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Author Affiliation:

¹Post Graduate Resident, Department of Obstetrics and Gynaecology, Jawaharlal Nehru medical college, Datta Meghe Institute of Medical Sciences (Deemed to be University), Wardha, Maharashtra, India

²Professor, Department of Obstetrics and Gynaecology, Jawaharlal Nehru medical college, Datta Meghe Institute of Medical Sciences (Deemed to be University), Wardha, Maharashtra, India

³Professor, Department of Medicine, Jawaharlal Nehru medical college, Datta Meghe Institute of Medical Sciences (Deemed to be University), Wardha, Maharashtra, India

⁴Post Graduate Resident, Department of Medicine, Jawaharlal Nehru medical college, Datta Meghe Institute of Medical Sciences (Deemed to be University), Wardha, Maharashtra, India

Corresponding author

Professor, Department of Obstetrics and Gynaecology, Jawaharlal Nehru medical college, Datta Meghe Institute of Medical Sciences (Deemed to be University), Wardha, Maharashtra, India

Email: drarpitajaiswal@gmail.com

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Post natal covid-19 induced severe acute respiratory distress syndrome managed with monoclonal antibody and prone ventilation

Dhruva Halani¹, Arpita Jaiswal²✉, Sunil Kumar³, Dhruv Talwar⁴, Sparsh Madaan¹

ABSTRACT

A 28 year old female who primigravida presented with high grade fever and breathlessness since one day with a saturation of 70 percent on room air. She required an urgent Cesarean section. She later tested positive for COVID-19. HRCT Chest showed extensive bilateral ground glass opacity with a CT Severity Score of 23/25 and CORAD 6. In view of raised inflammatory markers was managed with Monoclonal Antibody against Interleukin 6 and Prone Ventilation along with other supportive measures. The patient ultimately recovered thus showcasing the miracle of early administration of monoclonal antibody and the effect of prone ventilation in a case of severe acute respiratory distress syndrome seen in Post Natal Period thus preventing maternal mortality.

Keywords: COVID-19, Monoclonal antibody, prone ventilation

1. INTRODUCTION

Ever since its spread worldwide, Severe Acute Respiratory Syndrome Coronavirus 2(SARS CoV 2) has caused a profound increase in morbidity and mortality. One sub population which is particularly at risk is the pregnant and postnatal women with increased perinatal complications and risk of mortality due to COVID-19 in this period. The presentation of COVID-19 in pregnancy can range from mild cough to acute breathlessness. Studies show that predominantly third trimester had the greatest risk of COVID-19 induced complications requiring admission in health care facilities due to respiratory compromise. Complications in the third trimester due to COVID-19 are particularly challenging as they have a threat of maternal and fetal demise. Cardiomyopathy, respiratory compromise as well as thrombosis can be witnessed in the third trimester as a presentation of COVID-19. Delivery through caesarian section is not routinely advised however emergency



caesarian section might be performed to prevent maternal or fetal decompensation.

Respiratory failure associated with COVID-19 is challenging to manage in a gravid patient especially in the absence of any definitive treatment for COVID-19. Some practices like prone ventilation might reduce mortality and may be practiced in the intensive care unit. Also there has been an emergence of monoclonal antibody therapy in COVID-19. Interleukin 6 is a key inflammatory marker found in cytokine storm associated with COVID-19. Cytokine storm syndrome is the postulated etiology behind severe acute lung damage witnessed in COVID-19, thus making interleukin 6 a target for therapy in COVID-19. Anti human IL6 receptor monoclonal antibody known as tocilizumab has been in use to fight the ongoing pandemic but lack of proper evidence in antenatal and postnatal period requires proper selection and utilization of monoclonal antibodies. Besides, documentation of various adverse effects seen with tocilizumab stresses on the need of careful administration of the drug. Prone Ventilation strategy is also emerging as a beneficial practice supported by international organizations to improve oxygenation in severe COVID-19 which was earlier used in severe acute respiratory distress syndrome (Guerin et al., 2013). We report a case of Primigravida who presented with acute hypoxemia and was taken for immediate emergency caesarian section and later was managed with monoclonal antibody and prone ventilation along with other supportive measures.

2. CASE REPORT

A 28 year old primigravida presented in the emergency department with high grade fever and breathlessness since one day. Her gestational age was 37 weeks with a live singleton pregnancy. There was no history of any chronic medical illness in the past and her pregnancy had been uneventful till now. Obstetric History revealed duration of marriage to be three years and two doses of tetanus toxoid was received. Menstrual history revealed last menstrual period to be 39 weeks back. On general examination her condition was poor, she was febrile with temperature of 100.7 degree Fahrenheit, pulse was 104 beats per minute regular, blood pressure was 134/88 mm of hg in right arm, spo2 was 70 percent on room air and respiratory rate was 34 breaths per minute. On systemic examination uterus was term in size and relaxed with cephalic presentation. Fetal heard sounds were present and were regular with the rate of 148 beats per minute. Pervaginum examination os was closed and uneffaced. Respiratory auscultation showed bilateral bronchial breathing in mammary and inframammary regions. Heart sounds were normal and patient was conscious and oriented. Patient was taken for emergency caesarian section and a healthy neonate weighing 3.1kgs was delivered. A nasopharyngeal swab for COVID-19 was sent which tested positive by RTPCR method. HRCT Thorax was done showing extensive bilateral ground glass opacity with CT Severity score of 23/25 and CORAD 6 (figure 1). Lab investigations showed Interleukin 6 to be raised along with other inflammatory markers (Table 1).

Patient was managed with non invasive ventilation, remdesavir, low molecular weight heparin, corticosteroids along with monoclonal antibody against interleukin 6 known case tocilizumab and other supportive measures. Prone ventilation was practiced to improve oxygen saturation (Figure 2). During the course of hospital stay patient improved clinically and was taken on high flow oxygen support on day 12 of admission which was tapered and ultimately stopped on day 24 of admission. Respiratory physiotherapy was provided (Figure 3) and patient was ultimately discharged in stable condition after 35 days of admission.

Table 1 Showing Lab investigations of the Case

CBC	Hb-10.4gm/dl MCV-90fl Platelet count-158000/dl WBC Count-8900/dl
LFT	Total Protein-6.8gm/dl, Albumin3.4gm/dl, Globulin3.4gm/dl, aspartate aminotransferase 25 units/l , alanine aminotransferase 23 units/l, AlkanlinePhophatase99IU/l, Total Bilirubin :1.3mg/
KFT	Creatinine:1.2mg/dl, Urea38mg/dl,

	Sodium 133mmol/l, Potassium -4.9mmol/l
CRP	92.0mg/dl
D-Dimer	0.94
Serum Ferritin	758ng/ml
Interleukin 6	333pg/ml



Figure 1 HRCT Showing extensive bilateral ground glass opacities



Figure 2 Prone Ventilation being practiced to increase oxygen saturation of the patient



Figure 3 Chest physiotherapy being provided to the patient

3. DISCUSSION

Our patient presented with acute respiratory failure in the third trimester which led to immediate caesarian section and was managed in post partum period by non invasive ventilation, prone ventilation and monoclonal antibody. Our patient did not require ECMO support and was discharged in stable condition only by the help of prone ventilation and monoclonal antibody supported by high pressure non invasive ventilation. Pronation could not be practiced prior to her delivery given the rapid decompensation due to respiratory compromise however it proved to be highly beneficial in post partum period to our patient. The physiology behind prone ventilation is that prone ventilation increases the ventilation perfusion matching by providing optimizing aeration of the posterior segments of the lung.

Posterior segment of lung has more volume and is more prone to collapse and atelectasis in a setting of acute respiratory distress syndrome (Crosby et al., 2020). In conditions which have extrapulmonary causes of poor compliance such as obesity or in our case pregnancy, prone ventilation has proven to be exceptionally useful. The duration of prone ventilation required in patients remains a topic for debate. We provided our patient with prone ventilation for most of the day with several hours in supine position. For the initial few days our patient was unable to tolerate supine posture due to profound hypoxemia due to extensive infiltration in bilateral lung fields. This infiltration was witnessed in HRCT Chest which showed extensive bilateral ground glass opacity a characteristic finding of COVID-19 (Jain et al., 2020). Our patient was slowly shifted to intermittent prone ventilation as extensive use of prone ventilation might result in facial edema or pressure sores.

Severe COVID-19 in post natal period is a challenging disease to manage with no definitive treatment for COVID-19 and a variety of medications available without any proper research. Remdesavir, hydroxychloroquine, steroids and convulsant plasma all have been tried during pregnancy and post partum period. We initiated our patient on monoclonal antibody in view of raised interleukin 6 levels which ultimately proved to be beneficial. Another key aspect to be noted was the timing of monoclonal antibody, early initiation of monoclonal antibody in our case helped in recovery.

We did not opt for convulsant plasma therapy as its role is documented only in less severe cases (Libster et al., 2021). Hydroxychloroquine was also not given due to its limited efficacy shown in different studies. Thus a judicious selection of treatment modality in postnatal and pregnant females with COVID-19 induced respiratory distress might help in exceptionally favourable outcomes with complete recovery seen in our case even after extensive bilateral lung parenchyma involvement and a CT

Severity score of 23/25. Low molecular weight heparin was also given in our case due to raised D-Dimer to prevent thromboembolic complications common in COVID-19 (Wanjari et al., 2020). There is profound lung injury in COVID-19 which might turn out to be difficult to triumph (Talwar et al., 2021).

Reparatory physiotherapy might appear to be trivial in Severe COVID-19 but played a vital role in recovery of our patient and helped in increasing oxygen saturation even with extensive bilateral lung involvement thereby helping in discharging the patient even without oxygen support.

4. CONCLUSION

Thus, we conclude that even through there is no definite treatment modality available for COVID-19 induced respiratory failure a mindful approach along with use of simple strategies like prone ventilation might prove to have extraordinary outcomes. Use of monoclonal antibody even though controversial proved to be beneficial in our patient when initiated on the correct time thus strengthening the postulate that timing is of utmost importance while considering the use of monoclonal antibody.

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Conflict of interest

The Authors have no conflicts of interest that are directly relevant to the content of this clinic-pathological case

Financial Resources

There are no financial resources to fund this study

Informed Consent

Informed Consent was obtained from the patient.

Author's contribution

All the authors contributed equally to the case report.

Data and materials availability

All data associated with this study are present in the paper.

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