Editorial

Hope for Type 1 Diabetic Patients

Diabetes mellitus, a common metabolic disorder. It's number is increasing day by day, the reasons may be many, increasing overall population, increased life expectancy of a diabetic patient due to number of options in the management and cure, above all is the awareness and so the early detection of the disease. Till year 2030 the diabetic population will be doubled of the number two decades before. Due to this WHO has declared the diabetes mellitus as an epidemic, the only non-infectious condition. Most of these are type 2 diabetics. The metabolic derangement whether it is type 1 or 2 diabetes mellitus leads to secondary pathologic changes in multiple organ systems, thus causing morbidity and economic burden especially the sufferers from developing world like Pakistan. Despite adequate and appropriate management it is the leading cause of end stage renal disease, non traumatic lower limb amputations, blindness, heart attacks and brain attacks worldwide[1].

The type 1 diabetes mellitus is an autoimmune disease, accounts for 5-10 % of all cases. Condition usually affects the younger population i.e. below 20 years of age[1]. But can develop at any age including late adulthood, most commonly in childhood may manifest at puberty and progresses with age[2]. As the disease develops due to autoimmune destruction of pancreatic beta cells and so the absolute insulin deficiency. The only option is the insulin injections which makes the life of children miserable. As it is the age of livelihood, and I don't care attitude of child. So may cause frequent acute complications of Hypoglycemia and Diabetic Ketoacidosis which may be life threatening. Beside this the life time cost of management may be the barrier in certain individuals[3]. Acceleration in rates of diabetes in Pakistan is posing pressure on the economy and quality of life of people due to poor glycemic control and very high rates of complications[4].

Due to this, the people are in continuous quest of alternatives to keep the life of future generation comfortable.

Inability to control autoimmunity is the primary barrier in the development of cure for type 1 diabetes mellitus. Recent studies suggest that alterative approaches using stem cells may overcome the autoimmune component of the diseases. Diabetes patients lose the function of insulin-producing beta cells within the pancreas. Human embryonic stem cells may be grown in cell culture and stimulated to form insulin-producing cells that can be transplanted into the patient[5]. Human cord blood derived stem cells (CB-SCs) and mesenchymal stem cells have been sown to modulate immune activity in vitro[6,7].

A new method is described in Bio Med Central's open access journal BMC Medicine in January 2012, in which stem cells from cord blood were used to re-educate a diabetic's own T cells, to explain these results in to a clinically practicable remedy Dr. Yong Zhao & his team from university of Illinois at Chicago develop a new process to re-educate a patient's lymphocytes through co-culture with CB-SCs educator therapy increases the percentage of regulatory T lymphocytes in the blood of people in the treatment group, other markers of immune function, such as TGF-beta1 also improved. The improvement in autoimmune control allows the pancreatic islet beta cells to recover & restart the pancreatic function reducing the need for insulin. Stem Cell Educator therapy slowly passes lymphocytes separated from a patient's blood over immobilized cord blood stem cells (CBSC) from healthy donors. After two to three hours in the device the re-educated lymphocytes are returned to the patient. The progress of the patients was checked at 4, 12, 24 and 40 weeks after therapy. C-peptide is a protein fragment made as a by-product of insulin manufacture and can be used to determine how well beta cells are working. By 12 weeks after treatment all the patients who received the therapy had improved levels of C-peptide. This continued to improve at 24 weeks and was maintained to the end of the study. This meant that the daily dose of insulin required maintaining their blood glucose

levels could be reduced. In accordance with these results the glycated hemoglobin (HbA1C) indicator of long term glucose control also dropped for people receiving the treatment, but not the control group. Dr. Young Zhao states that this therapy is safe and a single treatment produce improvement in metabolic control & diminution in autoimmunity in moderate to severe cases of type 1 diabetes mellitus, which last for months. Further improvement may be achieved with further treatment[8]. Thus the type 1 diabetics can be cured by this mode of therapy.

This principle may be beneficial in the management of other autoimmune related diseases.

REFERENCES:

1. Maitra A. The Endocrine System. In: Kumar V, Abbas AK, Fausto N, eds. Robbins and Cotran Pathologic Basis of Disease 8th ed. Philadelphia, Pennsylvania: Elsevier Saunders; 2010. page 1132.

2. Imagawa A, Hanafusa T, Miyagawa J, Matsuzawa Y. A novel subtype of type 1 diabetes mellitus characterized by a rapid onset and an absence of diabetes-related antibodies. Osaka IDDM Study Group. N Engl J Med 2000;342:301.

3. Khuwaja AK, Khowaja LA, Cosgrove P. The economic costs of diabetes in developing countries: some concerns and recommendations. Diabetologia 2010;53:389-90.

4. Ahmed N, Jadoon SA, Khan RM, Mazahar UD, Javed M. Type 2 diabetes mellitus: how well controlled in our patients? J Ayub Med Coll 2008;20:70-2.

5. Gioviale MC, Bellavia M, Damiano G, Buscemi G. Cell Therapy in Type 1 Diabetes. J Stem Cell Res Ther 2011;2:004

6. Kang KS, Kim SW, Oh YH, et al. "A 37-year-old spinal cord-injured female patient, transplanted of multipotent stem cells from human UC blood, with improved sensory perception and mobility, both functionally and morphologically: a case study". Cytotherapy 2005;7(4):368-73.

7. Strauer BE, Schannwell CM, Brehm M. "Therapeutic potentials of stem cells in cardiac diseases". Minerva Cardioangiol 2009;57(2):249-67.

8. Zhao Y, Jiang Z, Zhao T, Ye M, Hu C, Yin z, et al. Reversal of type 1 diabetes via islet beta cell regeneration following immune modulation by cord blood-derived multipotent stem cells. BMC Medicine 2012;10:3.

Prof: Shams Uddin Shaikh
Dean Medical & Allied Sciences,
PUMHS, Nawabshah