the scan is complete and both provider and machine are out of the patient room.

16 **For remote learning for fellows, is there a preferred platform (Zoom, Skype, WebEx) that transmits echo images without significant delay/frame rate issues?**

At our institution, we use both Zoom and WebEx, taking caution to maximize security on both platforms. Transmission delays appear to depend most critically on bandwidth, internet/router speed, and delays created routing data through a VPN system.

17. What are the pediatric cardiology emergency situations faced during this period of COVID-19 which may require urgent imaging?

Presumed emergencies would be pediatric patients presenting in respiratory distress with concern for myocardial dysfunction or pulmonary hypertension. In the setting of hemodynamic instability, imaging to assess for pericardial effusion and myocardial dysfunction would be important. Data is too limited on pediatric patients with congenital heart disease to draw conclusions on their potential risks or presentation.

18. IF THERE IS A QUESTION OF MYOCARDITIS - ANY THOUGHTS OF GETTING CARDIAC MRI; RISKS, PROS AND CONS

Cardiac MRI can be considered for evaluation of myocarditis in a pediatric patient with COVID-19. Benefits include the ability to quantify right and left ventricular function, exclusion of congenital heart disease/coronary artery abnormalities, and assessment for delayed enhancement that may suggest myocarditis as a cause of decreased cardiac function over epicardial coronary artery disease. Risks and cons include transport through the hospital into another unit, creating a potential broad exposure risk; risks of patient decompensation in a less-monitored environment than an ICU; need for breath-holding or adjusting ventilator support; and need to decontaminate an entire scan room or MRI unit after the procedure.

19. Can you clarify the POCUS issue vs limited TTE by Pediatric Cardiologists?

The answer is really driven within each individual institution by what modality will provide the most accurate and complete information in the shortest time exposing the fewest people. Given the breadth of congenital heart disease, the potentially limited functionality of some POCUS systems, and the differences in assessing systolic and diastolic function in children compared to adults, we recommend TTE performed by a pediatric cardiac team as a best choice. The TTE views should be planned ahead and the scan focused to answer the specific clinical question (e.g.; systolic function, estimated pulmonary pressures, atrial shunting, etc.), rather than defaulting to a comprehensive exam. However, in institutions with an established POCUS program, POCUS may be useful for rapid bedside assessment of systolic function, effusions, or other organ systems as is standard of care for that institution.

20. Do we have any experience with COVID-19 in the Fontan/single ventricle

There are no data of which we are aware of COVID-19 outcomes in Fontan patients.

21 Have you altered your fetal echo screening protocol in those pregnant mothers with known autoantibodies? Prior to COVID-19, it was our practice to screen weekly until 28 weeks gestation.

I think this is a useful place to add in the additional layer of risk stratification. We are first, trying to risk stratify by family history (previous child with neonatal lupus or CHB) and by antibody titers (according to the work of Jaeggi, et al). If higher risk, we are using the recommended protocol of surveillance and monitoring closely though are sharing the visits with our MFM colleagues to minimize overlap and exposure. If low risk, then we are not bringing the ladies in for surveillance. Also, this is where some innovative thinking comes in. What we have started to do is to bring the ladies in for their first visit (preferably 16-18 weeks). During this visit, we review the history and send labs to risk stratify. Either way, we are giving the women home HR monitors and asking them to check the fetal HR 2X per day and notify us if it is anything but normal. We then minimize imaging to include only one or two visits, the last one being at 26-28 weeks. See relevant articles:

- Home Monitoring for Fetal Heart Rhythm During Anti-Ro Pregnancies. Cuneo BF, Sonesson SE, Levasseur S, Moon-Grady AJ, Krishnan A, Donofrio MT, Raboisson MJ, Hornberger LK, Van Eerden P, Sinkovskaya E, Abuhamad A, Arya B, Szwast A, Gardiner H, Jacobs K, Freire G, Howley L, Lam A, Kaizer AM, Benson DW, Jaeggi E.Cuneo BF, et al.J Am Coll Cardiol. 2018 Oct 16;72(16):1940-1951. doi: 10.1016/j.jacc.2018.07.076.J Am Coll Cardiol. 2018.PMID: 30309472Clinical Trial.
- Heart sounds at home: feasibility of an ambulatory fetal heart rhythm surveillance program for anti-SSA-positive pregnancies. Cuneo BF, Moon-Grady AJ, Sonesson SE, Levasseur S, Hornberger L, Donofrio MT, Krishnan A, Szwast A, Howley L, Benson DW, Jaeggi E.Cuneo BF, et al.J Perinatol. 2017 Mar;37(3):226-230. doi: 10.1038/jp.2016.220. Epub 2016 Dec 15.J Perinatol. 2017.PMID: 27977016Clinical Trial.

22. How have you dealt with mothers in the low risk category who insisted on getting the fetal echo scheduled

We are starting by having our nurse coordinator call the family and try to understand why the there is anxiety and offer the opportunity for one of our social worker counselors to speak with them. If there is still anxiety, we see them though try to minimize the risk by seeing the woman at one of our outreach sites.

23. What about considerations for pregnant personnel? Are there any extra protection practices?

Given the uncertainty, though it is not considered an absolute part of our protocol, we are attempting to minimize their exposure. Certainly, for those women who are COVID-19 positive or are considered PUI, we would avoid having our pregnant staff perform the imaging or participate in face to face counseling.