



# Usefulness of Modified Dindo-Clavien Scale to Evaluate the Correlation Between the Severity of Surgical Complications and Complications Related to the Renal and Pancreatic Grafts After Simultaneous Kidney and Pancreas Transplantation

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## ABSTRACT

**Objective.** Simultaneous pancreas and kidney transplantation (spktx) is the multiorgan transplantation. Thus various complications originated from transplanted organs and the complications that are not directly related to pancreatic or renal grafts could be developed at the same recipient.

**Aim.** The aim of this study is to explore whether there is a correlation between the severity of complications originated from transplanted pancreas, transplanted kidney and general surgical complication developed at the same spktx recipient.

**Methods.** Complications which developed among 112 spktx recipients were divided into three groups: related to the pancreatic graft (PTXc), to the renal graft (KTXc) and the general surgical complication (GNc). Severity of postoperative complications using modified Dindo-Clavien scale recipients was evaluated for each group. The correlation of severity of coexisting complications from different complication groups was analyzed.

**Results.** There were 22 recipients who developed the coexistence of complication between different complication groups. Complication originated from two and three complication groups developed 15 (68.2%) and 7 (31.8%) patients, respectively. There was not found correlation of the complication severity between: KTXc and GNc group, GNc and PTXc group, KTXc and PTXc group. The correlation ( $r = 0.84$ ) of complication severity in recipients who developed concurrently complication from transplanted kidney, transplanted pancreas and general surgery complication was found.

**Conclusion.** The modified Dindo-Clavien scale is an useful methodology for the correlation description of complication severity in complex multiorgan transplantation such is spktx, especially when the complications originated from different, potentially independent from the pathophysiological point of view, sources.

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**S**IMULTANEOUS kidney and pancreas transplantation is the most common multiorgan transplantation performed in the world [1]. However, one of the serious problems limiting this kind of transplantation, for not only medical but also economic reasons, is postoperative complications [2,3]. Transplantation of kidney and whole

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pancreas with part of the duodenum to diabetic and uremic recipients receiving immunosuppressants could result in a variety of postoperative complications [4,5]. It has been shown that the main source of these complications were the transplanted pancreases [6]. However complications due to kidney grafts and complications, which are not related to transplanted grafts, defined as general surgical complications could also happen [7,8]. Furthermore, the complications from different transplanted organs could occur in one recipient. Thus, the aim of this study is to explore, using modified Dindo–Clavien scale, whether there is a correlation between the severity of complications originated from transplanted pancreas, transplanted kidney and general surgical complications developed in the same spktx recipient.

## MATERIALS AND METHODS

Postoperative complications due to pancreatic and renal grafts and general surgical complications (not related to transplanted kidney or pancreas) among 112 spktx recipients who received their grafts from February 1988 to July 2010, were analyzed. Indications for transplantation were end-stage renal disease and diabetes type 1. The 43 (38.4%) were women and 69 (61.1%) patients man. The median age of recipients was 34 (24–59). The mean duration of diabetes and renal replacement therapy before transplantation were 24 (9–44) years and 14 (0–102) months, respectively. For all recipients transplanted kidneys were placed at left iliac fossa extraperitoneally. Vascular anastomoses were performed to the iliac vessels with subsequent anastomosis between the end ureter to urinary bladder. Twelve patients (19%) had porto-enteric drainage of pancreatic graft. Twenty-five out of 100 systemic-enteric drainage received segmental pancreatic transplant with four anastomoses technique [9]. In 25 (22.3%) recipients immunosuppression consisted of ATG, azothiopyrine, cyclosporine, and steroids. In 21.4% (24/112) recipients daclizimab, cyclosporine, mycophenolate mofetil were prescribed. ATG, mycophenolate mofetil, tacrolimus and steroids were administrated to 56.3% (63/112) patients.

Complications which developed spktx recipients were divided into three groups: related to the pancreatic graft (PTXc), to the renal graft (KTXc) and the general surgical complication (GNc).

**Table 1. Modified Dindo and Clavien Scale of Complication Severity After Simultaneous Pancreas and Kidney Transplantation**

Severity of Complication	Definition
I	No complication
II	Pharmacological treatment
III	Invasive intervention (radiological, endoscopic, operative)
IIIA	Invasive intervention not required general anesthesia
IIIB	Invasive intervention required general anesthesia
IV	Life or graft threatening complication
IVA	Failure of the graft
IVB	Death

Abbreviation: g, requirement of graft removal.

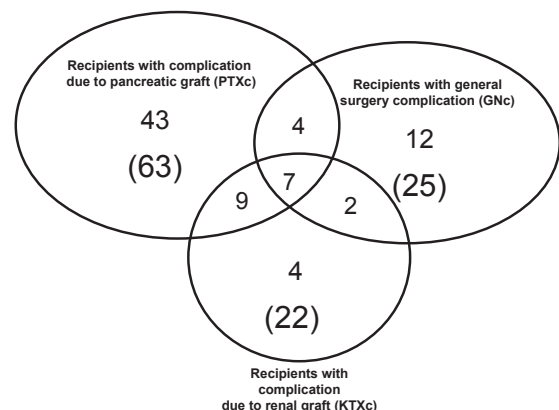
**Table 2. The Grade of the Complication Severity According to the Modified Dindo–Clavien Severity Scale in Relation to the Source of Complication**

Grade of the Complication Severity	Spktx recipients (n = 112) no (%)		
	Complications Due to Pancreatic Graft (Group PTXc)	Complications Due to Kidney Graft (Group KTXc)	General Surgical Complications (Group GNc)
I	49 (44.6%)	90 (80.3%)	87 (77.8%)
II	7 (6.25%)	7 (6.2%)	4 (3.6%)
IIIA	3 (2.6%)	1 (0.9%)	0
IIIB	10 (8.9%)	6 (5.4%)	19 (16.9%)
IVA/IVA (g)	29 [1 (0.9%)/28 (25%)]	6 [0/6] (5.4%)	0
IVB/IVB (g)	14 [3 (2.6%)/11 (9.8%)]	2 [1/1] (1.8%)	2 (1.7%)

Severity of complications for each group was classified according to Dindo–Clavien scale adjusted for spktx transplant (Table 1) [10,11]. If the recipient developed more than one complication originated from the same complication group, the complication of the higher grade was noted. The correlation of severity of coexisting complications from different complication groups was analyzed using STATISTICA 12 PL.

## RESULTS

Complications related to transplanted pancreas, transplanted kidney and general surgery complications developed 63 (57.3%), 22 (20%) and 25 (22.7%) recipients, respectively. The grade of the complication severity according to the modified Dindo–Clavien severity scale in relation to the complications for group PTXc, KTXc and GNc was shown in Table 2. There were 22 recipients who developed the coexistence of complications between different complication groups. Complication originated from two and three complication groups developed 15 (68.2%) and 7 (31.8%) patients, respectively. The coexistences of complications between KTXc, PTXc and GNc group were shown in Fig 1. There was not found correlation of the complication severity between: KTXc and GNc group, GNc and PTXc group, KTXc and PTXc group



**Fig 1.** The complications coexistences between KTXc (n = 22), PTXc (n = 63) and GNc (n = 25) group.

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