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Fetal interventions in the setting of the coronavirus disease 2019 pandemic: statement from the North American Fetal Therapy Network



Being healthcare providers (HCPs) for pregnant women and their fetuses, we have been challenged to balance the risks and benefits of care provision, as we adapt our established practice in the setting of the coronavirus disease (COVID-19; severe acute respiratory syndrome coronavirus 2 [SARS-CoV-2] infection) pandemic.^{1,2} The risks include the interventional risk to the fetus and mother, treatment-related SARS-CoV-2 exposure to the HCP, the effect on maternal and fetal health because of procedures done in the setting of maternal SARS-CoV-2 infection, and the risks of not intervening in a timely manner on fetal and/or neonatal outcome.¹

In an effort to balance these risks and to continue providing evidence-based fetal interventions that reduce fetal morbidity and mortality, the North American Fetal Therapy Network (NAFTNet, <https://www.naftnet.org>) suggests the following approach to fetal interventions in the setting of the COVID-19 pandemic³: prenatal care should be adjusted by optimizing appointment intervals; patient self-assessment, such as home blood pressure monitoring; and the use of virtual consultations.^{2,3} The gestational age—dependent nature of reproductive choice and the availability of effective interventions that can reduce fetal and neonatal morbidity and mortality make prenatal diagnosis and most established fetal therapies time sensitive, the delay of which may worsen perinatal outcome.⁴ These procedures should therefore not be defined as “elective,” and their provision should be guided by local institutional policies and practices in the context of resource availability.

The North American Fetal Therapy Network suggests the following specific considerations related to fetal interventions:

1. Because of the life-threatening, morbidity-related, and/or time-sensitive nature of conditions requiring intervention, most fetal procedures are not “elective.” These include, but are not limited to:
 - a. Fetal blood transfusions
 - b. Interventions for complicated monochorionic multiple gestations, including fetoscopic placental laser surgery or selective reduction
 - c. Shunting procedures for conditions with substantial fetal compromise, such as hydroptic hydrothoraces or cystic lung lesions
 - d. Open fetal surgical procedures that are not experimental or under research protocols, such as, but not limited to, open maternal-fetal surgery for fetal myelomeningocele repair and ex utero intrapartum therapy for anticipated neonatal airway compromise
2. The above recommendations should be applied regardless of a patient’s COVID-19 status. The decision to intervene may be influenced by the maternal condition. Maternal health always takes priority over fetal status.
3. The limited evidence to date regarding the risk of vertical transmission of SARS-CoV-2 infection through fetal intervention should be included in the informed consent discussion before such procedures.
4. Fetal therapists should strive to avoid transplacental passage of their needle or (in particular) fetoscope or shunt trocar. Avoiding transplacental procedures becomes especially pertinent when there is a potential risk of maternal-fetal viral transmission. An exception might be fetal transfusion into an anterior placental cord insertion, if the fetal intrahepatic vein was inaccessible. Open fetal surgical procedures may carry a higher risk of such transmission.
5. General anesthesia is a high-risk procedure for viral transmission. The anesthetic risks, and that of horizontal transmission of SARS-CoV-2 infection to HCPs, should be discussed among the patient and her HCPs.⁵ Procedures that violate the aerodigestive mucosa and/or result in body fluid aerosolization are associated with SARS-CoV-2 transmission.⁵ Most fetal procedures can be performed under conscious sedation and local anesthesia, which reduces maternal risk and SARS-CoV-2 exposure risk to HCPs.
6. Appropriate personal protective equipment (PPE) must be worn for all encounters with patients diagnosed as having COVID-19 or patients classified as person under investigation (PUI). This applies for any potentially aerosolizing procedures, including endotracheal intubation for general anesthesia or neonatal intubation.^{2,5}
7. Equipment, including ultrasound machines, must be cleansed thoroughly between patients, especially if the patient is positive for COVID-19, following stringent cleansing protocols.⁶
8. Only essential HCPs should participate in procedures on patients with positive COVID-19 or patients classified as PUI.
9. All nonessential personnel should limit direct patient contact. Whenever possible, patient encounters, for example, subspecialty consultation or result follow-up, should be conducted virtually.³ Dedicated fetal therapy nursing and care coordination remain critical components of the fetal care team.

TABLE
Coronavirus disease 2019 pregnancy registries

Registry	Website	Patient recruitment from	Inclusion criteria/objectives
PRIORITY	https://priority.ucsf.edu/	United States <i>only</i>	Pregnant or recently pregnant women, either under investigation for SARS-CoV-2 infection or with confirmed COVID-19
COVI-Preg	https://www.covi-preg.ch	International	Any pregnant patient suspected of SARS-CoV-2 infection
PAN COVID	https://pan-covid.org	International	Any woman in pregnancy or postnatal period and/or their neonate with suspected or confirmed SARS-CoV-2 infection
MFMU	https://mfmunetwork.bsc.gwu.edu/PublicBSC/MFMU/MFMUPublic/research-projects/	United States MFMU sites <i>only</i>	All women with SARS-CoV-2 infection in pregnancy or within 6 wk after delivery, at any MFMU hospital site
CHOPAN	https://www.covid19chopan.health	Australia, New Zealand, and Pacific region	All women diagnosed as having COVID-19 in pregnancy. Neonatal outcomes to 1 mo of age
UKOSS	https://www.npeu.ox.ac.uk/ukoss/current-surveillance/covid-19-in-pregnancy	United Kingdom <i>only</i>	Incidence of hospitalization with SARS-CoV-2 infection in pregnancy, assessing maternal and infant outcomes
ROI COVID-19	https://www.ucc.ie/en/npec/roicovid-19study/	Ireland <i>only</i>	All pregnant women and newborns aged <29 d who have been tested for SARS-CoV-2
NethOSS	https://www.nvog.nl/actueel/registratie-van-covid-19-positieve-zwangeren-in-nethoss/	Netherlands <i>only</i>	Pregnant women with SARS-CoV-2 infection
CAN COVID-Preg	https://ridprogram.med.ubc.ca/cancovid-preg/	Canada <i>only</i>	Pregnant women with COVID-19 infection and their newborns up to 6 weeks

CAN COVID-Preg, Canadian COVID-19 in Pregnancy Surveillance; *CHOPAN*, Coronavirus Health Outcomes in Pregnancy and Neonates; *COVID-19*, coronavirus disease 2019; *COVI-Preg*, International COVID-19 and Pregnancy Registry; *MFMU*, Maternal-Fetal Medicine Units; *NethOSS*, Netherlands Obstetric Surveillance System; *PAN COVID*, Pregnancy and Neonatal outcomes for women with COVID-19; *PRIORITY*, Pregnancy Coronavirus Outcomes Registry; *ROI COVID-19*, Republic of Ireland, COVID-19; *SARS-CoV-2*, severe acute respiratory syndrome coronavirus 2; *UKOSS*, UK Obstetric Surveillance System.

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- The potential exacerbation of known or unrecognized maternal SARS-CoV-2 infection that could result in increased fetal or maternal morbidity or mortality with any intervention must be considered. Where appropriate, infectious disease consultation should be entertained.
- Decisions should be made based on local medical, operational, and organizational considerations, influenced by local COVID-19 burden. Parents should be informed that treatment availability may change at short notice, because of local healthcare adjustments as they adapt to evolving pandemic trends.
- Preoperative SARS-CoV-2 testing for patients undergoing fetal interventions should follow local policies and guidelines, according to access to testing and result response time. For patients who receive positive test results for SARS-CoV-2 or are symptomatic, procedures should be delayed for 14 days or until patients meet local criteria for disease resolution. If the fetal condition requires immediate intervention, and if the mother is stable, the procedure should be performed using appropriate PPE.
- Practice guidelines for procedures during the COVID-19 pandemic are continually evolving as information emerges. The North American Fetal Therapy Network will closely monitor emerging evidence and will update their guidelines accordingly (<https://www.naftnet.org>).
- All interventional research protocols should be suspended during the pandemic. No clinical benefit for the fetus or newborn is lost, because the experimental outcomes are unknown. However, we encourage recruitment of pregnant women and neonates with SARS-CoV-2 infection into registries that may clarify the risk of vertical transmission (Table).
- Fetal therapy centers must carefully consider whether they can still offer certain, highly resource-intensive, fetal procedures if their staffing becomes depleted, because of either illness or deployment to other intensive care areas. In regions with multiple fetal therapy programs, this may be a time for collaboration, volume reduction, and/or referral of certain cases.
- Patients traveling between states, provinces, or countries should be counseled that, by such travel, they may expose themselves to a higher risk of SARS-CoV-2 infection. They may also become obliged to remain at their destined center for an unpredictable time period. After some procedures, patients may return earlier than usual

to their referring HCPs for ongoing monitoring and care. Fetal therapy centers should remain engaged with the referring HCP by phone or telemedicine. If travel restrictions are implemented, patients who need to travel to a distant fetal therapy center may require supporting documentation. Some centers may decline to accept patients with a positive result for COVID-19 testing or come from regions with a high infection prevalence.

The North American Fetal Therapy Network's suggested approach to the fetus, in the setting of the COVID-19 pandemic, emphasizes the need for a comprehensive multi-disciplinary approach to maternal–fetal care. We must carefully weigh the risks and benefits of all fetal interventions, considering whether the potential benefits may or may not be achieved with alternate or delayed therapeutic approaches. The risks of exposure of HCPs to SARS-CoV-2 and the availability of local resources must be considered in such decisions. During the COVID-19 pandemic, fetal interventions should not simply be defined as “elective” procedures. ■

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³Evidence-based guidance for the provision of antenatal care, prenatal diagnosis, fetal therapy, and intra- and postpartum care and the optimal approach to the surgical patient in the setting of the COVID-19 pandemic is rapidly evolving. Recommendations must be adapted considering local SARS-CoV-2 infection prevalence and resource availability. The North American Fetal Therapy Network recommends ongoing consultation with reputable organizations and institutions, such as the Centers for Disease Control and Prevention, American College of Obstetricians and Gynecologists, International Society for Ultrasound in Obstetrics and Gynecology, American Institute of Ultrasound in Medicine, Society of Obstetricians and Gynaecologists of Canada, International Fetal Medicine and Surgery Society, International Society for Prenatal Diagnosis, and Society for Maternal-Fetal Medicine, for up-to-date information regarding specific pregnancy care in the setting of the COVID-19 pandemic. Operating room policies and procedures should follow local guidelines in addition to those developed by surgical and anesthetic societies, including the American College of Surgeons, Association of Operating Room Nurses, Society for Obstetric Anesthesia and Perinatology, Canadian Association of Paediatric Surgeons, and Society of American Gastrointestinal and Endoscopic Surgeons.

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This communication has been published in the middle of the coronavirus disease 2019 pandemic and is available via expedited publication to assist patients and healthcare providers.

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Screening all pregnant women admitted to labor and delivery for the virus responsible for coronavirus disease 2019



OBJECTIVE: The coronavirus disease 2019 (COVID-19) pandemic sharply escalated in the United States in March and April of 2020. General medical and obstetrical guidelines for managing suspected or confirmed COVID-19 cases mostly rely on maternal symptoms or close proximity to positive contacts to trigger testing and subsequently diagnose COVID-19.¹ However, it has become apparent that most cases of COVID-19 are the result of viral dissemination from asymptomatic individuals.² Persons who may unknowingly spread COVID-19 are often young and healthy, which fits the demographic of many obstetrical patients. Because medical staff have been urged to conserve limited personal protective equipment (PPE) for suspected or confirmed cases,³ the risk of COVID-19 transmission to frontline healthcare workers from asymptomatic carriers has increased. Similarly, the risk of COVID-19 transmission from mother to her infant or to other obstetrical patients on a shared antepartum or postpartum unit has also increased. Therefore, we proposed that routine testing for COVID-19 should be performed in all obstetrical patients admitted to labor and delivery (L&D) unit, regardless of maternal symptomatology, allowing for appropriate triage, adequate obstetrical and neonatal management, and safe patient transport within overcrowded hospitals.

At the time of this writing, COVID-19 testing has been recommended only for patients presenting with symptoms and those in close proximity to laboratory-confirmed positive patients.⁴ The Society for Maternal-Fetal Medicine in conjunction with the Centers for Disease Control and Prevention (CDC) have advised not to prioritize testing of asymptomatic patients.⁵ This may lead to unrecognized viral transmission and incorrect use of PPE.

The primary objective of this study was to determine the accuracy of maternal symptomatology in predicting COVID-19 as confirmed by rapid laboratory testing. Secondary objectives were the rate of neonatal COVID-19 and the effect of routine maternal testing on the use of PPE compared with its use based on symptom-driven testing.

STUDY DESIGN: This was a retrospective cohort study of all obstetrical patients admitted to L&D from March 30, to April 12, 2020. Routine COVID-19 testing was implemented during this time period. Testing was performed in all admitted patients, regardless of indication for admission or presence of symptoms. Institutional review board approval was obtained in addition to approval by a COVID-19–specific research committee within our institution. The study was performed at the NYU Winthrop Hospital of the NYU Langone Health System; our hospital performs approximately 4800 deliveries per year.

All women were asked about symptoms (fever, cough, shortness of breath). The presence of 1 or more of the aforementioned symptoms was used to determine whether the patient was symptomatic. Sampling was performed by a resident physician or a physician assistant in appropriate PPE using a nasal swab in a negative-pressure room with closed doors. Each nasopharyngeal swab was collected in the GeneXpert Nasopharyngeal Sample Collection Kit for Viruses (Cepheid, Sunnyvale, CA) and transferred to the laboratory. Within the negative-pressure fume hood, 30 mL of viral culture media from the collection kit was transferred into the Xpert Xpress SARS-CoV-2 cartridge (Cepheid, Sunnyvale, CA). The cartridge was subsequently placed in Cepheid's equipment for polymerase chain reaction (Cepheid, Sunnyvale, CA).⁶ Polymerase chain