

Stem Cell Therapy for Type 1 Diabetes

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Abstract

Introduction: I invented an “Omental Pouch Stem Cell Operation” for children below 10 years and “Intrapancreatic Stem Cell Implantation” operation for Type 1 diabetes patients above 10-year age. Both the operations are reported for the first time in the medical literature.

Materials and Methods: Institutional Ethical Committee clearance taken. Last 2.5 years I treated 21 patients of Type 1 diabetes with Omental Pouch Stem Cell Operation where autologous bone marrow derived stem cells were put into an omental pouch and peritoneum. Age range was 6 month to 10 years. In the same time span 23 patients were treated with Intrapancreatic Stem Cell Implantation. 36 patients were put as control group who were treated with insulin. Age range was 10 year to 53 years. Blood sugar F/PP, Anti Gad antibody titre, Glycosylated Hb and C peptide levels were done before the therapy and thereafter at every 3 monthly intervals.

Procedure: 100-150 ml bone marrow was extracted from iliac crest and stem cells extracted by centrifuge with density gradient method. 50% stem cells were implanted in an omental pouch and remaining 50% intraperitoneally. In intrapancreatic group, all stem cells were put into pancreatic artery by femoral route.

Results: No significant side effects were noted in both groups. For Omental pouch group, at the end of 6 months, 7 patients went off insulin and are free of insulin till two year after therapy. Remaining 14 patient's insulin requirements dropped to 50 % and sugar levels dropped from 50-75 % into the normal range. Anti- GAD antibody titre dropped to about 50-75 % in 6 month indicating reversing of auto immunity. C peptide levels increased 50 % than before indicating increased endogenous insulin production. In intrapancreatic group, 15 patients went off Insulin at the end of one year. Remaining 8 patient's insulin requirements dropped to 50 % and sugar levels dropped from 50-75 % into the normal range.

Discussion: Scientists grew human stem cells in hyperglycemic environment in petri dishes and at the end of 3 months these cells transformed into pancreatic islet like cells and started producing insulin a phenomenon called plasticity. Stem cells were put into the peritoneal cavity of diabetic animals and these cells produced insulin at the end of 3 months. Stem cells given IV in diabetic animals repaired the damaged islet cells and also regenerated the islets of Langerhans. Stem cells given IV repaired the faulty signatures in T cells in an epigenetic manner and reversed autoimmunity. Above experiments are the foundation of stem cell therapy for Type 1 diabetes in humans. Peritoneal cavity has only 10% cellular immunity and Omentum has negligible immunity on its surface. Stem cells put into an omental pouch creates a new biological pancreas which is protected from auto immunity. Only 2% stem cells enter pancreas when put IV. In intrapancreatic route nearly 98% cells enter pancreas leading to much better results.

Conclusions: Stem cell therapy in type 1 diabetes is safe and effective. My centre developed world's first as well as the world's cheapest stem cell therapy costing only USD 1000 instead of USD 100000 in USA.

Keywords: Stem Cell Therapy, Type 1 Diabetes

