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Original Article

Acute macular edema and peripapillary soft exudate after pancreas transplantation with accelerated progression of diabetic retinopathy

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Abstract

Background: The effect of pancreas transplantation on diabetic retinopathy remains inconclusive. Herein, we report six patients with type 1 diabetes mellitus (DM) who underwent pancreas transplantation and developed acute macular edema and peripapillary soft exudate with rapid progression to proliferative diabetic retinopathy.

Methods: In this retrospective observational study, diabetic patients who underwent pancreas transplantation in a single medical center and developed symptomatic acute macular edema and peripapillary soft exudate within 3 months after the operation were enrolled. The complete ophthalmic course and medical records of the patients were retrospectively reviewed. Diabetic retinopathy and progression following treatment after pancreas transplantation were measured.

Results: Six Chinese women with type 1 DM were enrolled in this study. Mean hemoglobin (Hb) A1c was 13.4% prior to transplantation and decreased rapidly to 6.5% within 2 months postsurgery. The patients had no or mild pretransplant diabetic retinopathy and developed acute symptomatic macular edema and peripapillary soft exudate in both eyes after pancreas transplantation. All macular edema resolved either with or without treatment. Five cases progressed to proliferative diabetic retinopathy and received panretinal photocoagulation. Diabetic retinopathy remained stable in all eyes after treatment, and the visual prognosis was good, except in one eye that had macular branch retinal artery occlusion with foveal involvement.

Conclusion: Acute macular edema after pancreas transplantation has a favorable treatment outcome despite rapid progression to proliferative diabetic retinopathy. High pretransplant HbA1c and abrupt blood sugar normalization may be related to the disease course.

Keywords: diabetic retinopathy; hemoglobin A1c; macular edema; pancreas transplantation; soft exudate

1. Introduction

Pancreas transplantation is a potentially curative treatment to establish physiological normoglycemia in diabetic patients, particularly those with type 1 diabetic mellitus (DM).[1] Simultaneous pancreas and kidney transplantation (SPK) is the treatment of choice for diabetic patients with end-stage renal failure.[1] Pancreas transplantation is also performed

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after kidney transplantation to improve kidney survival and restore normoglycemia. With improvements in surgical techniques and immunosuppressive regimens, pancreas transplantation alone (PTA) is increasingly being performed in DM patients without advanced nephropathy.[2] It has been suggested that apart from achieving insulin-free euglycemia to improve quality and longevity of life, PTA before extensive microangiopathy may ameliorate or reverse diabetes-related complications.[3] According to the International Pancreas Transplant Registry, the number of SPK surgeries has remained stable since 1995, but the number of solitary pancreas transplants, including PTA, has quadrupled over the same period.[4]

The effect of pancreas transplantation on diabetic retinopathy remains inconclusive. Some studies have shown diabetic retinopathy improvement or stabilization after pancreas transplantation,[5,6] while others revealed no benefit or even reported disease progression.[7,8] It has been suggested that the pretransplant diabetic retinopathy status may be related to the progression of diabetic retinopathy after pancreas transplantation.[9–12] Other factors, such as pretransplant hemoglobin (Hb) A1c levels and DM duration may also affect the clinical course of diabetic retinopathy. In this study, we report a series of patients with no or mild nonproliferative diabetic retinopathy (NPDR) who underwent PTA and developed acute macular edema and peripapillary soft exudate within a few weeks, and progressed rapidly to proliferative diabetic retinopathy (PDR) within a few months. The complete clinical course and systemic data of these cases will be discussed to evaluate possible associated factors that may contribute to acute deterioration and progression of diabetic retinopathy after pancreas transplantation. To the best of our knowledge, this is the first case series discussing acute worsening of retinopathy after pancreas transplantation.

2. Methods

In this retrospective case series, we enrolled patients who had developed symptomatic acute macular edema and peripapillary soft exudate within 3 months after pancreas transplantation was performed in the Taipei Veterans General Hospital, Taipei, Taiwan, between September 2003 and May 2011. Six eligible patients were enrolled in the study; five patients were treated by one author (L.-I. Lau), and the other was treated by another author (A.-F. Li). Informed consent was obtained from all of the patients. Complete ophthalmic course and medical records were reviewed. This study was approved by the Institutional Review Board of the Taipei Veterans General Hospital.

3. Results

Demographic profiles of the six patients are summarized in Table 1; all patients were young Chinese women who suffered from type 1 DM. The mean duration of DM prior to transplantation was 9.8 years (range, 6–15 years). Three patients were active smokers, but no patient had elevated blood pressure before or after the transplantation. Two patients (Cases 1 and 3) had elevated cholesterol before transplantation, which normalized after PTA. PTA was indicated in all patients because of poor glycemic control with frequent life-threatening hypoglycemia or hyperglycemia with preserved renal function. Pancreas transplantation was performed with systemic venous drainage through the inferior vena cava and enteric exocrine drainage in all patients. Postoperative immunosuppressants, including mycophenolic acid (Myfortic; Novartis AG, Basel, Switzerland) or mycophenolate mofetil (Cellcept, F; Hoffman-La Roche Ltd., Basel, Switzerland), tacrolimus (Porgraf; Astellas Pharma US, Inc., Northbrook, IL, USA), and oral prednisolone, were prescribed. Prednisolone was tapered gradually within 2–3 months. Two patients showed elevated serum amylase and lipase during the early postoperative period (Cases 1 and 6). Case 1 was diagnosed with acute graft rejection and was rescued successfully using methylprednisolone and thymoglobulin therapy, while Case 6 recovered spontaneously. Case 4 had pancreas graft atrophy at 8 months after transplantation and required insulin therapy. The mean HbA1c was 13.4% (range, 10.9–16.2%) prior to transplantation and decreased rapidly to 6.5% (range, 5.5–7.4%), with an average reduction of 6.9% (range, 5.3–9.4%) within 2 months (Fig. 1).

The ophthalmic courses of all of the patients are summarized in Table 2. The average interval from transplantation to subjective visual blurring was 5.8 weeks (range, 2–10 weeks). All patients complained of misty visual blurring despite a wide range of presenting best-corrected visual acuity (BCVA) from 6/6 to 6/30. Fundus examination revealed macular edema and peripapillary soft exudate (Figs. 2A, 3A, and 4B). Fluorescein angiography (FAG) showed peripapillary arteriole

Table 1
Demographics and medical data of the patients.

Case	Age (y)/sex	Smoking	DM duration (y)	Baseline HbA1c (%)	Baseline CCr (mL/min)	Baseline/2 mo Chol (mg/dL)	Serum amylase/lipase[a] (U/L)	SBP (mmHg)	Graft rejection[b]
1	31/F	+	9	10.9	91.07	245/182	325/1019	104	+, 20 d, suppressed
2	27/F	–	15	11.2	158.67	205/164	128/237	116	+, 19 mo, suppressed
3	22/F	+	6	15.0	94.03	265/194	121/148	113	–
4	22/F	–	6	16.2	144.88	196/180	171/159	112	+, 8 mon, atrophy
5	25/F	+	14	14.0	84.11	176/147	214/295	121	–
6	23/F	–	9	13.0	73.61	157/169	562/300	110	–

CCr = creatinine clearance rate; Chol = cholesterol; DM = diabetes mellitus; F = female; HbA1c = hemoglobin A1c; SBP = systolic blood pressure.
[a] Highest serum amylase/lipase level after transplantation before acute macular edema.
[b] Time to graft rejection and its outcome.