

# Pancreatic Transplant Guide

## Transplant Unit

Royal Infirmary of Edinburgh

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This is part 3 of our Transplant Guide. Part 1 covers the Edinburgh Unit and Part 2 covers kidney transplantation.

For further information, and parts 1 and 2, go to:

<http://www.edren.org> and click on Transplant Unit

## Part 3

### Pancreas Transplantation

This section is for patients with diabetes who are considering a combined kidney pancreas transplant or a pancreas only transplant. It should be read along with the sections on renal transplantation.

#### What is the pancreas and why is it transplanted?

The pancreas is an organ inside the abdomen, which consists of 2 different types of tissue with 2 separate functions. Most of the pancreas is a gland that secretes a fluid rich in digestive enzymes. This helps digestion of the food we eat. About 2-3% of the pancreas consists of 'endocrine' tissue, which is a cluster of cells (islets) that secretes small amounts of hormones into the bloodstream. The most important one amongst these hormones is insulin. The lack of insulin causes diabetes. Pancreas transplants are performed to treat diabetes.

#### Can all diabetic patients be treated by pancreas transplantation?

No. Only patients suffering from the so-called 'type I' diabetes mellitus lack insulin as a result of self-destruction of their insulin producing islets. Such patients can be given a further source of islets by pancreas transplantation. 'Type II' diabetes is much more common. In this disease the problem is not lack of insulin, but a resistance to the action of insulin on other tissues. Some patients with type II diabetes may require insulin injections later during the course of their disease. Pancreas transplantation is only suitable for patients with type I diabetes.

#### What does pancreas transplantation offer to a diabetic individual?

People with type I diabetes require lifelong treatment with regular injections of insulin (usually a few times each day). Pancreas transplantation is the only treatment for diabetes that can restore complete insulin independence and normal blood sugar levels. Patients after successful pancreas transplantation do not need insulin, have no special dietary requirements, do not need to pierce themselves regularly to check their blood sugar levels and are not at any risk of becoming hypoglycaemic.

It is also known that most of the complications of diabetes are related to blood sugar control such as:

- retinopathy leading to blindness
- nephropathy leading to kidney failure
- neuropathy which may cause foot ulcers
- digestive problems
- abnormalities of heart rhythm
- hypoglycaemic unawareness
- angiopathy and accelerated atherosclerosis

Strict and good blood sugar control in diabetic patients is associated with a delay in the onset and a reduction in the severity of complications and perhaps even prevention of some complications. Since there is no better means of blood sugar control than successful pancreas transplantation, this operation should benefit diabetic patients by preventing or helping some of the long-term complications of diabetes.

### **How certain are we that pancreas transplantation can prevent diabetic complications?**

There is still a degree of uncertainty about this. There has been no controlled clinical trial directly comparing pancreas transplantation in a group of diabetic patients with insulin treatment in another comparable group of diabetic patients. We therefore rely on indirect evidence and have no scientific proof that the presumed long-term benefits of pancreas transplantation do genuinely exist. Having said this there is a substantial amount of convincing indirect evidence about the potential influence of successful pancreas transplantation on long-term diabetic complications. We can say with a reasonable degree of confidence that successful pancreas transplantation will prevent or even reverse early changes of diabetic nephropathy such that diabetic patients will not continue to develop end stage kidney failure and require dialysis. There is also reasonably good evidence showing that successful pancreas transplantation can prevent or partially reverse diabetic neuropathy.

The clinical manifestations of neuropathy can be prevented or if they already exist can be improved with pancreas transplantation. They include:

- fullness
- vomiting
- diarrhoea
- constipation
- tingling and numbness of hands and feet
- neuropathic ulcers of the feet
- some abnormalities of the heart rhythm
- hypoglycaemic unawareness

Retinopathy is another common complication of diabetes and is a major concern for patients since it can progress to blindness if untreated. The influence of successful pancreas transplantation on the course of retinopathy is unclear. It is unlikely that pancreas transplantation will change the clinical course of retinopathy during the first 2 years after transplant. There is even some concern that during this period retinopathy might progress more rapidly. In the longer term the available evidence suggests that retinopathy does stabilize in patients with pancreas transplants compared with those who remain on insulin. It is likely that 5 years after transplantation, patients with retinopathy will be better off compared with those who remain on insulin.

The amount of benefit that one can expect from the pancreas transplant depends on when exactly the transplant is performed in the course of the disease. End stage retinopathy with blindness or significant neuropathy and vascular disease, which may have necessitated amputation, clearly represent very advanced and irreversible complications, which can not be improved by pancreas transplantation.

### **Do diabetic patients receiving pancreas transplants live longer?**

They probably do. Almost all studies have shown better long-term survival in diabetic patients who have been treated with pancreas transplantation compared with those who have been treated with insulin. It may be that younger and fitter diabetic patients receive pancreas transplants whereas older diabetics with other health problems are those who remain on insulin. Better long-term survival rates with pancreas transplantation could therefore be simply a reflection of patient selection. However more recent data in the scientific literature suggests that

pancreas transplantation does confer a genuine survival advantage to diabetic patients. This is probably related to the influence of pancreas transplantation on long-term diabetic complications. Five or 10 years after transplantation the difference in the survival prospects for patients with transplants is considerably different to those who remain on insulin.

### **Why don't we offer pancreas transplantation to all patients with type 1 diabetes?**

Mainly because it has risks. Lifelong treatment with insulin injections is still safer for most patients with type I diabetes. Even if pancreas transplantation could be made much safer, there would be the problem of shortage of organ donors to provide the number of pancreas transplants that we need to perform to meet the demand.

Transplantation of the pancreas involves a major operation. Like all surgical procedures this puts the patient at risk of complications and even a small chance of death. Recent advances in surgical techniques and other medications that are used have greatly improved the safety of the pancreas transplant operation, such that around 97-98% of patients undergoing pancreas transplants will survive. Other complications such as bleeding and infection are not rare and about 1 in 4 patients undergoing a pancreas transplant will require at least 1 more operation to deal with complications. Other risks relate to the medication that patients need to use after transplantation. Pancreas transplants like other organ transplants involve transfer of foreign tissue, which would undergo rejection in normal circumstances. It is therefore necessary to use medication to suppress the immune system in order to prevent the rejection of the transplanted organs. These medicines (immunosuppressants) have many potentially serious side effects such as increased risk of infection and even a small increase in the probability of developing cancer.

### **How successful are pancreas transplants?**

The success rate expressed as the probability of being cured of diabetes (not needing any insulin) 1 year after the transplant is around 85%. This is similar to the success rate of other organ transplants such as kidney, liver or heart transplants. In the longer-term (beyond 1 year) patients with pancreas transplants are likely to do at least as well as those with other types of organ transplants.

### **Diabetes can also cause kidney failure. Can such patients receive kidney transplants?**

Yes. In fact if a diabetic patient requires a kidney transplant in order to treat kidney failure, they can also be given a pancreas transplant at the same time. This type of double transplant (simultaneous pancreas kidney transplant) is particularly attractive since patients have already been selected for one transplant, which requires immunosuppression. With only minimal additional risk it is possible to treat diabetes as well as treating kidney failure.

### **What about diabetic patients who do not have kidney failure, can they receive pancreas transplants?**

Yes they can but this will be appropriate in only a very small proportion of diabetic patients. As discussed above, for most diabetic patients without kidney failure lifelong treatment with insulin, despite its problems and the inconvenience, is still safer than a pancreas transplant. However a small number of diabetic patients have life threatening complications of diabetes (for example hypoglycaemic unawareness). In such patients benefits of a pancreas transplant outweigh the risks, indeed a pancreas transplant can be life saving.

### **Why is the whole pancreas transplanted, when it is only the insulin producing islets that are needed?**

Good question. Insulin producing cells make up only around 2% of the pancreas gland. If these islets could be separated from the remainder of the pancreas gland they could be transplanted with a very simple procedure similar to a blood transfusion. This has been tried for many years without much success for various technical reasons. We are making progress and only in the past year or so a small number of patients have received successful islet transplants. This is obviously attractive because the surgical risks of a major operation can be avoided. However even then patients receiving islet transplants do require lifelong immunosuppressive medication with potentially serious side effects.

### **Are islet transplants going to replace pancreas transplants in the future?**

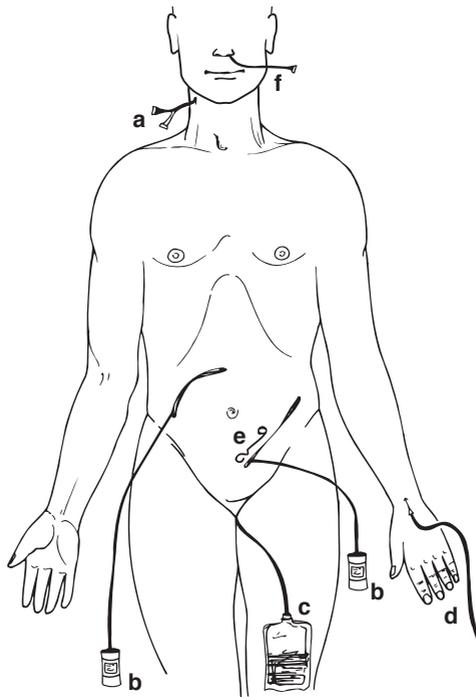
Difficult to know. Problems with islet transplantation are very difficult and it is not yet a common successful procedure. We are making some progress but at least for

the next decade the only realistic option to make diabetic patients independent of insulin will still be a pancreas transplant.

When we eventually overcome the difficulties preventing successful islet transplantation, we will still face a major shortage of islets from organ donors to meet the need of diabetic patients. Genetic manipulation of islet tissue from animal sources may provide the solution to the donor shortage. Advances in genetic engineering and our understanding of the genetic basis of diabetes will also make it possible to develop better treatments and even prevention for diabetes in the future.

### What wounds will I have for kidney/pancreas transplant operation?

The pancreas is placed on the right hand side of the lower abdomen. If you also require a kidney transplant it is placed on the left hand side.



#### KEY FOR DIAGRAM

a=central line b=drain c=urinary catheter d=drip line e=stent f=nasogastric tube

## **What tubes and drains will I have? See diagram**

In addition to the tubes and drains described on page 11 & 12 of the kidney transplant section you will have:

- a tube (drain) from the pancreas operation site
- you will also have a nasogastric tube (a tube that is passed into your stomach via your nose)

## **How long does it take to perform the operation?**

The pancreas operation can take about 4 - 6 hours to complete. Then if you require a kidney transplant it will take a further 2 hours.

## **How long will I be in hospital for?**

This depends on each individual patient and how they recover from their operation and how well the organs function. It is usually around 14 – 21 days.

## **How long will I be off work?**

In the early weeks after a transplant, there is a need to review patients at the out-patients clinic very frequently. Therefore even if all goes very well, return to work is not practical before 2 months. Most patients will be off work for about three months, some longer.

## **How do you know if the pancreas is functioning?**

If the pancreas functions well you will not need any insulin after your operation and your blood sugar will be normal.

## **Am I likely to wait longer for a pancreas compared with a kidney transplant operation?**

This is not possible to predict. There are fewer pancreas donors compared with kidney donors, but there are also far fewer patients awaiting pancreas transplants, compared with the kidney transplant waiting list.

## **How is the pancreas allocated?**

The pancreas is allocated by blood group which is similar to all other organs. However, unlike the kidney transplant on its own, tissue typing is not taken into account.

In addition to this it will not be definite that you will receive the transplant until doctors in the transplant unit assess you to ensure you are fit and well for surgery. We also do a crossmatch test between you and the donor. In most cases this test takes place in the donor hospital and we know the result before we call you. In some cases it requires to be performed when you come to the transplant unit. This allows us to tell if there is any reaction between you and the donor organ.

The surgeons will also need to examine the donor organs carefully to ensure there is no problem to prevent the transplant from going ahead.

## **What if I have a combined transplant and one organ fails?**

We will usually have to remove the organ that has ceased to function if it is doing you harm. If it is not doing you harm (although no longer functioning) we can leave it in place. At another time you may wish to be reassessed for a further transplant of the organ that is no longer functioning. The same applies for patients who have received a single transplant.