Journal of Clinical and Experimental Transplantation

Editorial Open Access

Exploring the Various Surgical and Clinical Procedures in Pancreas Transplantation

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Introduction

A pancreas transplant is a surgical procedure in which a healthy pancreas from a deceased donor is placed into a person whose pancreas no longer functions properly. The pancreas is located behind the lower part of the stomach and plays a crucial role in producing insulin, a hormone that helps regulate the absorption of sugar (glucose) into cells. When the pancreas is unable to produce enough insulin, blood sugar levels can rise to unhealthy levels, leading to type 1 diabetes. Pancreas transplants are most commonly performed to treat type 1 diabetes, offering the potential for a cure. However, this procedure is typically reserved for those with severe complications from diabetes, as the risks and side effects of the transplant can be significant. In some cases, pancreas transplants may also be considered for treating type 2 diabetes or, more rarely, pancreatic, bile duct, or other cancers. Often, pancreas transplants are performed alongside kidney transplants for individuals whose kidneys have been damaged by diabetes. While a pancreas transplant can restore normal insulin production and improve blood sugar control, it is not a standard treatment. The required antirejection medications after the transplant come with their own risks and potential serious side effects[1]. A pancreas transplant usually isn't a treatment option for people with type 2 diabetes because type 2 diabetes occurs when the body becomes resistant to insulin or unable to use it properly, rather than due to a problem with insulin production in the pancreas. But for some people with type 2 diabetes who have both low insulin resistance and low insulin production, pancreas transplant may be a treatment option. About 10 percent of all pancreas transplants are performed in people with type 2 diabetes [2].

There are several different types of pancreas transplants, including

Pancreas transplant alone

People with diabetes and early or no kidney disease may be candidates for a pancreas transplant alone (solitary pancreas transplant). A pancreas transplant surgery involves the placement of a healthy pancreas into a recipient whose pancreas is no longer functioning properly.

Combined kidney-pancreas transplant

Surgeons often may perform combined (simultaneous) kidneypancreas transplants for people with diabetes who have or are at risk of kidney failure. Most pancreas transplants are done at the same time as a kidney transplant. The goal of this approach is to give you a healthy kidney and pancreas that are unlikely to contribute to diabetes-related kidney damage in the future [3].

Pancreas-after-kidney transplant

For those facing a long wait for both a donor kidney and a donor pancreas to become available, a kidney transplant may be recommended first if a living- or deceased-donor kidney becomes available. After you recover from kidney transplant surgery, you'll receive a pancreas transplant once a donor pancreas becomes available.

Pancreatic islet cell transplant

During pancreatic islet cell transplantation, insulin-producing cells (islet cells) taken from a deceased donor's pancreas are injected into a vein that takes blood to your liver. More than one injection of transplanted islet cells may be needed. Islet cell transplantation is being studied for people with serious, progressive complications from type 1 diabetes. It may only be performed as part of a Food and Drug Administration-approved clinical trial. The pancreas is an organ about the size of a hand located in the abdomen in the vicinity of the stomach, intestines, and other organs. It lies behind the stomach and in front of the spine. The pancreas produces juices that help digest food and hormones such as insulin and glucagon that maintain optimal blood sugar levels and help the body to use and store energy from food [4]. A pancreas transplant is an organ transplant that involves implanting a healthy pancreas (one that produces insulin) into a person whose pancreas no longer can supply sufficient insulin to the body. The healthy pancreas comes from either a deceased donor or in the form of a partial pancreas from a living donor. A pancreas transplant offers a potential cure for type 1 or insulin-dependent diabetes. A successful pancreas transplant will eliminate the need for insulin injections, reduce or eliminate dietary and activity restrictions due to diabetes, and decrease or eliminate the risk of severe low blood sugar reactions. A pancreas transplant can also help manage the damage to other organs including the kidneys that may result from type 1diabetes [5]. Pancreas transplants are primarily offered to persons with type 1 with severe kidney disease or other life-threatening consequences from uncontrolled glucose levels. Type 1 diabetes is caused by a loss or malfunction of the insulin producing cells, called pancreatic beta cells. Beta cells (β cells) are a type of cell found in the pancreatic islets of the pancreas. They make up 65-80% of the cells in the islets [6].

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Received: 01-Nov-2024, Manuscript No: jcet-25-160423; **Editor assigned:** 04-Nov-2024, PreQC No: jcet-25-160423 (PQ); **Reviewed:** 18-Nov-2024, QC No: jcet-25-160423; **Revised:** 22-Nov-2024, Manuscript No: jcet-25-160423 (R); **Published:** 30-Nov-2024, DOI: 10.4172/2475-7640.1000257

Citation: Dorge R (2024) Exploring the Various Surgical and Clinical Procedures in Pancreas Transplantation. J Clin Exp Transplant 9: 257.

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