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Clinical Trials – Regenerative Medicine

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Abstract 12

Phase I Study of Cord Tissue Derived Mesenchymal Stromal Cells in COVID-19–Related Acute Respiratory Distress Syndrome

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Introduction: SARS-CoV-2 infection results in the COVID-19 disease that caused a global pandemic. In severe cases, COVID-19 leads to acute respiratory distress syndrome (ARDS), due to direct lung injury and hyperinflammatory response. COVID-related ARDS treatment now includes remdesivir, dexamethasone, and anti-inflammatory monoclonal antibodies, which have decreased the mortality rate, yet patients continue to die from sepsis or multiorgan failure and new treatments are needed. The use of mesenchymal stromal cells (MSC) offers a unique therapeutic option that may shorten time to lung injury resolution through anti-inflammatory, immune-modulatory, and regenerative mechanisms.

Objective: The aim of this study was to test the safety of human cord tissue-derived MSCs (hCT-MSC) in patients with COVID-related ARDS. This study was funded by The Marcus Foundation.

Methods: In this phase I multisite study, 10 adults with COVID- related ARDS were treated with 3 daily intravenous infusions of hCT-MSCs (1 million cells/kg/dose, maximum dose 100 million cells with a post thaw viability ≥70%). Patients were excluded if they had evidence of multiorgan failure, immunodeficiency, or were receiving extracorporeal membrane oxygenation or not expected to survive more than 24 hours. The primary endpoint was short-term safety of hCT-MSC infusions. The secondary endpoints included 28-day survival and changes in the Murray Lung Injury Score.

Results: From August to November 2020, 10 patients (7 females, 3 males; 2 Black, 6 White, 2 other; 3 Hispanic or Latino), with a median age of 61.5 years (range 39-97), were enrolled at 2 sites. There were no infusion-related or study-related adverse events. The average cell dose administered was 0.94 ± 0.29 cells/kg, and average cell viability was 85% ± 11%; 5 of 30 (17%) doses were less than the study dose, and 29 of 30 (97%) met the ≥70% viability criteria. There were 28 non-serious adverse events in 3 unique patients and 2 serious adverse events in 2 unique patients, which were expected and deemed unrelated to the study product. Five patients died: 3 by day 28 and 2 by day 90. All deaths were determined to be unrelated to the hCT-MSCs. The Murray Lung Injury Score did not appear to change over the 28-day study period.

Discussion: hCT-MSCs infusions are safe in patients with COVID-related ARDS. Future studies determining their efficacy are warranted.