Role of Mesenchymal Stem Cells in Treatment of Systemic illness

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Chronic systemic organ failure is an important clinical problem with significant morbidity, mortality and socioeconomic impact worldwide. Unfortunately, there is no definitive or curative treatment for most of these conditions, and the management has been predominantly confined to supportive care, which necessitates the need for novel therapies. Mesenchymal stem cell (MSC) therapy has a vast array of preclinical data and early, preliminary clinical data that suggests its potential to regenerate and restore the function of damaged tissues and organs.

To evaluate the effectiveness of MSC therapy in managing multiorgan failure, utilizing currently available literature. A review of human randomized controlled trials (RCTs) and observational studies assessing the role of MSC therapy in managing or treating organ failure.

PubMed, Cochrane Library, US National Guideline Clearinghouse, Google Scholar, and prior systematic reviews and reference lists were utilized in the literature search from 1990 through May 2020. In this lecture, studies that included embryonic stem cells, induced pluripotent stem cells, differentiated MSCs into specific lineage cells, and hematopoietic stem cells were excluded. Trials with intraorgan infiltration of MSC were also excluded.

The primary outcome evaluated the improvement in clinical assessment scores and indices of organ function. The secondary outcome assessed the safety of MSC therapy in the clinical trials.

This lecture is based on randomized control trials of MSC in humans for lung, heart, liver, kidney, musculoskeletal and COVID-19. The studies specifically assessed the effectiveness of MSC therapy in ARDS reported curative treatment, ischemic and nonischemic heart failure reported beneficial effects. Liver failure from different etiologies revealed favorable outcomes. Kidney failure showed positive results and Musculoskeletal disorders showed positive outcomes. The incidence of disease worsening or major complications was extremely rare from MSC therapy. There is a lot more animal data showing the safety and efficacy of MSC in organ failure.

Conclusions: MSC therapy seems to be promising to treat multiorgan failure. More studies are urgently needed to assess both safety and efficacy.