



# Surgical Complications Not Related to the Renal and Pancreatic Grafts After Simultaneous Kidney and Pancreas Transplantation

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## ABSTRACT

**Background.** Simultaneous pancreas and kidney transplantation (SPKTx) is the most commonly performed multiorgan transplantation procedure worldwide. Transplanted organs are the main source of complication; however, some postoperative complications are not directly related to the pancreatic or renal grafts. The goal of this study was to evaluate the prevalence, type, and severity of postoperative complications not related to transplanted kidney or pancreas among SPKTx recipients.

**Methods.** Complications unrelated to transplanted pancreas and kidneys among 112 SPKTx recipients were analyzed. The cumulative freedom from general surgical complications was assessed, and it was compared with cumulative freedom from complications related to kidney and pancreatic grafts. Severity of complications was classified according to a modified Clavien-Dindo scale.

**Results.** The general surgery complication rate was 22.2%. Cumulative freedom from general surgical complications at days 60 and 90 after transplantation was 0.89 and 0.87, respectively. Cumulative freedom from general surgical complications was comparable with cumulative freedom from complications related to kidney grafts but significantly higher than cumulative freedom from complications related to pancreatic grafts (log-rank test,  $P < .001$ ). The rates for grades of severity II, IIIa, IIIb, and IVb were 19.4%, 9.7%, 64.5%, and 6.4%, respectively. The most frequent cause of complications was intra-abdominal hematoma or abscess (25.8%).

**Conclusions.** The general surgical complication rate was comparable to the rate of complications originating from the renal grafts but significantly lower than the complication rate related to the transplanted pancreas. The incidence of general surgical complications could be defined as moderate, and the severity of this type of complication was low.

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**S**IMULTANEOUS pancreas and kidney transplantation (SPKTx) is the most commonly performed multiorgan transplantation procedure worldwide; however, the high rate of postoperative complications influence medical and economical views toward this type of transplantation [1–3]. The main source of these complications is transplanted pancreas [4,5], although some complications are unrelated to the transplanted grafts [6]. This type is described as a general surgical complication. The aim of the present study was to

evaluate the prevalence, type, and severity of general surgical postoperative complications among SPKTx recipients by using a modified Clavien-Dindo scale. A comparison between the cumulative freedom from general surgical complications

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and complications related to pancreatic and renal grafts was also performed.

**PATIENTS AND METHODS**

Postoperative complications unrelated to the transplanted kidney or pancreas were analyzed among 112 SPKTx recipients who received their grafts from February 1988 to July 2010. The indications for transplantation were end-stage renal disease and type 1 diabetes mellitus. Table 1 presents recipient characteristics. For all recipients, the transplanted kidney was placed at the left iliac fossa extraperitoneally. Vascular anastomoses were performed to the iliac vessels, with subsequent anastomosis between the end ureter to the urinary bladder. Twelve patients (19%) had porto-enteric drainage of the pancreatic graft. Twenty-five of 100 systemic-enteric drainage received a segmental pancreatic transplant with 4 anastomoses technique [7].

In 22.3% (25 of 112) of recipients, immunosuppressive therapy consisted of antithymocyte globulin, azathioprine, cyclosporine, and steroids. In 21.4% (24 of 112) of recipients, daclizumab, cyclosporine, and mycophenolate mofetil were prescribed. Antithymocyte globulin, mycophenolate mofetil, tacrolimus, and steroids were administered to 56.3% (63 of 112) of patients.

Severity of complication was classified according to the Clavien-Dindo scale adjusted for SPKTx [8,9] (Table 2). If the recipient developed >1 complication, the complication of the higher grade was used. The cumulative freedom from general surgery complications was assessed by using Kaplan-Meier analysis. In addition, we compared the cumulative freedom from general surgery complications vs cumulative freedom from complications related to renal and pancreatic grafts by using the log-rank test. Survival curves for complications related to the transplanted pancreas and kidney were created by using the same sets of data that were published previously [10,11]. All statistical analyses were performed by using STATISTICA 12 PL (StatSoft Inc, Tulsa, Okla, United States).

**RESULTS**

Among 112 SPKTx recipients, 87 (77.8%) were free from general surgical complications. Cumulative freedom from general surgical complications on days 60 and 90 after transplantation were 0.89 (standard error, 0.02) and 0.87 (standard error, 0.03), respectively. Cumulative freedom from general surgical complications was comparable to cumulative freedom from complications related to kidney grafts but significantly higher than cumulative freedom from

**Table 1. Characteristics of SPKTx Recipients**

Characteristic	Value
Sex	
Male	69 (61.6%)
Female	43 (38.4%)
Age of recipient at SPKTx, y	38 (24–59)
Duration of diabetes before transplantation, y	24 (9–44)
Duration of renal replacement therapy before transplantation, mo	14 (0–102)
Total ischemia time of transplanted pancreas, min	517 (183–860)
Total ischemia time of transplanted kidney, min	576 (165–1099)

Unless otherwise indicated, values are median (minimum–maximum).  
Abbreviation: SPKTx, simultaneous pancreas and kidney transplantation.

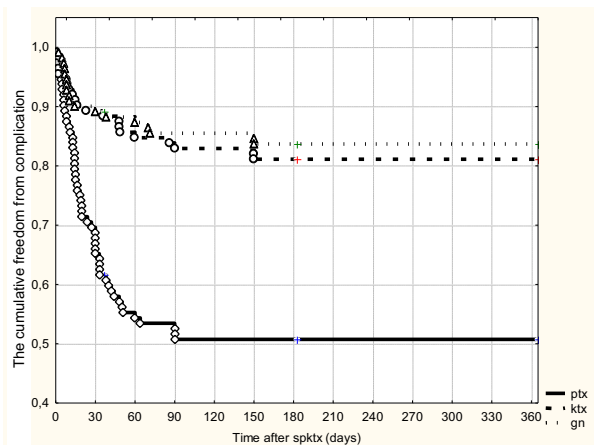
**Table 2. Modified Clavien-Dindo Scale of Complication Severity After SPKTx**

Severity of Complication	Definition
I	No complication
II	Pharmacologic treatment
III	Invasive intervention (radiologic, endoscopic, or operative)
IIIa	Invasive intervention not requiring general anesthesia
IIIb	Invasive intervention required general anesthesia
IV	Life- or graft-threatening complication
IVa	Failure of the graft
IVb	Death

Abbreviation: SPKTx, simultaneous pancreas and kidney transplantation.

complications related to pancreatic grafts (log-rank test,  $P < .001$ ; Fig 1).

In this study, 22.2% of SPKTx recipients required some interventions due to general surgical complications. The rates for grades of severity II, IIIa, IIIb, IVa, and IVb are shown in Table 3. Small interventions were required in 30.1% of complications (grades II and IIIa). Successful operation was performed in 64.5% of complications. The most common operations (grade IIIb) were relaparotomy due to hematomas or abscesses (40%), bleeding into the abdominal cavity (20%), eversions (20%), and ileus (15%). The most severe (grade IVb) complications occurred in 6.4% (2 cases) due to multiorgan failure as a result of acute necrotizing pancreatitis of the recipient’s own pancreas and fungal peritonitis caused by intestinal fistula. Function of both transplanted organs was preserved until a fatal outcome in these 2 recipients.



**Fig 1.** The cumulative freedom from complications due to pancreatic graft (ptx;  $\diamond$ , solid line) is significantly lower than the cumulative freedom from complications related to the transplanted kidney (ktx;  $\circ$ , dashed line) and general surgical complications (gn;  $\Delta$ , dotted line) ( $P < .001$ ). The majority of complications occurred within 3 months after simultaneous pancreas and kidney transplantation (spkTx).

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