Contents lists available at ScienceDirect

Taiwanese Journal of Obstetrics & Gynecology

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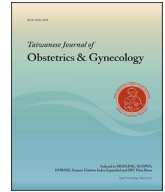
Case Report

A symptomatic near-term pregnant woman recovered from SARS-CoV-2 infection

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A R T I C L E   I N F O

A B S T R A C T

Objective: Coronavirus-2019 (COVID-19) is a global health crisis. Although pregnant women are a vulnerable population during the infectious pandemics, extremely rare cases of pregnant women infected by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) are described in Taiwan. We share our experience to manage a pregnant women with COVID-19 in the third trimester and subsequent delivery at term.
Case report: A 43-year-old woman presented with sore throat, cough and rhinorrhea was diagnosed as laboratory-confirmed SARS-CoV-2 infection at the 35 gestational weeks (GW). During the hospitalization, the disease progressed with a need of oxygen supplement and prednisolone therapy. She was discharged uneventfully at 37 GW. Finally, she delivered a female baby with Apgar score of 8–9 points at 38 GW by cesarean section due to the deformity of pelvic cavity resulted from previous surgery for pelvic bone tumor. Both mother and her offspring (without SARS-CoV-2 infection) were discharged uneventfully.
Conclusion: Our report adds the growing body of experience toward management of pregnant women with SARS-CoV-2 infection. Decision making of timing and method of delivery is regarding to individualized condition and hospital setting.

Introduction

Coronavirus disease 2019 (COVID-19), which is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has resulted in ongoing pandemic disease worldwide [1–3]. Pregnant women are a vulnerable population during the infectious pandemics, which has been recognized for centuries that predispose them to untoward outcomes compared with the general adult population [1]. As a new disease, evidence-based knowledge about COVID-19 in pregnancy is limited [1,4–7]. Therefore, the decisions about prevention, diagnosis, and management can be made according to previous experience with influenza or other novel coronavirus infections, clinical judgements, and basic knowledge [1]. However, the attack of the new infectious disease- COVID-19 still changes a fundamental lifestyle and challenges health care systems worldwide, contributing to the uncertainty of prevention and management of pregnant women infected with SARS-CoV-2, resulting in great variation of management of pregnant women with SARS-CoV-2 infection from countries to countries, even from different health care settings [1]. Based on little experience of pregnant women with COVID-19 in Taiwan due to extremely limited cases available, we would like to share the experience of the management of the pregnant woman infected with COVID-19 at the near term and expand our understanding of clinical manifestations,

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potential risk, and management of this infectious disease in pregnant women.

Case report

A 43-year-old woman, gravida 1, para 0, had history of right sacrum hemangioma undergoing tumor excision and reconstruction of the pelvic cavity. Gestational diabetes mellitus (GDM) was diagnosed during the prenatal examination, which has been controlled with dietary modification. She lived with her husband, mother-in-law, and father-in-law. SARS-CoV-2 pneumonia was first confirmed in her mother-in-law on 29th May 2021. She developed with symptoms of cough, sore throat, and rhinorrhea on the next day (at pregnancy 35 weeks and 6 days). She was diagnosed with laboratory-confirmed SARS-CoV-2 infection, with the cycle threshold (CT) value of 19.73 through the SARS-CoV-2 reverse-transcription polymerase chain reaction (RT-PCR) test. The vital signs during the hospital showed respiratory rate (RR) of 24/min, oxygen saturation of 95 % under room air, temperature of 35.8 °C, blood pressure (BP) of 141/86 mm Hg, and heart rate (HR) of 86/min. Chest X ray showed bilateral infiltrates (Fig. 1). Laboratory tests were within normal limits despite lymphopenia (WBC: 5800/ul, lymphocyte: 13.4 %, absolute lymphocyte count: 777.2/ul). Pseudoephedrine, cetirizine and acetylcysteine were used for symptom control. Daily doppler fetal ultrasound and 24-h cardiotocography (CTG) monitor were used for fetal assessment. On the third day, she complained of shortness of breath, and oxygen saturation was dropped to 92 % and below at room air. Prednisolone 40 mg daily plus oxygen support via nasal cannula of 3–5 L/min was initiated on that day. Her symptoms had been improved gradually and resolved completely. On the 12th day, SARS-CoV-2 RT-PCR testing showed 32.66 of CT value, and there was no need of oxygen supplement. She was then discharged uneventfully on 12th June 2021.

On 19th June 2021, she came to emergency department with the main complaints of regular abdominal pain. Pelvic examination revealed cervical dilation to 1.5 cm, with effacement 70 %, and the

Fig. 1. Chest X ray on admission with bilateral infiltrates.

station was −3. She was admitted for cesarean delivery previous pelvic surgery with pelvic deformity and in term with active labor stage. The surgery accompanied with spinal anesthesia was performed at negative-pressure operating room. A female infant, weighted 2980 gm, with Apgar scores of 8 and 9 at 1st and 5th minute after birth, was delivered. The newborn had SARS-CoV-2 RT-PCR testing on the first, second, third, fourth day after birth, and all the results were negative. Finally, both mother and her offspring were discharged uneventfully and the last follow-up (20 July 2021) was total free of symptoms and recovered completely of mother.

Discussion

We report a pregnant woman with SARS-CoV-2 infection during the third trimester, who was recovered from the illness completely. The initial symptoms were mild, which are in agreement with literature review to show that most mothers with SARS-CoV-2 infection are often asymptomatic or present mild symptoms if they have symptoms [1,5–7]. The former is supported by epidemiology to show nearly three quarters of pregnant women with laboratory-confirmed SARS-CoV-2 infection are free of symptoms and only less than one quarter pregnant women with COVID-19 have various symptoms or signs [5–7]. The common symptoms of pregnant women with COVID-19 are similar to non-pregnant women, including cough, fever, headache, myalgia, and fatigues [1,5–7]. Our patient initially had mild symptoms, including cough, sore throat, and rhinorrhea, although chest X film has demonstrated increased lung markings and infiltrates at hospitalization and oxygen saturation was 95 % at room air.

Laboratory data in the current patient were relatively normal, except the patient had lymphopenia. Lymphopenia is the most common laboratory finding in laboratory manifestations of patients with COVID-19 [3]. Other laboratory findings, including prolonged prothrombin time and elevated lactate dehydrogenase (LDH), were absent in this patient, although this part is important, based on its high association with thromboembolism risk. COVID-19 associated coagulopathy (CAC), an evolving entity that encompasses changes of laboratory coagulation, thrombosis and bleeding and leads to endothelial and platelet activation akin to what is observed in disseminated intravascular coagulation (DIC), and DIC-related mortality may be exacerbated in the pregnant women, who are already stayed in a hypercoagulable state with increased thrombin, circulating coagulation and fibrinolytic factors (plasmin), and increased intravascular inflammation and subsequent endothelial damage [1]. The pregnant women with COVID-19 have a four-fold increase of venous thromboembolism risk than age-matched controls do [1]. Therefore, it is reasonably believed that our patient may also stay in a high risk of thromboembolism. Although consensus recommends that thromboprophylaxis is needed in pregnant women with laboratory-confirmed SARS-CoV-2 infection [8], there is significant variability in physicians prescribing of anticoagulation in COVID-19 pregnancy in a real-world clinical practice [9]. In our experience and domestic data in Taiwan (unpublished), we did not learn any information that these pregnant women with COVID-19 have been treated with any anti-coagulant agents.

Additionally, the risk of severe diseases in pregnant women with COVID-19 is dramatically increased compared with nonpregnant women and/or pregnant women without COVID-19 [1]. Those pregnant women with COVID-19 have a higher risk of intensive care unit (ICU) admission, the need of invasive ventilation and extracorporeal membrane oxygenation (ECMO) use than those pregnant women without or non-pregnant women with COVID-19 [1]. The risk is persistently present, regardless of presence or absence of symptoms in pregnant women with COVID-19 [1]. That is why even
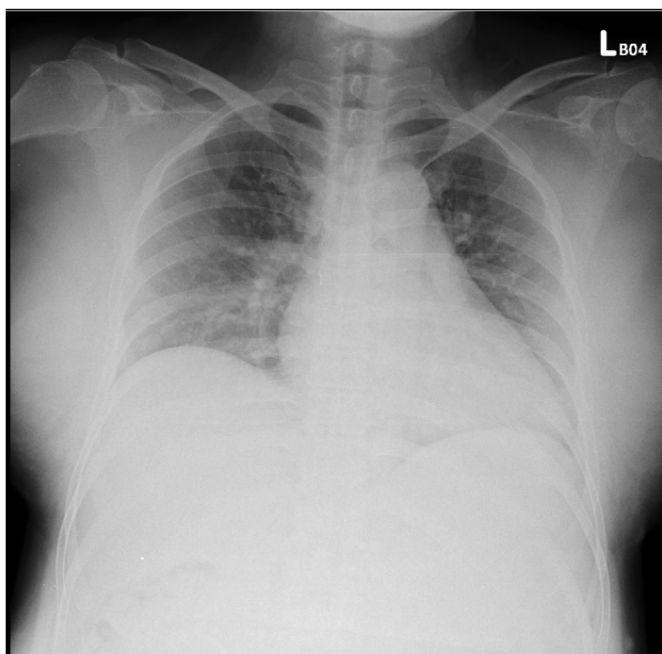
though the initial symptoms or signs of our patient were mild, she still needed hospitalization for care.

Besides the above concerns of an increasing risk of severe disease of pregnant women with COVID-19, this pregnant woman have many risk factors, in which any of them was associated with further increased untoward outcomes. Our patient was 43 years of age, classified as advanced maternal age (maternal age ≥35 years), and had body mass index (BMI) 34.2 kg/m^2 (BMI ≥30 kg/m^2), defined as obesity, and GDM, defined as presence of co-morbidity, and all of them are strongly associated with adverse pregnancy outcomes [1,5,10]. Furthermore, compared to white race, Asia pregnant women with COVID-19 had a statistically and clinically meaningful worse pregnancy outcomes [1].

The spectrum of infection severity of hospitalized patients with COVID-19 can be classified as (1) level I: not require supplemental oxygen, (2) level II: require supplemental oxygen, (3) level III: require oxygen delivery through a high-flow device or noninvasive ventilation, (4) and level IV: require intermittent mandatory ventilation (IMV) or extracorporeal membrane oxygenation (ECMO) [11]. Managements of COVID-19 patients should be based on the severity of illness, regardless of pregnancy or non-pregnancy. Initially, our patient presented as mild symptoms, we followed the recommendation by National Institutes of Health (NIH) in Unites States (US) to provide supportive care with close monitoring for clinical worsening for patients who do not need oxygen supplement [11]. However, the clinical course was downhill dramatically and progressed rapidly in our patient. Supplemental oxygen support is needed.

Based on severity of disease progressing to level II in this patient, the use of dexamethasone for 10 days and considering remdesivir was recommended for patient needing supplemental oxygen by NIH [11]. The application of glucocorticoid is based on the Randomized Evaluation of COVID-19 Therapy (RECOVERY) trial [12]. It is worth mentioning that RECOVERY trial included pregnant women [12]. Regarding to the choice of glucocorticoids, dexamethasone will cross the placenta while prednisolone and hydrocortisone will not. In the corticosteroid regimen of pregnant women in RECOVERY trial, prednisolone 40 mg by mouth daily, or hydrocortisone 80 mg, intravenous injection twice daily were used rather than dexamethasone. In pregnant woman who have a risk of preterm birth, and meet criteria for the use of corticosteroid, 6 mg of dexamethasone given by intramuscular injection in every 12 h for two days is a better choice, not only being active for the therapy of symptomatic pregnant women but also offering the benefits of enhancing lung maturity. However, it is important that, in the following eight days, prednisolone or hydrocortisone were still recommended to give these pregnant women with COVID-19. The side effect of the patients during and after glucocorticoid treatment should be monitored for hyperglycemia and the risk of infection, since the pregnant women are vulnerable to glucose intolerance and attacks by infection.

Since the current status of the patient was at near term, the lung maturity of fetus is not a concern; therefore, this patient has been treated with a 10-day course of daily 40 mg prednisolone. It is lucky for the patient whose disease had been stopped at level II and recovered completely.

If the more severe status was progressed, the recommendation by NIH is shown below. For patients who need high-flow oxygen or noninvasive ventilator, besides dexamethasone and remdesivir, baricitinib or tocilizumab can be considered [11]. In patients who requiring IMV or ECMO, only dexamethasone is suggested [11]. If the patient who are within 24 h of admission to the ICU, tocilizumab may be added [11]. Remdesivir, an adenosine analog and the only Food and Drug Administration-approved drug for the treatment of COVID-19 currently, inhibits viral replication by a way of binding to the RNA-dependent RNA polymerase of coronavirus [13,14]. The Adaptive Covid-19 Treatment Trial (ACTT-1) conducted by National Institutes of Health (NIH), reported promising results with a statistically significantly shortening the time to receiver in adults who were hospitalized with COVID-19 and had evidence of lower respiratory tract infection [15]. Unfortunately, the ACTT-1 trial did not enroll pregnant women for evaluation, although evidence shows that inclusion of pregnant women in COVID-19 clinical trials would allow evaluation of effective therapies to improve maternal health, pregnancy and birth outcomes, and of most importance, to avoid any delay of the development of new treatment recommendations for pregnant women [16]. So far, a relatively large number of experience in using Remdesivir (86 pregnant women), revealed the high recovery rates and a low incidence of serious adverse events [15]. As echoing recent evidence [16], the authors also recommended that inclusion of pregnant women in future remdesivir clinical trials is essential to better characterize pharmacokinetics, safety, and efficacy of remdesivir use in pregnancy as well as pregnancy and birth outcomes in this understudied population vulnerable to infectious disease pandemics [1,17]. Moreover, there is insufficient evidence toward the safety of using baricitinib or tocilizumab during pregnancy [11].

Besides maternal health, fetal health should be taken into consideration in pregnant women with COVID-19. The methods of fetal evaluation are simple by measuring fetal movement by patients themselves, or the use of other instruments or machines to provide a service, including CTG, periodic doppler fetal heart rate monitoring, non-stress testing (NST), and ultrasound evaluation [14,18−21]. The proper method of assessment and frequency depend on gestational age, the severity of the disease, whether there are other comorbidities or obstetric complications, and the equipment available in different medical institutions; however, all are still a challenge for clinicians to provide appropriate fetal assessment and follow the infection control policies. In the current case, this pregnant woman used the following strategies, including maternal awareness of fetal movement, daily ultrasound and 24-h CTG to monitor the wellbeing of the fetus with success.

Furthermore, the last challenge for the pregnant women with COVID-19 is the determination of time for delivery. Timing of delivery can be dependent on gestational age, maternal condition and fetal condition. For patients with COVID-19 infection in the first or second trimester who recover, the timing of delivery is the same as not infected women [22]. For individuals with suspected or confirmed COVID-19 in the third trimester who recover, American College of Obstetricians and Gynecologists (ACOG) suggest delaying delivery until isolation status is lifted or a negative testing result of COVID-19 is obtained [23]. If the patient has severe illness, the timing of delivery should be individualized to maximize benefits of maternal and neonatal outcome. Regarding the mode of delivery, COVID-19 infection only is not an indication to cesarean delivery, despite severe illness or other obstetric indications [1,23,24]. The rationale is that cesarean delivery cannot lower the risk of vertical transmission [24]. Choice of anesthesia of cesarean delivery is based on the condition of patient (oxygen saturation). Regional anesthesia is considered in women with oxygen saturation ≥94 % to avoid aerosol-generating procedure. If the individual has unstable vital signs, general anesthesia needs to be applied [25]. However, decisions should be individualized based on risk of patient and resources of health facilities [26].

This case report demonstrates our experience in the management of pregnant woman with COVID-19, and the subsequent management of delivery. These individuals should be managed by expert teams in a multidisciplinary hospital. Further research is necessary to understand this ongoing spreading disease.

Acknowledgments

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