

Keeping Pregnant Patients Safe During COVID-19 Pandemic

Philip E. Hess¹, Blair J. Wylie², Toni Golen², Scott A. Shanker², Chloe Zera², Yunping Li^{1,*}

During a crisis such as the coronavirus disease 2019 (COVID-19) pandemic, a hospital can suspend all elective surgery to expand capacity for intensive care;¹ however, the clinical care on the Labor and Delivery Unit (L&D) cannot be delayed. Pregnant patients must come to the hospital for their obstetric care and delivery, and patients may express concerns and fear regarding the risk of nosocomial infection. The COVID-19 pandemic poses multiple challenges specifically for L&D Units around the world, such as: (1) caring for COVID-19 and non COVID-19 pregnant patients simultaneously on the same unit; and (2) the mode of delivery cannot be pre-determined and emergent cesarean delivery is sometimes necessary. Therefore, strategies and guidelines are desperately needed to protect pregnant patients and health care workers (HCWs) from viral transmission while at the same time ensuring safe and swift responses to obstetric emergencies. Throughout the COVID-19 pandemic, we have learned an enormous amount about how to provide safe obstetric care. Here we report and share our strategies and experience as the COVID-19 pandemic is accelerating and global peak is still to come.

Beth Israel Deaconess Medical Center in Boston is a tertiary teaching hospital; its L&D unit is responsible for providing care for over 5000 deliveries each year. In addition, the hospital receives transfers of critically ill COVID-19 pregnant patients from its network hospitals. Facing an evolving pandemic caused by a novel pathogen, we quickly developed systemic and strategic approaches to allow our L&D Unit to face unprecedented challenges.

Leadership

We established a multidisciplinary leadership committee, including Obstetrics, Obstetric Anesthesiology, Maternal Fetal Medicine, Nursing, Infection Control and Neonatology. In parallel with hospital guidelines, this committee communicates frequently and governs routine and emergent operations on L&D.

Designated COVID labor and delivery rooms and an operating room

In the United States, many L&D Units have found it necessary to cohort COVID-19 and non COVID-19 pregnant patients in the same unit. With minimal changes to existing physical space, we isolated and designated four labor rooms and one operating room for COVID patients.² This area is relatively independent with separate entrances, its own anteroom, and a dedicated hallway to the soiled room. This area is sufficiently equipped for vaginal delivery, cesarean delivery, and resuscitation for postpartum hemorrhage. The COVID operating room is thoughtfully redesigned. The anesthesia machine is covered with plastic sheeting and the ventilatory circuit is installed with three heat and moisture exchange/bacterial-viral filters, two in exhale limb and one in the gas sampling line to avoid contamination of the anesthesia machine. We stock the operating room with minimal disposable items to avoid cross contamination and unnecessary waste. We also have a trained team for decontamination after COVID-19 cases.

Expandable resources

After partitioning L&D Unit for the COVID area, we moved scheduled cesarean deliveries to a main operating room, which is located in the same building on a different floor. The collaborative efforts in the hospital significantly decongested the L&D unit for caring for COVID-19 patients. We have offered virtual anesthesia consultation (telemedicine) to most of the high-risk patients and virtual Childbirth Classes to every expectant mother. Many pregnant women have utilized these resources with great satisfaction.

Universal masking

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) can be spread via droplets and aerosolized particles.³ Hospitals in United States have adopted universal masking. We provide a surgical mask to every

¹Department of Anesthesia, Critical Care and Pain Medicine, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, Massachusetts 02215, USA; ²Department of Obstetrics and Gynecology, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, Massachusetts 02215, USA.

*Corresponding author: Yunping Li., Department of Anesthesia, Critical Care and Pain Medicine, Beth Israel Deaconess Medical Center, Boston, Massachusetts 02215, USA. E-mail: yli1@bidmc.harvard.edu

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patient and their support person upon arrival to the hospital. The hospital provides enhanced N95 masking for frontline HCWs, for use at times when aerosolization may occur. A surgical mask is worn by HCWs at all other times along with eye protection for protection of mucous membranes. Hospital-wide vaporized hydrogen peroxide reprocessing for N95 masks has sustained personal protective equipment (PPE) supply. Effective PPE and strict hand hygiene have contributed to zero nosocomial COVID-19 transmissions among physicians and nurses on L&D in our hospital. This has been a great success in the preservation of frontline workforce taking care of our pregnant patients.

Universal screening and testing

Focusing on masking alone may not be sufficient to prevent the spread of the virus from active COVID-19 patients to HCWs or vice versa. Implementing vigorous screening constitutes a fundamental measure to identify symptomatic infections.^{4,5} In the very early stages of pandemic, COVID-19 testing limited, thus we adopted the strategy of diligently screening all patients and their support person for symptoms of COVID-19 and contact history before admission to L&D (Fig. 1). As testing capability expanded, we subsequently tested all patients with symptoms of COVID using polymerase-chain-reaction to detect SARS-CoV-2 infection. On April 30th, 2020,

we expanded to universal screening and testing in all pregnant patients before the admission or upon arrival to the hospital. The universal testing approach has identified symptomatic and asymptomatic COVID-19 patients and has helped to determine isolation during hospitalization, care of the newborns, and plans for discharge.

Development of COVID-19 guidelines and workflows specific for L&D

There was limited time and minimal scientific evidence for how to develop such guidelines for clinical practice during the COVID-19 pandemic. We created L&D specific guidelines for operating procedures, airway management, and PPE. After implementation, we organized debriefings and updated and improved the guidelines accordingly, in an iterative manner. As the SARS-CoV-2 pandemic continues, we have further refined the guidelines multiple times. Guidelines currently exist as version 11.² This workflow for COVID-19 cases is the center piece of guidelines to ensure standardized practice and maximized safety.

COVID-19 hotline and COVID surveillance for pregnant patients

We have set up a COVID-19 hotline for pregnant patients and their families. The professionals on the hotline help pregnant patients to address their anxiety, answer

Department of Obstetrics and Gynecology Beth Israel Deaconess Medical Center
<p>Title: Screening and Testing at the time of obstetric admission for COVID 19</p> <p>Protocol #: COVID 30</p>
<p>BACKGROUND</p> <p>Screening of patients and their support personnel for symptoms of COVID 19 at the time of admission to the labor/delivery or antepartum/postpartum units will identify symptomatic individuals that should be considered persons under investigation (PUIs) for COVID19 and confirm the health of support personnel entering the unit. Symptoms of COVID19 may also develop during the course of labor (e.g. fever), the postpartum period or during an antepartum admission. Screening is a process to identify <u>symptomatic individuals</u>.</p> <p>Testing for COVID19 refers to obtaining a nasopharyngeal swab from a patient and is distinct from screening (which is question based). Universal testing of patients admitted to obstetrics units will help <u>identify asymptomatic carriers</u>.</p> <p>This guideline outlines the following for care on the obstetrics units:</p> <ul style="list-style-type: none"> • Screening of patients and support personnel for symptoms of COVID19 at the time of admission and during the course of their stay • Testing and care of individuals with symptoms on presentation or during the course of their admission • When testing requires a rapid versus standard turnaround time nasopharyngeal swab

Figure 1. Universal screening and testing at the time of obstetric admission for COVID-19. ©Beth Israel Deaconess Medical Center, Inc. Reproduced with permission. d: Days; CBC w/diff: Complete blood count with differentiation; CD: Cesarean delivery; COVID-19: The coronavirus disease 2019; ID: Infectious Disease; IOL: Induction of labor; L&D: Labor and Delivery Unit; MFM: Maternal fetal medicine; NICU: Neonatal intensive care unit; OB Anesth: Obstetric Anesthesiologists; PT/PTT/INR: Prothrombin time, partial prothrombin time and international normalized ratio; PUI: Persons under investigation; SOB: Shortness of breath. TEG: Thromboelastogram.

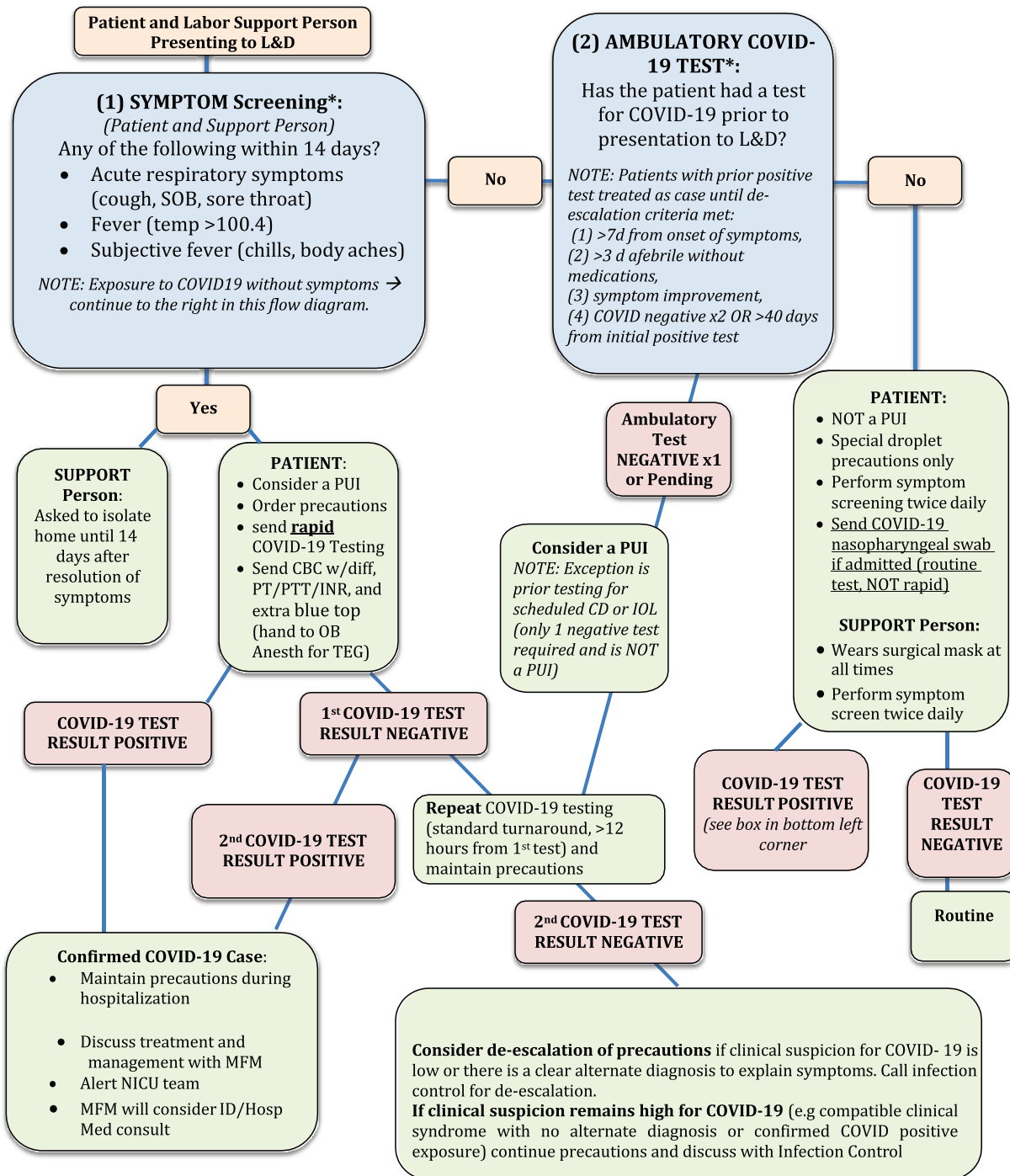


Figure 1. Universal screening and testing at the time of obstetric admission for COVID-19. ©Beth Israel Deaconess Medical Center, Inc. Reproduced with permission. (Continued).

questions, and find resources for them. This is a critical communication pathway with patients, to assure they understand changing rules, regulations, and processes for childbirth. In parallel, we established a COVID surveillance team which is comprised of experienced obstetric nurses and a faculty maternal-fetal medicine subspecialist. Patients were referred to the surveillance system by their managing obstetric providers following reported symptoms or exposures to COVID-19 or after admission for COVID-19. The surveillance team made daily contact with

the patients to monitor symptoms, triaging those that needed ambulatory or inpatient evaluation, and arranging testing for those meeting criteria. Surveillance was continued for a minimum of 14 days and longer when necessary.

Our standardized protocols and guidelines translated to satisfactory perinatal outcomes. The data from our surveillance indicated that there was none who acquired SARS-CoV-2 infection in our patients during their hospitalization for prenatal care, delivery, and postpartum

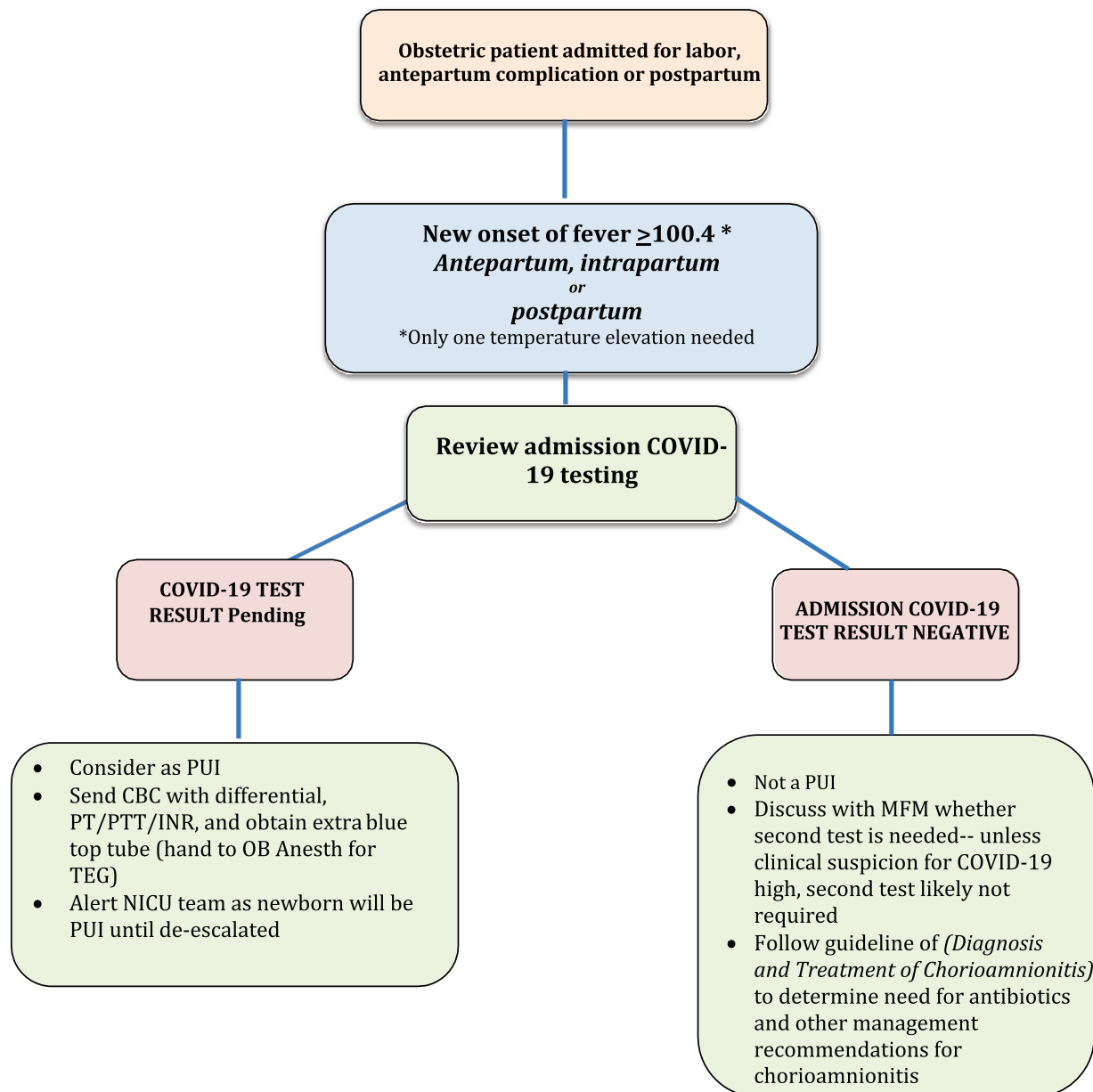


Figure 1. Universal screening and testing at the time of obstetric admission for COVID-19. ©Beth Israel Deaconess Medical Center, Inc. Reproduced with permission. (Continued).

care. Three pregnant women were admitted to intensive care unit due to severe COVID-19 disease; two of them were intubated. They all recovered and delivered healthy babies. There was no maternal mortality during this period time of pandemic (March 2020 to July 2020).

Centers for Disease Control and Prevention⁶ and the United Kingdom have declared that pregnant women are a vulnerable population to COVID-19. Pregnancy related physiologic changes and increased oxygen demand reduce a woman's respiratory reserve. These physiologic alterations have the potential to impact the clinical course of pregnant patients with COVID-19. The hypercoagulable state during pregnancy potentially make them prone to complications of microthrombosis from COVID-19. As global COVID-19 cases are still increasing, shared

knowledge and experience are vital in the medical community for the optimal care of pregnant patients.

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Conflicts of Interest

None.

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