

Successful Management of a Postpartum Mother with Severe COVID-19 Associated ARDS Complicated by Life-Threatening Respiratory Events

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Reported mortality of severe COVID-19 pneumonia-associated ARDS is high. This mortality rate increases further in obstetric patients who develop COVID-19 ARDS. We report a case of a postpartum mother who developed life-threatening events while being on respiratory support for severe COVID-19 pneumonia-associated ARDS and made a complete recovery due to the timely diagnosis and efficient interventions.

Keywords: COVID-19 pneumonia, ARDS, life-threatening respiratory complications, tension pneumothorax, pulmonary collapse

Introduction

The COVID-19 pandemic caused by SARS-CoV-2 resulted in unprecedented severe pneumonia among pregnant women.¹ Pregnant women are in a high-risk group for infectious diseases due to gestational immunological and physiological changes.² To date, only a few cases have been reported with life-threatening complications among peripartum women with COVID-19 pneumonia-associated ARDS.¹ High degree of vigilance for detection and a multidisciplinary team approach for life-saving interventions are crucial to improve outcomes.¹

Case presentation

A 30-year-old mother (P2C2) who had an uneventful delivery at 35 weeks by

emergency LSCS presented on postpartum day 3 with shortness of breath, cough, and fever with a respiratory rate (RR) of 35/min and SpO₂ of 86% on air. As Rapid Antigen Test for COVID-19 (RAT) was positive, admitted to the COVID-HDU and initially treated with high flow nasal oxygen (HFNO) 60 l/min, I.V. dexamethasone 6mg daily, therapeutic dose of S.C. enoxaparin 60 mg twice a day and I.V. antibiotics.

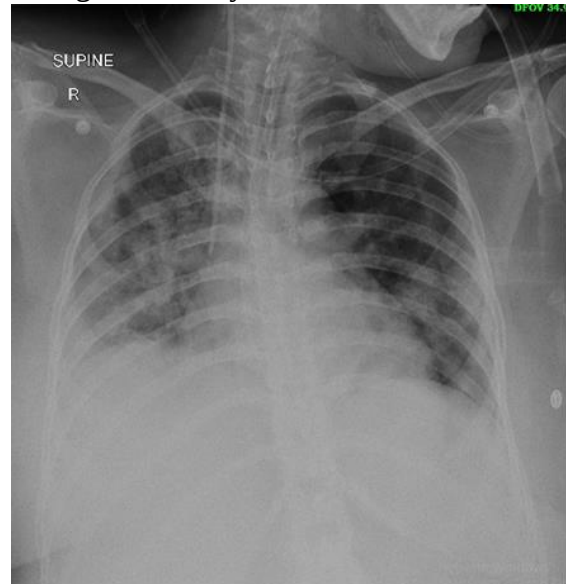


Figure 1: Chest X-ray showing severe ARDS

However, as the respiratory distress worsened with further desaturation (SpO₂

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80%), intubated and ventilated, and transferred to a COVID-ICU for specialized care. On admission, afebrile with a SpO₂ of 94% on FiO₂ 0.6. She was ventilated on pressure control mode (PC 25 PEEP10) with only 300 ml of tidal volume delivered. Chest X-ray revealed bilateral patchy opacities consistent with severe ARDS (Figure 1).

Blood pressure was maintained on a minimum dose of noradrenaline and the renal functions were satisfactory. Over the next 2 days, the requirement for ventilatory supports was further escalated due to the worsening hypoxaemia and a marked reduction of static compliance (12-ml/cmH₂O). The inflammatory markers (CRP104 mg/dl; S. Ferritin 59 ng/ml.; LDH 1819 IU/L) were high indicative of a 'cytokine storm'. In the absence of evidence for secondary sepsis (WBC 14× 10⁹/L; procalcitonin 0.04 ng/ml) the decision was taken to start I.V. methylprednisolone 500 mg daily for 3 days followed by I.V. dexamethasone 6 mg daily. Although the D-dimers were high, pulmonary embolism was excluded by the CTPA (CT score 16/25).

On day 3 in ICU, a blocked ETT was suspected in the presence of gradual failure to deliver the tidal volumes with high EtCO₂. Respiratory parameters showed a rapid improvement after changing the partially blocked ETT with thick secretions. However, the respiratory supports were escalated again (FiO₂ 1.0; PEEP 12) in the context of deteriorating saturation (P/F 55). Point of care ultrasound (POCUS) did not reveal evidence in favour of pneumothorax, pulmonary embolism or cardiac event.

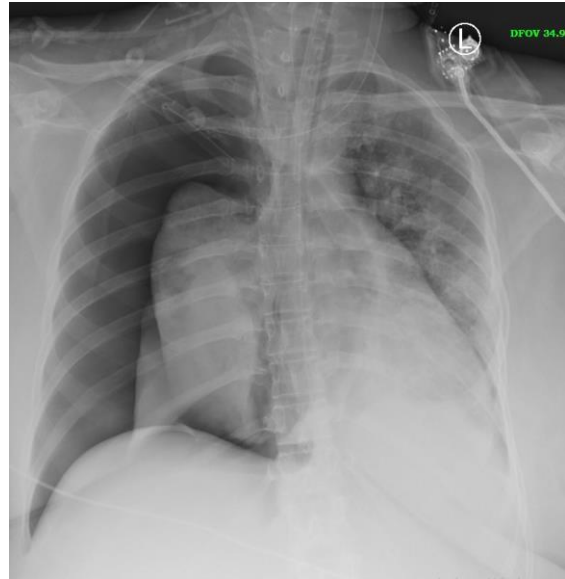


Figure 2: Chest X-ray showing right-sided tension pneumothorax

Further, pneumothorax was excluded clinically (AWP 20 cmH₂O) and radiologically (X-ray chest).

Prone ventilation was adopted with a view to improving oxygenation. Although an improvement was shown initially, the oxygenation deteriorated again with high airway pressures and a repeat X-ray chest showed a right-sided tension pneumothorax (Figure 2).

Immediately, the patient was turned supine and performed needle decompression followed by insertion of ICT with underwater seal drainage. An immediate improvement in respiratory parameters was evident and commenced weaning from respiratory supports gradually over the next few days. However, on day 5, the ventilatory requirements increased abruptly again and the HRCT showed a collapsed R/lower lobe (Figure 3).



Figure 3: HRCT showing collapsed R/lower lobe

A mucus plug was suspected and bronchoscopy assisted removal was done. Following this, a marked improvement in respiratory parameters was shown and respiratory rehabilitation continued. She was extubated on day 8 and the IC tube was removed on day 10 while on CPAP trials for alveolar recruitment. Bronchoalveolar lavage samples became positive for multi-drug resistant coliforms and acinetobacter and were treated successfully with I.V. teicoplanin and colistin respectively. She was discharged to the step-down ward on day 13 of ICU care (postpartum day 15) on 2L/min O₂.

Discussion

Pregnancy may predispose mothers to respiratory infections due to the associated physiological and immunological changes. They are at a higher risk of being infected with SARS-CoV-2 and developing complicated clinical events.³

Acute Respiratory Distress Syndrome (ARDS) is a life-threatening condition characterized by bilateral pulmonary opacities and non-cardiogenic pulmonary oedema with a P/F of < 300 mmHg

occurring or worsening within a week of the primary disease. ARDS occurs as a complication of COVID-19 pneumonia in up to 33% of cases.⁴

Supportive respiratory therapies of ARDS in pregnancy do not significantly differ from that of the nonpregnant patient, focusing primarily on lung protective ventilation through the use of low tidal volumes (4–8 mL/kg) and plateau pressures. Our patient with severe ARDS (P/F<55 mmHg) was unresponsive to standard respiratory therapies and therefore adopted prone ventilation which has shown outcome benefits⁵ with improved oxygenation among ~60% with ALI or ARDS⁶ as a result of improved ventilation-perfusion ratios. However, our patient was turned supine after a short time to immediately decompress the tension pneumothorax.

Underlying COVID-19-induced lung pathology together with the use of optimum ventilatory supports (IPPV and PEEP > 10) were likely risk factors for developing tension pneumothorax. Patients with ARDS managed on mechanical ventilation are at a higher risk for developing pulmonary barotrauma (overall incidence of 6.5%) due to the elevated transpulmonary pressures predisposing to alveolar rupture in low-compliant lungs leading to high morbidity and mortality.⁷ Gattinoni et al. reported a 48.8% incidence of pneumothorax with a mortality of 66% vs. 46% in patients with ARDS without pneumothorax.⁸ However accurate diagnosis and immediate interventions resulted in favourable outcomes for our patient.

Blocked ETT and pulmonary collapse secondary to thick mucus plugs were complications not reported previously in the

literature. However, both conditions were suspected and diagnosed early in the context of unexplained abrupt deterioration of respiratory parameters preventing adverse outcomes. Our patient-made a remarkable recovery from severe COVID-19 pneumonia-associated ARDS despite life-threatening events which complicated the course of her illness.

Conclusions

Many reported and unreported life-threatening events adversely impact the disease progression in patients with severe COVID-19 pneumonia-associated ARDS. However, patient outcomes are greatly influenced by the vigilance of healthcare workers to detect and manage complications efficiently. Early recognition and appropriate interventions of life-threatening respiratory complications helped our patient to make an uneventful recovery from severe COVID-19 pneumonia-associated ARDS.

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