The Journal of Maternal-Fetal & Neonatal Medicine

ISSN: 1476-7058 (Print) 1476-4954 (Online) Journal homepage: https://www.tandfonline.com/loi/ijmf20

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To cite this article: Farnoosh Qadri & Federico Mariona (2020): Pregnancy affected by SARS-CoV-2 infection: a flash report from Michigan, The Journal of Maternal-Fetal & Neonatal Medicine, DOI: 10.1080/14767058.2020.1765334

To link to this article: https://doi.org/10.1080/14767058.2020.1765334

Published online: 20 May 2020.

THE JOURNAL OF MATERNAL-FETAL & NEONATAL MEDICINE
https://doi.org/10.1080/14767058.2020.1765334

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SHORT REPORT

Pregnancy affected by SARS-CoV-2 infection: a flash report from Michigan

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ABSTRACT

The world is currently affected by the invasion of a human to human highly transmissible novel corona virus classified as SARS-CoV-2. It causes a severe acute lower respiratory tract syndrome named corona virus disease (CoVid-19). The virus is detected primarily by RT-PCR. The reproduction number (Ro) has been reported between 2.28 and 5.27]. It is beyond our objective to provide an in-depth discussion of the virus characteristics and its distinct viral clades and pathogenic behavior. On 30 January 2020 the World Health Organization (WHO) declared this outbreak a Public Health Emergency of International Concern, (PHEIC) and on 11 March 2020 WHO declared it a pandemic. There is limited information on the effect of CoVid-19 in pregnancy and the new born. We describe the details of the hospital course of the first 16 cases involving pregnant women, admitted to an urban-suburban community general hospital in Wayne County Michigan, from 26 March to 10 April 2020. At the time of this writing the Covid-19 pandemic has affected 35,291 persons in the state of Michigan (0.37%) making it the third most affected state in the USA (MDHHS). Pregnant women are believed to be at higher risk of Covid-19 infection in association with the known physiologic changes of the immune, cardiorespiratory and metabolic systems during pregnancy.

ARTICLE HISTORY
Received 1 May 2020
Accepted 3 May 2020

KEYWORDS
Covid-19; pregnancy; corona virus; pandemic; SARS-CoV-2

Objective

Our objective is to share this short contemporaneous report describing a limited observation conducted on the hospital clinical course, treatment and outcomes of the first 16 Covid-19 positive pregnant women admitted to the unit.

Methods

All patients were treated by their attending physicians with multidisciplinary consultants. There were no standard protocols in place for the diagnosis or treatment of the Covid-19 positive pregnant patients. Evaluation *via* verbal "screening" for most frequent Covid-19 risk factors, (fever, cough, shortness of breath) and patient's vitals were checked at the time of admission. During this period the unit did not practice universal testing of pregnant patients for Covid-19 on admission. Expedited approval was requested from the IRB. A total of 16 patients is included.

Results

One hundred and ninety-two patients were included during the observation period. Sixteen patients were CoVid-19 positive (8.3%). Maternal age ranged from 20 to 40 years of age; All 16 patients were diagnosed Covid-19 positive *via* nasopharyngeal sample and RT-PCR technique. Four of 16 patients (25%) were positive for Covid-19 risk factors screening on admission; two of them had tested positive prior to admission. Two patients (12.5%) were admitted with the diagnosis of PROM (31 1/7 and 34 weeks) and a negative risk factor screening; they were tested when a temperature elevation ($\geq$100.4°F) during labor was detected. They were treated for chorioamnionitis and sampled at the time of the fever spike. Isolation measures were implemented after the return of the positive report. Approximately 8–10 health care workers were exposed to these women before the positive Covid-19 test was reported. Eleven of the 16 patients were African American (68.7%); gravidity and parity was distributed between primigravidas and grand multiparous, gestational age ranged from 22 to 40 3/7 weeks gestation.

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Due to the urgent and developing nature of the topic, this paper was accepted after an expedited peer review process. For more information about the process, please refer to the instructions for authors.

Four patients (25%) at (23, 24, 27 3/7- and 32 weeks gestation) who screened positive at the time of admission received a chest x-ray. The findings were generically reported as opalescence of the lung bases, diagnosed as pneumonia. Two patients (12.5%) received O_2 by nasal cannula starting at 11 L and gradually decreased to 4 L as the FiO2 returned to $>$ 94%; they were treated with Azithromycin, Hydroxychloroquine, Remdesivir and steroids. They were discharged undelivered; periodic follow up continued *via* telephone contact.

Of the remaining 12 patients that were screened negative at the time of admission (75%) and later tested positive for Covid-19, two (16%) were delivered by uncomplicated primary cesarean due to obstetrical indications, 1 was a repeat elective cesarean at 40 weeks and the other an elective primary cesarean at 39 weeks 2/7 days second to breech presentation.

Eight patients had an uncomplicated spontaneous vaginal delivery (66%). There was one preterm birth (12%); she delivered vaginally at 22 weeks after an early second trimester US examination showed a cervix of 1.2 cm length and was treated with vaginal progesterone. She was asymptomatic on admission and her Covid-19 positive report arrived after her hospital discharge.

Ten of sixteen patients were obese Class I and above (62.5%), BMI range (25.5–42.5 K/m^2). The two patients with the highest BMI received respiratory support *via* nasal cannula. Seven of the patients were screened at random for serum C reactive protein considered a marker for inflammatory changes; all of them showed a significant elevation (30.1–127.1 mg/dl, normal $<$8 mg/dl). Platelet count range from 146 K/mm to 338 K/mm; no patient evidenced clinical signs or symptoms of disseminated intravascular coagulopathy. White blood cell count ranged from 4.1 to 15.7.

Maternal length of stay was 7 days for the undelivered patients; they were treated with Azithromycin, Hydroxychloroquine, Remdesivir and steroids at the discretion of infectious disease physicians. Maternal-infant length of stay for the delivered patients was 24–72 hours. None of them was actively treated with any agent. There were no maternal readmissions.

Birth weight ranged from 2830 g to 4215 g. There were no Apgar scores at one minute below 7 and all 5-min Apgar scores were assigned as 9. All neonates were immediately isolated, tested for Covid-19 at 48 h of age. No Covid-19 positive tests were reported.

There were no small for gestational age newborns. One newborn was readmitted on day 4 due to hyperbilirubinemia. New born feeding was equally divided between breast and bottle feeding. All patients were instructed in the proper hygiene steps required for safety and protection from contamination of their newborn. At the time of discharge, the parents received pointed instructions in writing, following the most recent guidelines and NIH recommendations, supplemented by those published by the American College of Obstetricians and Gynecologists (ACOG) the Society for Maternal Fetal Medicine (MFM) and the Centers for Disease Control and Prevention (CDC)

Post-partum follow-up continued in the hands of the attending obstetrician.

Discussion

There is still scarce information regarding the effects of Covid-19 during pregnancy. Small numbers of patients have been reported from outside of China [1].

Specific data for SARS CoV-2 continues to evolve and it demonstrates a wide spectrum of disease which includes pre-symptomatic women who initially screen negative for risk factors, later test positive for Covid-19 and either develop no clinical disease or experience different degrees of respiratory dysfunction, from full blown pneumonia, to critical disease in need for invasive respiratory support [2]. Two of our pregnant patients who received a short treatment of O_2 by nasal cannula, were treated with a combination of Hydroxychloroquine and Azithromycin plus steroids, by infectious disease specialists outside of an established protocol or a clinical trial.

The USA National Institutes of Health (NIH) states that the optimal management of Covid-19 is changing quickly and treatment guidelines are frequently changing as data is further analyzed. Currently the NIH states that no drug has been proven to be safe and effective for treating Covid-19; and further states that there is insufficient clinical data to recommend either for or against using hydroxychloroquine alone or in combination with azithromycin, except in the context of a clinical trial. Equally firm is the statement on Remdesivir, which is currently being investigated in clinical trials or available through expanded or compassionate use for certain populations. Neither the ACOG nor the SMFM participated in the NIH panel that generated the above statements [3]. One of the patients started on Remdesivir developed acute transaminitis with the liver enzymes elevated to five times the normal level, which returned to normal with discontinuation of the medication. Remdesivir has garnered a lot of media interest recently.

Our early experience indicates that Covid-19 in pregnancy presents in a variety of clinical forms.

Medical practices must be prepared for rapid changes in treatment approach until we fully understand the pathophysiology of Covid-19 disease in pregnancy. None of our patients experienced the severe or critical respiratory failure described by other authors [4]. Our experience cannot be generalized. Given the existence of asymptomatic carriers we strongly believe that all pregnant women admitted for evaluation or delivery, at any gestational age, should be tested using the rapid determination of Covid-19 *via* RT-PCR in order to protect other patients and just as importantly, the health care workers. Should limitations in the testing capacity be a concern, all patients and the personnel must wear full PPE equipment. Ongoing bedside clinical monitoring during hospitalization to detect any maternal or fetal clinical changes in need for aggressive treatment. Additional therapeutics agents may need to await the completion of some of the 900 ongoing clinical trials. Empirical use of certain agents must be discussed between the patient and the attending physician.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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