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ALLOGENEIC CORD-DERIVED MSC INFUSION IS SAFE AND IMPROVES METABOLIC FUNCTIONS OF UNCONTROLLED DIABETES PATIENTS

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Background: Insulin resistance causes type II diabetes mellitus (DM) and is characterized by increased serum insulin and eventually insulin depletion. The initial increased insulin state results in increase in inflammation and deranged metabolic function.

Methods: 65 patients with uncontrolled diabetes were recruited. Diet, exercise and medications were not altered unless in medical emergencies. Total 50-100 x10^6 C-MSC were infused over 1 or 2 sessions. Blood tests for glycated haemoglobin (Hba1c - marker of glycaemic control), high-sensitivity C-Reactive Protein (hs-CRP, marker of inflammation), fasting LDL cholesterol (LDL-Chol), triglyceride (TG), gamma-glutamyl transaminase and aspartate transaminase (GGT and AST, both markers of fatty liver infiltration), serum creatinine (a marker of renal dysfunction), systolic and diastolic blood pressure (SBP and DBP) were measured at baseline and 6 months. Serum total testosterone was also measured in men only.

Results: All patients tolerated the procedure well. There was significant improvement of Hba1c (7.9±2.0 vs. 7.4±1.7%; p<0.001), TChol (4.7±1.4 vs. 4.2±1.0 mmol/L; p=0.01), LDL-Chol (2.5±1.3 vs. 2.1±1.0 mmol/L; p=0.01) and creatinine (107±115 vs. 97±93 umol/L; p=0.03). In men, there was also significant improvement in total testosterone (10.3±4.8 vs. 12.3±6.0 nmol/L; p=0.03). There were trends for improvement of hs-CRP, TG, AST and DBP. The reduction is Hba1c was most significant for very poorly controlled diabetics (9.4±1.9 vs. 8.4±1.8%; p<0.001). There was a modest inverse correlation between Hba1c and total testosterone (r=-0.49, p <0.001).

Conclusions: Allogeneic C-MSC infusion is safe in diabetes patients and is associated with improvement in their metabolic functions including testosterone, cholesterol and renal function. Further study with increased number of infusions and longer observation period may be warranted to observe the sustainability of the response.