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ORIGINAL ARTICLE

Surgical complications after simultaneous pancreas–kidney transplantation: A single-center experience

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Summary *Background:* We investigated the rate of early surgical complications after simultaneous pancreas–kidney transplantation (SPKT) and their impact on both grafts and recipient survival.
Materials and methods: The retrospective analysis of typical pancreas-related complications, different methods of correction, and their efficacy were performed. Data describing pancreas transplant recipients were drawn from our SPKT waiting list.
Results: The overall surgical complications rate was 37.5%. The 1-year pancreas graft survival was 82.5% and 1-year recipient survival was 90%. Surgical complications based on the graft loss rate did not exceed 2.5%. Direct surgical complications did not account for the loss of a single patient.
Conclusion: We conclude that the high rate of surgical complications is a major obstacle to widespread application of pancreas transplantation; early recognition and appropriate treatment of graft-related complications is fundamental for graft survival.

Conflicts of interest: All contributing authors declare no conflicts of interest.

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1. Introduction

Despite a large potential recipient pool, widespread application of pancreas transplants has been hampered by substantial graft failure caused by surgical complications.[1–3] Although the islet cells account for < 2% of the overall pancreas graft mass, all surgical complications after pancreas transplants result from the remaining 98% of the tissue transplanted with the islets (i.e., vasculature, exocrine parenchyma, and, for whole organ pancreas grafts, the duodenum).[1]

Pancreas transplantation is associated with the highest complication rate of all of the routinely performed solid organ transplants.[3–6] Pancreatic grafts are susceptible to a unique set of surgical complications mostly related to exocrine secretions and the low microcirculatory blood flow of the gland.[2] Surgical complications are also relevant, because they frequently result in graft loss (i.e., from vascular graft thrombosis and intra-abdominal infection).[1,3] In contrast to other surgical complications after pancreas transplants, graft thrombosis is, with rare exceptions, irreversible. It remains the leading cause of nonimmunologic graft failure after pancreas transplantation. Intra-abdominal infections lead to high rates of graft loss and substantial mortality.[7] Post-transplant leaks still remain a significant risk factor for intra-abdominal infections.[1] Graft pancreatitis is a major risk factor for graft thrombosis and is often associated with significant peripancreatitis and infection. Although the overall impact of bleeding on graft survival is comparatively benign, it is one of the most frequent indications for a relaparotomy after pancreas transplantation.[1,8] A higher incidence of graft loss and fatal outcome has characterized a group of patients in which a revised open surgery was performed to reduce surgical complications.[3,9] Thus, surgical complications requiring and leading to a high rate of repeat laparotomies, high risk of severe complications, and fatalities are in part a limiting factor in the widespread use of this method in clinical practice.[5,10] The purposes of this study were to evaluate the incidence of early surgical complications, and to analyze their structure and impact on pancreas graft and recipient survival.

2. Methods

The data for analysis were drawn from the simultaneous pancreas–kidney transplantation (SPKT) waiting list available as of August 05, 2014. From January 2008 to June 2014, 40 patients suffering from Type I diabetes complicated with end stage renal disease underwent SPKT. The age of the patients ranged from 25 years to 51 years and averaged 35.7 ± 6.36 years. The gender distribution was as follows: 19 women (47.5%) and 21 men (52.5%). A total of 20 recipients (50%) were blood type O, 14 recipients (35%) were blood type A, and six recipients (15%) were blood type B. There were no AB patients observed in our research. All patients had a long history of the disease—from 4 years to 39 years (mean duration 25.2 ± 7.6 years; Table 1). All of the patients were long-term disabled and suffered from multiple diabetic complications including severe retinopathy, microangiopathy and macroangiopathy, and some patients were lower extremity amputees. This category of patients is considered to be among the most severe cases amongst the group of patients requiring dialysis. Seventeen (42.5%) patients underwent pancreatic transplantation with intra-abdominal localization and the formation of the duodenojejunal anastomosis, 23 (57.5%) patients underwent retroperitoneal pancreatic transplantation with the formation of interduodenal anastomosis. In most of the patients ($n = 31$, 77.5%), venous drainage was directed into the vena cava inferior system, whereas in nine (22.5%) patients, the intravenous anastomosis was made with the portal vein system using a standard surgical technique.

In each case, access into the abdominal cavity was gained through the standard total median laparotomy, and the transplanted organ was placed bilaterally where the kidneys occupied the left-hand side. In three cases, the pancreas was transplanted first. However, knowing that the pancreas requires extended time during the operation, in an attempt to reduce the cold ischemia time (CIT) of the kidney, the first transplanted organ in other cases was the kidney. The median depicting nephrotransplant CIT was 7 (5–8) hours, whereas the median showing pancreas transplant CIT was 9 (8–10.75) hours.

The donors' ages varied from 18 years to 45 years (mean 28.2 ± 6.36 years). The gender distribution was 36 males (90%) and four females (10%). Head injuries are a major cause of death amongst the donors ($n = 33$, 82.5%), but in seven cases, the cause of death was acute irreversible cerebrovascular dysfunction (17.5%). Human leukocyte antigen (A, B, Dr) mismatch median was 5 (3, 5.5).

2.1. Immunosuppressive therapy

Induction immunosuppressive therapy was the following: 36 patients (90%)—basiliximab, three patients (7.5%)—Thymoglobulin, and one patient (2.5%)—daclizumab. Induction tacrolimus dose was 0.1 mg/kg/d and induction cyclosporine dose was 15 mg/kg/d.

The basic maintenance immunosuppression with tacrolimus was administered in 36 patients (90%; through levels, 8–12 ng/mL), cyclosporine—in four patients (through levels, 180–200 ng/mL), but in three cases the conversion to tacrolimus has been made in the early postoperative period.

Perioperative systemic anticoagulation therapy is not the routine practice in our clinic. In cases of patients' hypercoagulability state observed via thromboelastography, we used intravenous heparin at subtherapeutic doses.

The lifetime of the transplanted pancreas was determined as the period of total insulin independence. From the standpoint of statistics, the fatal outcome with a functioning graft was considered to be graft failure.

We classified all early surgical complications following the SKPT in accordance with the Clavien–Dindo classification system. Most often (33.3%) we encountered Grade IIIa complications, then Grade I and Grade II together (23.8%), and rarely, complications classified as Grade IIIb (19.1%).

2.2. Statistical analysis

The Kolmogorov–Smirnov one-sample test has been used to characterize the received data through comparison