DH FUNDS ISLET CELL TRANSPLANT TREATMENT FOR TYPE 1 DIABETES

The Department of Health is supporting a groundbreaking new transplant procedure for patients with type 1 diabetes. Nerys Hairon reports on this innovative treatment.

The Department of Health has announced government funding for a new treatment for type 1 diabetes – islet cell transplantation. From April this year a specialised service for selected patients with type 1 diabetes will operate at six centres across the UK (DH, 2008). The DH will invest up to £2.34m in islet transplant services in the first year, which will increase to a maximum of £7.32m to meet the predicted annual need in the longer term.

THE NEW SERVICE

These pioneering islet cell transplants have previously been offered to 12 patients in England with funding from charities, mainly Diabetes UK. In the first year of the new government-funded service, it is expected that around 20 transplants will take place.

The six centres that will offer the specialised service are: the Oxford Radcliffe Hospitals NHS Trust; the Royal Free Hampstead NHS Trust, London; King’s College Hospital NHS Foundation Trust, London; Newcastle-upon-Tyne Hospitals NHS Foundation Trust; North Bristol NHS Trust; and Central Manchester and Manchester Children’s University Hospitals NHS Trust. The service will then expand in subsequent years in order to meet the predicted annual demand of around 80 transplants.

An integrated hub-and-spoke programme will be set up, whereby islets will be prepared in two specialised clinical laboratories for distribution to the six regional transplant centres. From April, the DH will fund these two islet isolation laboratories – one in London, jointly at King’s College Hospital and The Royal Free, and one in Oxford. The laboratories will be available 24 hours a day to receive donor pancreases and prepare islet cells for transplantation.

Each patient selected for the treatment will have had a history of recurrent hypoglycaemia or have had a kidney transplant. People receiving the treatment will be injected with insulin-producing islets, taken from a donated pancreas. Islet transplantation is a suitable alternative to whole-organ pancreas transplant as it is less invasive and can be considered for patients with cardiac disease who would be unfit for open surgery. As the treatment depends on donated pancreases, the DH stresses that it is committed to improving donor coordination services, as recommended in the recent report on increasing organ donations (DH, 2008; Organ Donation Taskforce, 2008).

THE PROCEDURE

Islets are groups of cells in the pancreas that contain the insulin-producing beta cells. These cells produce insulin as required, in order to keep blood-glucose levels stable. In people with type 1 diabetes, the beta cells are destroyed, making insulin injections necessary.

According to Diabetes UK (2008), only a small number of people with type 1 diabetes can benefit from islet transplantation. This procedure involves replacing a person’s destroyed islet cells using cells harvested from donor pancreases. The islet cells are transplanted by injection into the recipient’s liver. Typically, a transplant patient will receive islets from up to three donated pancreases. The transplanted cells produce insulin – this stabilises the diabetes and reduces the amount of insulin that needs to be administered. In some cases the transplanted cells may produce...
A procedure is carried out under local anaesthetic and does not involve major surgery. A very thin needle is used, along with X-rays, to locate the main blood vessel in the liver (the portal vein), into which the islet cells are injected. Most patients require islets from more than one donor pancreas, they will need more than one transplant procedure (Diabetes UK, 2008).

**PIONEERING TREATMENT**

Islet cell transplantation is a process that has been refined by researchers James Shapiro and Jonathan Lakey in Edmonton, Canada. They published details of highly successful improvements to the islet transplantation procedure (Shapiro et al, 2000). This study concluded that islet transplantation can result in insulin independence with excellent metabolic control when glucocorticoid-free immunosuppression is combined with the infusion of an adequate islet mass. The improvements to the procedure demonstrated in this study were quickly adopted worldwide – the particular islet transplantation procedure pioneered by these researchers is now known as the ‘Edmonton protocol’.

In the UK, Diabetes UK set up the Islet Cell Consortium, which brought together nine islet research centres from around the country. In 2002, the DH and Medical Research Council reported that the consortium’s purpose was to facilitate the development of an islet transplantation programme and, specifically, to replicate the Edmonton protocol (DH and MRC, 2002). With the help of members and supporters, Diabetes UK raised funds to pay for the first islet transplantations to be carried out in the UK according to this protocol.

**CONCLUSION**

Islet cell transplantation offers protection from hypoglycaemic events for patients with type 1 diabetes, and can sometimes allow them to be free of insulin dependence. In time this innovative treatment has the potential to help many more people with this long-term condition and it has been suggested by some experts that in the future it may lead to a ‘cure’.

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**PATIENT CASE STUDIES**

- Transplantation gave the first two patients at King’s College Hospital relief from hypoglycaemia but left them still needing small doses of insulin.
- The third patient, Richard Lane, received three transplants of islet cells in 2004–2005 and was free of insulin injections for many months. Since his transplant, he has not suffered a severe hypoglycaemic attack.

Richard went back on small doses of insulin in 2006 after a viral infection triggered his immune system into attacking the islet cells. He recently went back on insulin pump therapy.

He said: ‘The transplant made an amazing difference. Even though I’m now back on insulin, I’m only on half the amount I used to need and I feel a million times better. It’s not a cure but it’s had an amazing effect on my life.’

Source: King’s College Hospital NHS Foundation Trust (2008)