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Short Communication

Acute Respiratory Distress Syndrome (Ards) In Pregnancy — A Mini-Review Article

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Abstract

Acute Respiratory Distress Syndrome (ARDS) during pregnancy is rare but associated with significant maternal and fetal morbidity and mortality. Management follows the general principles of ARDS but requires adaptations for pregnancy physiology, fetal monitoring, and delivery planning. This review synthesizes current understanding based on the 2024 Global Definition of ARDS, the Global Library of Women's Medicine (GLOWM), Critical Care in Obstetrics (Dharani K., Wiley), and Fishman's Pulmonary Diseases & Disorders, with recent evidence and guidelines [1–4].

Keywords: agenda; covid-19; police; perception; security

1.Introduction & Epidemiology

ARDS is an acute inflammatory lung injury characterized by non-cardiogenic pulmonary edema, hypoxemia, and decreased lung compliance [2]. In pregnancy, both obstetric and non-obstetric causes contribute—sepsis, pneumonia, aspiration, transfusion-related injury, pre-eclampsia, or amniotic fluid embolism [3]. Incidence estimates range from 0.05–0.3 % of pregnancies, but ARDS remains a major reason for obstetric ICU admission. Physiological changes in pregnancy—reduced functional residual capacity, increased O_2 consumption, and hypercoagulability—reduce respiratory reserve and complicate treatment [4, 5].

2. Definition — 2024 Global Definition of ARDS and its Application in Pregnancy

The 2024 Global Definition of ARDS, jointly proposed by ATS/ESICM, expands upon the Berlin 2012 definition [1]. It recognises patients on various forms of respiratory support—mechanical ventilation (MV), non-invasive ventilation (NIV), CPAP, or high-flow nasal oxygen (HFNO ≥ 30 L min^{-1})—as eligible for diagnosis.

Diagnostic criteria:

Timing: Within 1 week of a known insult or new/worsening respiratory symptoms.

Imaging: Bilateral opacities on chest X-ray, CT, or lung ultrasound not explained by effusion, collapse, or nodules.

Origin of oedema: Respiratory failure not fully explained by cardiac failure or fluid overload (supported by echocardiography).

Oxygenation:

$PaO_2/FiO_2 \leq 300$ mmHg or $SpO_2/FiO_2 \leq 315$ (if $SpO_2 \leq 97$ %), while on MV, NIV/CPAP (PEEP ≥ 5 cmH_2O) or HFNO ≥ 30 L min^{-1}.

Severity: Mild ($200 < PaO_2/FiO_2 \leq 300$), Moderate ($100 < PaO_2/FiO_2 \leq 200$), Severe ($PaO_2/FiO_2 \leq 100$).

This update supports earlier recognition of ARDS in pregnant patients who have not yet required intubation, encouraging timely intervention and use of bedside lung ultrasound as a valid diagnostic tool in obstetric units [1, 4].

3. Pathophysiology & Pregnancy-specific Considerations

Pregnancy elevates the diaphragm, reduces functional residual capacity, and induces baseline respiratory alkalosis. Oxygen consumption rises by 20–30 %, and desaturation occurs more rapidly during apnea [2, 5]. Increased cardiac output and plasma volume complicate fluid balance, while a hypercoagulable state heightens thrombotic risk—key for ECMO planning. Clinicians must balance lung protection with uteroplacental perfusion.

4. Diagnosis & Initial Assessment

Diagnosis applies the global definition criteria using imaging and oxygenation indices. Echocardiography differentiates cardiogenic from non-

cardiogenic edema. Investigations include cultures, viral PCRs, and inflammatory markers to identify underlying causes. Continuous cardiotocography is recommended for viable gestations. GLOWM underscores the importance of early obstetric–critical-care collaboration to optimise maternal–fetal outcomes [3].

5. Management Principles in Pregnancy

Management integrates supportive care, ventilatory protection, and cause-specific therapy [6–8].

Oxygenation: Maintain maternal $SpO_2 \geq 94$ % to preserve fetal oxygenation.

Fluids: Employ a conservative post-resuscitation approach to reduce pulmonary edema.

Ventilation: Use tidal volume 4–8 mL kg^{-1} PBW and plateau pressure ≤ 30 cm H_2O. Permissive hypercapnia is restricted because fetal CO_2 retention can cause acidosis [5].

Prone positioning: Increasing evidence supports prone positioning in moderate-to-severe ARDS during pregnancy when abdominal pressure is carefully off-loaded [7].

Corticosteroids: Administer for inflammatory etiologies (e.g., COVID-19) and for fetal lung maturation when preterm delivery is expected [6].

Pharmacotherapy: Choose antibiotics, antivirals, and immunomodulators considering fetal safety.

6. Extracorporeal Membrane Oxygenation (ECMO)

ECMO is the rescue option for refractory hypoxemia. The ELSO registry (2023) reports favorable maternal survival when managed in experienced centers [6]. Pregnancy-specific challenges include anticoagulation, uteroplacental perfusion, and timing of delivery. Both GLOWM and Dharani K. stress multidisciplinary planning—critical care, obstetrics, anesthesia, perfusion, and neonatology—with continuous fetal monitoring [3, 4, 6].

7. Timing of Delivery & Obstetric Considerations

Delivery decisions must be individualized. Although delivery may improve lung mechanics, it does not always improve oxygenation [3, 4]. Indications include obstetric emergencies (non-reassuring fetal status, hemorrhage) or refractory maternal hypoxemia despite maximal support. Cesarean section under critical conditions carries high risk; planned delivery should involve optimization and team readiness for ECMO backup.

8. Maternal & Fetal Outcomes

Advances in ventilatory support and ECMO have improved maternal survival, yet preterm birth and neonatal morbidity remain frequent [6, 9]. Viral pneumonia (influenza, SARS-CoV-2) remains the dominant cause in recent years. Preventive strategies—vaccination, infection control, and antenatal screening—are vital. Survivors should undergo long-term pulmonary follow-up similar to non-pregnant ARDS survivors [2, 10].

9. Evidence Gaps & Research Directions

Pregnancy-specific randomized data are lacking. Research priorities include defining optimal maternal $PaCO_2/SpO_2$ targets, evaluating proning safety by gestational age, and developing ECMO anticoagulation protocols. Prospective registries integrating maternal and neonatal outcomes are critical [4, 6].

10. Conclusion

ARDS in pregnancy demands prompt recognition and coordinated multidisciplinary management. The 2024 Global Definition enhances diagnostic inclusivity by incorporating HFNO, NIV, and SpO_2-based criteria, facilitating earlier detection in pregnant women. Lung-protective ventilation, conservative fluids, and cause-specific therapy remain central. Prone positioning and ECMO are feasible in expert hands, and individualized delivery timing is crucial. Collaboration between obstetric, critical-care, and neonatal teams is the cornerstone of improved outcomes [1–6].

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