Georgian Scientists
ქართველი მეცნიერები
Vol. 7 Issue 4(1), 2025
https://doi.org/10.52340/gs.2025.07.04(1).03

NOVELTIES IN THE PHARMACOTHERAPY OF ACUTE RESPIRATORY DISTRESS SYNDROME

Luiza Gabunia[1], Shorena Khetsuriani[2], Gvantsa Janigashvili[3], Nodari Sulashvili[4]

1. Department of Clinical Pharmacology, Scientific Skills Center, Tbilisi State Medical University, Tbilisi, Georgia
2. Department of Microbiology, Tbilisi State Medical University, Tbilisi, Georgia
3. Department of Clinical Pharmacology, Tbilisi State Medical University, Tbilisi, Georgia
4. Department of Clinical Pharmacology, Tbilisi State Medical University, Tbilisi, Georgia

Acute respiratory distress syndrome (ARDS) is characterized by a rapid onset of hypoxemia and bilateral pulmonary infiltrates not fully explained by cardiac failure or fluid overload.

For decades, ARDS management has relied on supportive, non-pharmacological interventions to mitigate lung injury and optimize gas exchange.

Recent clinical trials have re-evaluated corticosteroid use in ARDS, showing significant mortality benefits. In the DEXA-ARDS trial, ARDS patients received dexamethasone, which reduced 60-day mortality and increased ventilator-free days. In the RECOVERY Trial large cohort, COVID-19 patients with ARDS, who received dexamethasone, reduced 28-day mortality.

JAK inhibitors (baricitinib) target the Janus kinase (JAK) pathway, crucial for cytokine signaling and immune cell activation. Oral JAK1/2 inhibitor shows promise in COVID-19 patients with ARDS, reduces inflammation, and improves clinical outcomes. IL-6 receptor antagonists (tocilizumab and sarilumab) block the IL-6 receptor, inhibiting its inflammatory effects. Target IL-6, a key pro-inflammatory cytokine, is particularly effective in patients with high inflammatory markers. Initial studies in COVID-19 ARDS showed mixed results.

Research continues into other agents targeting various inflammatory pathways: TNF-alpha inhibitors and complement inhibitors block complement system activation. These agents target different points in the inflammatory cascade still investigational for ARDS. They block specific inflammatory pathways, reduce cytokine release, protect alveolar-capillary barrier, and modulate immune cell function.

Statins reduce inflammation and improve lung function in ARDS patients. Anticoagulants prevent microvascular thrombosis and improve pulmonary perfusion. Novel endothelial barrier stabilizers reduce pulmonary edema and improve lung function. Cell-based therapies - mesenchymal stem/stromal cells (MSCs) demonstrate immunomodulatory and regenerative properties, show safety, and potential efficacy.

Personalized medicine is moving toward phenotype-guided treatment to identify patient subgroups most likely to benefit from specific therapies. It offers us moving beyond a "one-size-fits-all" approach by identifying distinct ARDS phenotypes and endotypes to tailor treatments more effectively.

Ongoing Clinical Trials involve essential validation of emerging therapies, refinement of treatment protocols, and integration of novel pharmacological agents into standard care. Understanding the complex interplay of inflammation, coagulation, and tissue repair in ARDS is important for developing more targeted and effective interventions.

Keywords: Acute Respiratory Distress Syndrome, Pharmacotherapy, Glucocorticoids, Personalized Medicine.