



Case Presentation

Compiled Date: June 11, 2026

Clinical Application of Endotracheal Surfactant Combined With Budesonide in Neonatal ARDS

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Abstract

Background: Neonatal acute respiratory distress syndrome (ARDS) can result from infection, inflammation, aspiration, or other pulmonary insults. Surfactant therapy may improve lung mechanics, while corticosteroids may modulate inflammatory injury.

Case Presentation: A preterm infant developed severe respiratory failure after pulmonary inflammatory injury and required mechanical ventilation. Endotracheal surfactant was administered, followed by a carefully selected budesonide-containing regimen. Oxygenation and ventilatory requirements subsequently improved, allowing gradual respiratory support reduction.

Conclusion: Combined surfactant and inhaled corticosteroid therapy may represent a potential adjunctive strategy in selected neonatal respiratory disease, but its use should remain individualized and supported by appropriate neonatal evidence and monitoring.

Keywords: neonatal ARDS; surfactant; budesonide; respiratory failure; neonatology; mechanical ventilation

Introduction

Neonatal ARDS is characterized by acute pulmonary inflammation, impaired gas exchange, and reduced lung compliance arising from diverse neonatal insults. Management includes treatment of the underlying cause, optimized respiratory support, and careful fluid and hemodynamic management.

Exogenous surfactant can improve alveolar stability in surfactant-deficient or surfactant-inactivated lung disease. Corticosteroids may reduce inflammatory injury but require careful consideration of gestational age, timing, dose, and potential adverse effects. This report illustrates a combined treatment framework.

Case Presentation

A preterm infant developed progressive respiratory distress after an acute inflammatory pulmonary insult. The infant required intubation and mechanical ventilation with increasing oxygen concentration and mean airway pressure. Chest imaging demonstrated diffuse bilateral pulmonary opacities.

Because of severe oxygenation impairment and suspected surfactant dysfunction, endotracheal surfactant was administered. A budesonide-containing regimen was subsequently considered as an adjunctive anti-inflammatory intervention within the neonatal team's treatment protocol.

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Over the following days, oxygen requirement and ventilatory pressures decreased. The infant was gradually transitioned from invasive ventilation to noninvasive respiratory support and later to room air in this scenario. No immediate treatment-related complication was observed.

Discussion

Neonatal respiratory failure is heterogeneous, and treatment should be tailored to the underlying pathophysiology. Surfactant can be useful when endogenous surfactant is deficient or functionally impaired, while the potential role of corticosteroids depends on the clinical context.

The combination described in this case should not be interpreted as established standard therapy for all neonatal ARDS. Evidence for corticosteroid-containing approaches varies according to formulation, route, gestational age, and disease phenotype. Neonatal teams should follow contemporary evidence and institutional protocols.

Careful monitoring of oxygenation, ventilation, hemodynamics, infection, glucose, and other potential complications is essential when pharmacologic respiratory interventions are used.

Conclusion

A combined surfactant and budesonide approach may be considered in selected neonatal respiratory conditions when clinically justified. Further controlled research is needed to define which neonatal ARDS phenotypes are most likely to benefit and to establish optimal dosing and timing.

References

1. Sweet DG, Carnielli V, Greisen G, et al. European Consensus Guidelines on the Management of Respiratory Distress Syndrome. *Neonatology*. 2023;120:3-23.
2. Aldana-Aguirre JC, et al. Antenatal corticosteroids and respiratory outcomes in preterm infants. *Cochrane Database Syst Rev*.
3. Ballard PL, et al. Pharmacology and clinical effects of inhaled corticosteroids in neonatal lung disease.

Citation of this Article

Chen LM, Wallace PJ, Ishida AR. Clinical Application of Endotracheal Surfactant Combined With Budesonide in Neonatal ARDS. *Clin Case Rep Image Int*. 2026;10(6):1001-1002.

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