Neonatal Opiate Withdrawal Syndrome in COVID-19: Are hospitalized infants with NOWS experiencing more severe clinical illness associated with COVID-19 related changes in hospital infection control policies and practices?

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BACKGROUND

Pregnant women with opiate use disorder have high-risk pregnancies and require specialized medical care throughout their pregnancy. Newborns that are exposed to opiates during pregnancy are at risk for experiencing neonatal opiate withdrawal syndrome (NOWS). Infants with NOWS may experience symptoms including poor feeding, poor sleep, excessive crying, and difficulty with consoling. Severe forms of NOWS may result in excessive vomiting and diarrhea with subsequent dehydration, seizures, and even death. Infants born to mothers with opiate use disorder must be hospitalized after their birth for evaluation and appropriate management of NOWS. Physicians commonly evaluate babies with NOWS using the Finnegan Scale tool (see Table 1) or the Eat, Sleep, Console tool.

The SARS-CoV-2 pandemic has forced hospitals to implement increasingly escalating infection control practices to prevent nosocomial disease. At the University of New Mexico Hospital, multiple practices were adapted on April 15, 2020. These included:

- Mandated universal masking of all staff, providers, visitors
- Limitations in visitation, with volunteers and cuddlers no longer permitted in the hospital
- Infants limited to one parent at the bedside at a time in the Intermediate Care Nursery and the Newborn Intensive Care Unit

These interventions directly impact the ability of families, providers, and staff to provide optimal non-pharmacological interventions for this vulnerable population. This raises the concern that more infants with NOWS may require pharmacological intervention to manage their symptoms. Additionally, having masked caregivers may result in additional agitation for the infants. Together, the impact of these infection control practices for infants with NOWS may result in additional stressors during a period of intense tension for the infants.

STUDY OBJECTIVE

Given the recent changes required to improve infection control during the pandemic, we hypothesized that infants with NOWS born during this period will have a more complicated hospital course.

Specifically, we aim to evaluate NOWS severity, defined as utilization of pharmacological intervention and length of treatment, combined with length of hospital stay in infants born prior to the pandemic with the diagnosis of NOWS (discharged between June 1, 2019 – February 29, 2020). These findings will be compared with a sample of infants born during the pandemic with a diagnosis of NOWS (discharged between April 15, 2020 – December 31, 2020).

METHODS

Data will be extracted from the electronic medical record (EMR) by UNM Clinical and Translational Science Center (UNM CTSC), de-identified and pooled by an Honest Broker. Demographic information including infant sex, ethnicity, race, and county of mother's residence will be obtained. Additionally, information from the pregnancy (see Table 2) will be collected including gestational age at time of delivery, growth parameters of the infant, what the prenatal substance exposure included, and any additional pregnancy complications (such as maternal diabetes or pre-eclampsia).

To identify infants that qualify, the following ICD-10 codes for newborns suspected to be affected by maternal use of other drugs of addiction are being used:

- P96.1
- P04.49
- P04.9
- P04.41

All infants included in the study will be divided into two cohorts: pre-COVID and COVID, to represent the population born prior to the pandemic and those born during the pandemic. Infant must be discharge between the following dates to be included:

- Pre-COVID: June 1, 2019 – February 29, 2020
- COVID: April 15, 2020 - December 31, 2020

Information on maternal COVID status, including infection and vaccination, will be collected when available.

All infants must be discharged from the intermediate care nursery at UNM Hospital, as we aim to assess pharmacological intervention differences in the two cohorts.

The outcomes to be analyzed for both cohorts include:

- Finnegan Scale assessments
- Pharmacological intervention required
- Dosing of pharmacological intervention (including the highest dose and the total amount received)
- Utilization of secondary pharmacological intervention
- Length of hospital stay

Upon completion of the data extraction, statistical analysis will be completed.

Table 1: Summary of the Finnegan Scale

Body System	Symptoms	Scores (Ranges)
Central Nervous	High Pitched Cry, Poor Sleep, Moro Reflex (startle), Tremors, Muscle Tone, Convulsions	1-5
Metabolic / Somatic / Respiratory	Sweating, Fever, Yawning, Stuffiness, Elevated Respiratory Rate	1-3
Gastrointestinal	Excessive Sucking, Poor Feeding, Vomiting, Loose Stools	1-3

Table 1 shows a summary of the Finnegan Scale. There are three main body systems evaluated, and infants are evaluated every 3-4 hours. Elevation in the scores will prompt providers to discuss additional intervention to manage symptoms, include pharmacological intervention. If an infant receives three consecutive scores of ≥8 or one score >12, pharmacological intervention may be initiated. The medications commonly used include morphine or methadone, with clonidine often used as a secondary medication. Infants remain hospitalized throughout the duration of pharmacological therapy, which can last weeks to months.

METHODS

Table 2: Summary of Maternal and Infant Characteristics to be Obtained

Demographic Information	Pregnancy Information	COVID Information
Infant Sex	Gestational Age at Delivery	Maternal Infection with COVID
Infant Ethnicity	Growth Parameters for Infant	Maternal COVID vaccination
Infant Race	Prenatal Substance Exposure(s)	
Mother's County of Residence	Pregnancy Complications (including diabetes, pre-eclampsia)	

Table 2 shows a summary of the maternal and infant characteristics that will be collected. This includes demographic information, pregnancy information, and any information about COVID infection and/or vaccination in the mother.

STUDY PROGRESS

Approval by the Institutional Review Board (IRB) has been obtained and the request for utilization of the Honest Broker has been submitted. Currently, the data extraction is ongoing.

Once the de-identified data set has been created, data analysis will commence.

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