HIV and SARS-CoV-2 Coinfection in Pregnancy: Case Report

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ABSTRACT

The ongoing outbreak of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection has been associated with worse outcomes in several populations, including those with co-morbidities. Pregnant women are one such group of individuals that may be at increased risk of infection related to physiologic changes in metabolic and maternal immune system changes in normal pregnancy. This risk may increase with underlying immunocompromised states such as in people living with HIV (PLWH). However, there is currently limited data on pregnant women with coronavirus disease (COVID-19) and HIV. In this paper, a case of pregnant women infected with COVID-19 and HIV co-infection is reported.

Keywords: Immunocompromised, pregnant, SARS-CoV-2.

I. INTRODUCTION

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is an enveloped β-coronavirus coated by spike (S) glycoprotein that contains the receptor binding domain of angiotensin-converting enzyme 2 (ACE 2) which is upregulated during pregnancy. The profound physiological, metabolic and maternal immune changes may affect the pathogenesis or exacerbate the clinical presentation of COVID-19. Cough and fever are present in about 40% of symptomatic pregnant women, with lymphopenia and elevated C-reactive protein being the most laboratory finding. Pregnancy is associated with a higher risk of severe infection including pneumonia, admission to the intensive care unit and death [1], [2].

The WHO reports that people living with HIV (PLWH) who are not taking antiretroviral treatment (ART) and have a low CD4 cell count, particularly with advanced HIV are at increased risk of opportunistic infection, however, there is conflicting evidence on whether people with HIV have an increased risk of SARS-CoV-2 infection [3]. There is currently no well-established study about the clinical manifestation of COVID-19 in pregnant women with HIV. Here, we report a case of a pregnant woman with HIV and SARS-CoV-2 co-infection [4], [5].

II. CASE PRESENTATION

A 35 year old Balinese G2P1000, with known HIV presented at 38 weeks and 1 day gestation to the Labor and Delivery unit with labor pain. She reported no fever, cough, sore throat or loss of smell, her SARS-CoV-2 PCR testing was positive. She was HIV positive since 2015 and on an ARV regimen of tenofovir-lamivudine-efavirenz with viral load was undetectable and CD4 T-cell count was 319 cell/μL. The patient had an uncomplicated abdominal delivery of a male infant whose birth weight was 2950 grams, the APGAR score was 8 and 9. The infant had no symptoms and was negative for SARS-CoV-2. She was retested on the day 10th with PCR SARS-CoV-2 was negative and was discharged from the hospital.
III. DISCUSSION

Pregnant women are at increased risk of severe SARS-CoV-2 infection compared to non-pregnant women due to physiologic changes including increased heart rate, oxygen consumption, reduced lung capacity and a shifting cell-mediated immunity. Although numerous studies have been done, the impact of SARS-CoV-2 infection on maternal and perinatal outcomes remains conflicting especially coinfected with HIV [1], [2].

SARS-CoV-2 infection trigger local immune responses, recruiting macrophages and monocytes that respond to the infection, release cytokines and prime adaptive T and B cell. Both T and B cell responses are detected around 1 week after the onset of infection [6]. CD4 T cells will be mediating protective humoral immunity by stimulating B cells to produce virus-specific antibodies, whereas CD8 T cells directly attack and kill virus-infected cells. CD4 T lymphocyte count dynamic during mild and severe COVID-19 [6], [7]. Both CD4 and CD8 T cell counts are reduced in moderate-severe infection [8]. Moreover decreased numbers of effector memory T Cells and Treg cells are responsible for immune response homeostasis by suppressing activation and proinflammatory function that was very low in severe COVID-19 infection. In addition increasing programmed cell death-1 (PD-1), HLA-DR, CD25, and CD38 induced T cell dysfunction and correlated with disease progression. Both HIV and SARS-CoV-2 have distinct virological characteristics but share CD4 T cell lymphopenia. HIV infection is characterized by the continued decline of CD4 T-cells, which are associated with the development of AIDS [9]. Antiretroviral therapy rapidly suppress replication and recover CD4 T cell, however, PLWH still presents persistent immune activation and inflammation combined with exhausted and senescent T cell. The expressions of CD38 and HLA-DR, as well as PD-1, are biomarkers of activated T cells that contribute to T cell senescent in HIV. These exhaustion and T cell senescent lead to slower clearance of the virus from the host and promote disease progression [8], [9].

Despite ART and immune reconstitution, substantial inflammation and immune dysregulation still occur in PLWH. Elevation of INF-α, IFN-γ, monocyte chemoattractant protein (MCP-1), soluble IL-2, IL-6 and IL-8 was seen in the chronic stage. Similarly, in COVID-19 elevation of inflammatory cytokines such as TNF-α, INF-γ, IL-2R, IL-6, IL-8 and IL-10 were detected [9], [10]. This may lead to further accumulation of proinflammatory cytokines circulates resulting in cytokine storm and leading to multi-organ damage. The profound inflammatory response will induce a coagulation cascade to promote a hypercoagulable state of “thromboinflammation”. Since pregnancy itself carries an increased risk of thrombosis, thromboprophylaxis is an important consideration in the management of pregnant women with SARS-CoV-2 infection [2], [8], [9].

According to a recent analysis of COVID Cohort Collaborative (N3C) data, among people with HIV the risk for poor COVID-19 outcomes is much higher among those with lower CD4 cell counts (<200 cell/μL) and no association between viral suppression and disease severity or mortality [11]. The COVID-19 Treatment Guidelines Panel recommends using the same approach to management and advising of COVID-19 in people with HIV the same as those for the general population and the ARV regimen should not be switched or adjusted to prevent or treat SARS-CoV-2 [12]. To date multiple studies outlining the management of COVID-19 disease during pregnancy have been released. But there have been a few reports regarding the outcomes of mothers co-infected with SARS-CoV-2 and HIV [13]. A study in South Africa reported that pregnant women were associated with severe illness and a significant risk of maternal death in women with high-risk pregnancies including HIV. Cough, dyspnea and fever are the most common symptoms in pregnant women with HIV infection, most women receive ART with CD4 cell count >200 cells/μL and suppressed HIV RNA. The outcomes of COVID-19 in pregnant women and their infants did not appear to differ by maternal HIV status [14].

IV. CONCLUSION

In conclusion, both HIV and HIV infection share CD4 T cell loss that is associated with disease outcomes and immunodeficiency. ART treatment with CD4 cell count >200 cell/μL and undetectable viral load may play role in the outcomes of COVID-19 infection during pregnancy. There is still limited guidelines management of COVID-19 with HIV, especially in pregnant women.

CONFLICT OF INTEREST

Authors declare that they do not have any conflict of interest.

REFERENCES

