

Continuous Glucose Monitoring Systems and the Improvement in Hypoglycemic Awareness Post-Islet Transplantation: A Single-Centre Cohort Study

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Abstract : Background: Type 1 diabetes mellitus (T1DM) is an autoimmune disorder affecting >400,000 people in the UK alone, with the global prevalence expected to double in the next decade. Islet transplant offers a minimally-invasive procedure with very low morbidity and almost no mortality, and is now as effective as whole pancreas transplant. The procedure was introduced to the UK in 2011 for patients with the most severe type 1 diabetes mellitus (T1DM) – those with unstable blood glucose, frequently occurring episodes of severe hypoglycemia and impaired awareness of hypoglycemia (IAH). Objectives: To evaluate the effectiveness of islet transplantation in improving glycemic control, reducing the burden of hypoglycemia and improving awareness of hypoglycemia through a single-centre cohort study at the Royal Infirmary of Edinburgh. Glycemic control and degree of hypoglycemic awareness will be determined and monitored pre- and post-transplantation to determine effectiveness of the procedure. Methods: A retrospective analysis of data collected over three years from the 16 patients who have undergone islet transplantation in Scotland. Glycated haemoglobin (HbA1c) was measured and continuous glucose monitoring systems (CGMS) were utilised to assess glycemic control, while Gold and Clarke score questionnaires tested IAH. Results: All patients had improved glycemic control following transplant, with optimal control seen visually at 3 months post-transplant. Glycemic control significantly improved, as illustrated by percentage time in hypoglycemia in the months following transplant ($p=0.0211$) and HbA1c ($p=0.0426$). Improved Clarke ($p=0.0034$) and Gold ($p=0.0001$) scores indicate improved glycemic awareness following transplant. Conclusion: While the small sample of islet transplant recipients at the Royal Infirmary of Edinburgh prevents definitive conclusions being drawn, it is indicated that through our retrospective, single-centre cohort study of 16 patients, islet transplant is capable of improving glycemic control, reducing the burden of hypoglycemia and IAH post-transplant. Data can be combined with similar trials at other centres to increase statistical power but from research in Edinburgh, it can be suggested that the minimally invasive procedure of islet transplantation offers selected patients with extremely unstable T1DM the incredible opportunity to regain control of their condition and improve their quality of life.

Keywords : diabetes, islet, transplant, CGMS

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