COVID-19/PUI Care Pathway and Patient Flow – NICU

Definitions—Mothers/Infants:

1. **COVID-19 POSITIVE:** patient has a confirmed positive test for COVID-19 from Kaleida Health or Department of Health

2. **COVID-19 PUI:** patient is suspected of having COVID-19 because of symptomatology that is consistent with the illness, but confirmatory test result is not available (CDC symptoms: https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html)

3. **Procedural/OR rule out:** patient has no symptoms, but was screened with test prior to a planned OR procedure or possible OR procedure (related to possible risk with intubation) and results are not available. Patients do not have to be in isolation and infants of mothers with this status are not considered PUIs except in the unlikely event that the test comes back positive

Additional Definition—Infants:

COVID-19 PUI: In addition to the definitions above, an infant is considered a PUI if their mother meets the criteria for 1 or 2 above.
What do we do with the infant in this situation?

- If mom was a COVID-19 PUI and her test comes back **negative**, infant is no longer a PUI
- If mom was a COVID-19 PUI and her test comes back **positive**, infant should have a test sent after 24 hours of life to determine status going forward

**The guidelines that follow are for COVID-19 POSITIVE and COVID-19 PUI patients ONLY:

Important Considerations:

- This document should be implemented for a suspected Patient Under Investigation (PUI) or confirmed COVID-19 infection
- During this outbreak, the disease may spread within healthcare settings when appropriate protective guidelines are not implemented and followed
- These guidelines are in place across all disciplines and departments to ensure staff safety is maximized while caring for these patients
- COVID-19 requires Airborne Strict Isolation protocols and PPE designated for that isolation status. All staff must wear appropriate PPE in the patient room after being trained to competency
- In the event of PPE supply shortage, Infection Prevention will determine supply-saving measures such as prolonged use of PPE
- Isolation will not be changed or discontinued without consultation and approval from Infection Prevention

Delivery Room Management and Admission to NICU:

- Attendance at deliveries of COVID-19 positive mothers or PUIs should be limited to those necessary based on the situation. If full resuscitation is required, personnel should consist of 1 person for each role (airway, breathing, circulation, RN, documentation). The airway person should be the most experienced to minimize exposure to multiple providers.

- PPE, including gown, gloves, N95 respirators, eye shield (personal eye glasses or contact lenses are not adequate eye protection) and hat should be used in all COVID-19+/PUI deliveries. Encourage 6 ft distance from mother for the Neonatal team.

- When leaving the DR—outside of isolette should be wiped with disinfectant per manufacturers guidelines and PPE should be disposed of in delivery room and changed to fresh for transport to NICU in event the team will need to access the infant on the way. Procedure facemask is acceptable once out of the delivery room unless infant needs to be intubated/re-intubated on the way.

- Patients should be transferred to the NICU in a closed isolette or giraffe omnibed and admitted to a negative pressure room if available. If not available, a regular room is acceptable with the door closed once they arrive.

- Infants should be bathed as soon as reasonably possible after birth

Who is to be tested in the NICU:

- Patients delivered to a COVID-19 positive mother, after 24 hours of age, to avoid detection of transient viral colonization and to facilitate detection of viral replication. An additional test should be performed at 48-72 hours of life. Infants born to mothers who are COVID-19 PUIs should only be tested if mom's test comes back positive.
- Patients with new onset fever and/or severe acute lower respiratory tract infection (e.g., pneumonia, ARDS) requiring intubation (re-intubation) and mechanical ventilation (or need for increased support)
- Patients with new onset GI symptoms (with or without hx of exposure to a confirmed COVID-19 case within last 14 days)
- Patients with unexplained thrombosis (with or without hx of exposure to a confirmed COVID-19 case within last 14 days)
- Patients with new onset URI symptoms (with or without hx of exposure to a confirmed COVID-19 case within last 14 days)

- ♦ Since testing requires approximately 24-hour turnaround time, location and staffing of the PUI must assume COVID positive
- ♦ Testing (type of sample, site of sample and number) will be performed per ID specifications for NICU patients

Our goal is: *To test all patients born to COVID-19 positive mothers as well as those with unexplained symptoms that are consistent with pediatric symptomatology in this illness. The PUIs go into isolation until COVID testing comes back negative*

Isolation and PPE in NICU

- Patients with confirmed COVID-19 or PUI related to maternal illness will be cared for in negative pressure rooms 32, 34, 49 and 50. These rooms should be prioritized for patients on respiratory support with increased risk related to aerosolizing procedures if the number of patients is greater than available isolation rooms. If more than 4 rooms will be needed consistently, the 6-bed area (rooms 59-64) will be designated in addition. Individual doors will need to be kept closed and that area of the NICU closed off to the rest of the unit.
- Healthcare personnel should adhere to Standard, Contact, and Airborne Precautions, including the use of eye protection (e.g., goggles or a face shield) when caring for patients with PUI/COVID-19 infection. These precautions include the use of PPE, including N95 respirators gowns, gloves, face shield/eye protection, etc.
- Strict donning and doffing procedures should be followed
- Creative ways to improve communications during resuscitation can be utilized, such as a printed "Call Airway Team" card for difficult intubations, using a communication whiteboard in the patient room and using phones to relay messages to staff outside the room for equipment and help

- Early on, begin limiting the number of people entering a room with respiratory cases
- Move large group rounding to outside the room/entire area if using the surge beds
- Consolidate tasks for every entry into the patient's room including the healthcare team taking over trash and linen removal, formula delivery and removal, etc.
- Utilize phones to call into room as much as possible
- Non-disposable equipment should not be shared for multiple patients
- If a patient needs to be moved within the NICU or to other areas of the hospital for imaging, they should be transported in a closed transport isolette and accompanied by staff in appropriate PPE

Reducing general utilization of PPE to avoid shortage:

- Family-centered rounds outside patient's room
- Only essential staff enter room
- Cluster care
- Refer to current Kaleida Health policy regarding reuse of N95 respirators as this can change based on supply

Staffing approach and NICU model of care for COVID-19 or PUI:

- Stay in room as much as possible
- Limited care providers will access patient/patient room
- Assign an observer whose role is to ensure no break in PPE and proper donning and doffing procedures as available
- Designated RT staff to be assigned to these patients (preferred not to enter other patients' room based on available resources)
- Limit the number of providers (attendings, fellows, residents and APPs) entering the patient's room). All PUI and positive patients should be in the same APP/resident book as much as possible
- 2-6 nurses, RTs and physicians will be involved with patient care at any one time, 24 hours a day

Assessment and Monitoring

- Care will be provided based on patient needs and can be changed based on assessment and request of physician
- Throughout the duration of care, use NICU Standards as the guidelines for vitals and adjust as deemed necessary by physician
- Staffing for emergencies/codes/intubations should be limited to those absolutely necessary
- Intensive Care Interventions will be used per standard care

Interventions and general NICU care:

1. General care
    a. **Feeding**:
        i. Infants may receive maternal breastmilk. It can be fed to infant by staff or asymptomatic designated family member. Breast pumps and components should be thoroughly cleaned in between pumping sessions using standard policies. (clean pump with antiseptic wipes, clean pump attachments with hot soapy water)
        ii. Food for the designated family member in the patient room should be delivered directly to room, removed by RN caring for patient and handed directly to person collecting trays from the NICU.
        iii. Once cleared by Infection Prevention, mothers who were previously PUI or COVID-19 Positive can directly breastfeed their infant while observing appropriate precautions—hand and torso washing prior to feeding, clean linens/gown, wearing a mask—when infant is clinically appropriate to BF
    b. **Intensive Care** Interventions will be used per standard care including central line care
    c. **Respiratory failure**
        i. Significant respiratory compromise is rare in Neonatal patients, but if it occurs, should be treated as it would be in any neonatal patient
        ii. Use a HEPA filter on the exhalation side of the ventilator circuit if possible
    d. Intubation and Mechanical Ventilation:
        i. Designate the most experienced professional available to perform the intubation if possible
        ii. Avoid awake intubation unless specifically indicated (Use RSI as per protocol)
        iii. Ensure the placement of a HEPA filter in between the facemask and breathing circuit or in between facemask and reservoir bag, if available
        iv. Attempt to avoid manual ventilation of patient's lungs and potential aerosolization of virus from airways
        v. Perform RSI (ensure a skilled assistant is available to perform cricoid pressure)
        vi. If manual ventilation is required, apply small tidal volumes if possible to decrease risk for air leak with uncuffed tube
        vii. Intubate and confirm. Use designated stethoscope in room and $ETCO_2$ detector
        viii. Re-sheath the laryngoscope immediately after intubation. Seal all used airway equipment in a zip-locked plastic bag
        ix. Use disposable blades if available
        x. Keep other associated equipment outside the room until needed
        xi. Wipe down the used surfaces and the non-disposable items with proper disinfectant
        xii. Use of the ante room for medications and supplies as much as possible to ensure ventilation, CVL set up, and other procedures
        xiii. Closed-system suction should be used. Try not to disconnect from the ventilator

xiv. Use checklists for preparation of drugs and pre-prepared trolleys for equipment, for intubation, line setting and other procedures, to minimize staff movement and enhance efficiency

2. Visitors
    a. 2 designated caregivers are allowed per patient. They will be screened at hospital entry including temp.

    b. Caregivers will need to wear procedure masks at all times while in the hospital

    c. Designated caregivers/support persons must be in good health, meet criteria for entry into the hospital, and not under any form of COVID quarantine by the county or state
        i. Exceptions/accommodations may be made in the following circumstances
            1. End of life care
            2. Education necessary to ensure a safe discharge

    d. Once a designated caregiver enters a COVID-19+ or PUI patient room, they cannot leave and return to the hospital; they should be maintained in that room until results have been returned or the patient is deemed non-infectious.
        i. Exception would be in the NICU to access the bathroom or shower room; the family member should perform hand hygiene, maintain their surgical/procedure mask in the correct position over nose and mouth and go directly to/from designated bathroom or shower room. Shower will need to be terminally cleaned immediately after use and before another parent can enter.
    e. Parents who were COVID-19 positive will be able to come to the NICU to help care for their infants when they are no longer considered infectious. According to current CDC guidelines, an immunocompetent person may be considered non-infectious if (a) afebrile for 24 hours without use of antipyretics (b) at least 10 days have passed since symptoms first appeared (or, in the case of asymptomatic women identified only by obstetric screening tests, at least 10 days have passed since the positive test), and (c) symptoms have improved. For persons severely or critically ill with COVID-19, and for severely immunocompromised individuals, the length of time since symptoms first appeared can be extended to 20 days.

3. Discharge
    a. Considerations when infant is medically appropriate for discharge
        i. Infants determined to be infected, but with no symptoms of COVID-19, may be discharged home with appropriate precautions and plans for outpatient follow up on a case-by-case basis
        ii. Infants whose infection status was determined to be negative will be optimally discharged home when otherwise medically appropriate, to a

designated healthy caregiver who is not under observation for COVID-19 risk. If such a caregiver is not available, manage on a case-by-case basis.

iii. If infant is discharged to a home with symptomatic or positive family members, they should be instructed to wear a mask when in close contact with the infant and practice hand washing with all interactions

General information about the use of ECMO in COVID-19 patients with ARDS:

- The Extracorporeal Life Support Organization (ELSO) is closely monitoring this outbreak. The WHO guidance document includes a statement to "consider referral patients with refractory hypoxemia despite lung-protective ventilation in settings with access to expertise in ECMO"
- ECMO should be considered according to the standard management algorithm for ARDS in supporting patients with viral lower reparatory tract infection. However, there is currently little worldwide experience with using ECMO for COVID-19 patients. ELSO will start collecting additional data in the registry and provide more recommendations as things evolve

References

- AAP website FAQs: Management of infants born to mothers with suspected or confirmed COVID 19: https://services.aap.org/en/pages/2019-novel-coronavirus-COVID-19-infections/clinical-guidance/faqs-management-of-infants-born-to-COVID-19-mothers/
- Erie County's Department of Health COVID-19 website: http://www2.erie.gov/health/coronavirus
- CDC's COVID-19 website: https://www.cdc.gov/coronavirus/2019-ncov/hcp/caring-for-newborns.html
- NYSDOH COVID-19 Website: https://www.health.ny.gov/diseases/communicable/coronavirus/
- WHO COVID-19 Website: https://www.who.int/emergencies/diseases/novel-coronavirus-2019
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- MacLaren G, Fisher D, Brodie D. Preparing for the Most Critically Ill Patients With COVID-19: The Potential Role of Extracorporeal Membrane Oxygenation. JAMA. 2020 Feb 19.