

Recommendation on Newborn Screening Operation under COVID-19 Pandemic

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ABSTRACT

Objectives: This article aims to provide a response strategy that we proved effective in Maternal and Child Health Hospital of Hubei Province during the COVID-19 outbreak, with a focus on the program of Newborn screening.

Methods: We have done the response measures for newborn screening operation.

Results: No in-hospital infection took place from Feb 1st to Mar 31st in 2020, with 4054 delivery cases in the same period.

Conclusions: Since the procedure described above has been proven effective in our institute, we report it here as a reference for other medical centers involved with newborn screening.

Keywords: Newborn Screening; COVID-19; Individual Protection; Wuhan; China

Introduction

Since December 2019, the outbreak of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) caused huge burden on health care system in many countries [1]. Due to the shortage of personal protective equipment and the lack of well-established response plan, many medical staffs are in risk of infection and some have been confirmed to be infected [2]. Guidance for operation in hospitals proven effective is urgently needed.

This article aims to provide a response strategy that we proved effective in Maternal and Child Health Hospital of Hubei Province during the COVID-19 outbreak, with a focus on the program of Newborn screening.

Newborn screening is the practice of testing all babies shortly after birth for certain disorders and conditions that can hinder their normal development. Early detection and treatment have been proven helpful to prevent intellectual and physical disabilities and life-threatening illnesses.

Anti-Pandemic Protocols and Operations

The medical and nursing staff in Obstetrics Department should operate in strict accordance with the protective requirements, and are required to wear overalls, isolation clothes, shoe covers, medical protective masks or N95 masks, goggles, protective face screens, disposable work caps, single or double latex gloves, and strictly enforce hand hygiene. In our hospital, all of the pregnant women also consciously wear masks. We use ultraviolet light and 75% alcohol for the disinfection of working environment.

Admission of the pregnant

When the parturient is evaluated to be admitted to the hospital, in addition to routine examination, CT (Computed tomography) of the chest was performed for each patient. Patients who were diagnosed as suspected case will receive RT-PCR testing. For the pregnant women suspected of COVID-19 who may give birth, ultrasound rooms, delivery rooms, operating rooms, elevators should be dedicated to avoid the spread of infection. The suspected pregnant women and diagnosed pregnant women should be admitted to different floors. After giving birth, they will be transferred to COVID-19 designated hospital for treatment.

Blood collection

Collection of dry blood spots on filter paper (Blood sampling card of schleicher & schuell 903, American) for confirmed cases, suspected cases and close contacts.

Acquisition time

- a. Newborns diagnosed with COVID-19: blood collection should be suspended until being completely cured. The recovery criteria are as follows: no clinical symptoms in reexamination in the second and fourth week of discharge; test negative for 3 consecutive days for two times;
- b. Suspected infected newborns: blood collection should be suspended until the closure of isolation period. The nucleic acid test must be negative twice (the sampling interval is at least 1 day).
- c. Newborns in close contact: for newborns with the following conditions, it is recommended to recall dry blood spots on filter paper after 14 days of medical observation: newborns whose mothers are diagnosed as confirmed cases or defined as suspected cases 14 days before delivery; newborns are close contacts of confirmed or suspected cases after birth.

The above-mentioned delayed blood collection shall be recalled by the delivery hospital after cure or medical observation period, and shall be coordinated by the health administrative department of the local area to collect blood slices in local medical institutes.

Requirement for escorts

Accompanying relatives should be proved as 1) no close contact with infected patients or 2) out of isolation period for suspected cases 3) meeting recovery standard described in 1.1.a.

Collection procedure

a. Collection site: Dried blood spots are collected by medical staff in a specially set sampling room. Dried blood spots should be collected on one-to-one basis. The collection site needs to be disinfected before and after each newborn is collected.

b. Waste disposal: the medical waste generated during the collection process shall be disposed of in accordance with the Water, sanitation, hygiene and waste management for COVID-19 proposed by WHO.

The staff shall dispose of the waste in time and establish the waste disposal record.

c. All blood smears shall be treated as samples of blood-borne infectious diseases, and blood smears of confirmed cases of 2019-nCoV or suspected infections shall be clearly marked and packaged separately.

Collection method and notification

Collect heel blood strictly according to the steps of blood smear collection for neonatal genetic metabolic disease screening, and fully inform parturient or family members of the relevant knowledge of neonatal disease screening, especially for newborns who do not collect blood slides within 7 days to fully inform of the benefits and risks (the risk of not collecting blood for neonatal disease screening, and put forward suggestions).

Marking, packaging and preservation of dried blood spots on filter paper

For confirmed cases, suspected cases and close contacts, the dried blood spots on filter paper were placed separately in three-layer sealed bags, and marked on the outermost layer.

Other neonatal blood slices are packed in two-layer sealed bags, with no more than 10 blood tablets in each package, and then delivered in envelopes. For example, a hospital needs to send 28 blood tablets, and each group of bags contains 10, 10 and 8 blood tablets respectively, and finally three bags are packed into envelopes for delivery, so as to prevent contamination between samples caused by confirmed NCP pregnant women or confirmed NCP newborns after blood collection. After drying, the blood spots can be stored in the refrigerator at 2-8 °C, and the blood spots can be preserved below 0 °C if possible.

Specimen transportation

For confirmed cases, suspected cases and close contacts, a special car will be sent to deliver dried blood spots of filter paper to Hubei Neonatal Disease Screening Laboratory within 10 working days after blood collection. For newborns with confirmed or suspected of COVID-19, express delivery of dried blood spots on filter paper is not recommended to prevent pollution caused by inadequate understanding of the virus. The above filter paper dry blood spots should not be mixed with other items or specimens, transporters, recipients and drivers should also do personal protection, and pay attention to the disinfection of the handover link.

Result and Discussion

Much of the world's population are experiencing the disruption and pain caused by the COVID-19 pandemic [3]. COVID-19 has shown high transmission rates mainly through respiratory droplets and direct contact with mucous membrane^[4]. Health care workers have a high chance to be exposed to the virus in medical practice, and many cases of infection among them have been reported. Considering the novel epidemiological feature of transmission of the SARS-CoV-2 [5], new operation procedure proven effective to protect medical staff and patients should be considered in medical center in areas affected. From Feb 1 to Mar 31, 2020, 4054 women gave birth in Maternal and Child Health Hospital of Hubei Province, including 12 confirmed COVID-19 cases and 625 suspected cases. By far, no human-to-human spreading case was reported to take place in our hospital, due to the practice of the guidance de-

scribed above. Our response procedure was based on the Guideline for the Prevention and Control of Novel Coronavirus Pneumonia in Medical Institutes (the 1st edition) (<http://www.nhc.gov.cn/yzygj/s7659/202001/b91fdab7c304431eb082d67847d27e14.shtml>). It should be noted that no vertical transmission from pregnant woman to newborn was observed in our institute, which is consisted with previous studies [6].

Since the procedure described above has been proven effective in our institute, we report it here as a reference for other medical centers involved with newborn screening.

Ethics approval and consent to participate

The research was approved by the Ethics Committee of Maternal and Child Health Hospital of Hubei Province. All patient guardians gave informed consent to the study.

Disclosure statement

The authors have no conflicts of interest relevant to this article.

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