

HOSPITAL PHYSICIAN®

ENDOCRINOLOGY BOARD REVIEW MANUAL

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The *Hospital Physician Endocrinology Board Review Manual* is a study guide for fellows and practicing physicians preparing for board examinations in endocrinology. Each manual reviews a topic essential to the current practice of endocrinology.

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Posttransplantation Diabetes Mellitus

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Posttransplantation Diabetes Mellitus

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INTRODUCTION

The proportion of organ recipients with diabetes mellitus at the time of transplantation varies widely and depends on the primary disease necessitating transplantation (**Table 1**).¹⁻⁵ For example, diabetes is the most common cause of renal failure requiring transplantation, whereas peripheral blood stem cell transplantation is usually performed in individuals with diseases unrelated to preexisting diabetes mellitus. Approximately 2% to 50% of transplant recipients develop posttransplantation diabetes mellitus (PTDM) (**Table 2**),^{3,6-14} this percentage largely depends on the type of transplant and the definition of diabetes mellitus and PTDM.

There is a general consensus that the definition for diagnoses of abnormalities of blood glucose concentrations after transplantation should be the same as the current American Diabetes Association (ADA) definitions of diabetes mellitus, impaired glucose tolerance, and impaired fasting glucose (**Table 3**).⁷ Because there is no clear definition for PTDM, this term has been used to describe patients with recognized preexisting diabetes mellitus, previously unrecognized diabetes mellitus, and new-onset diabetes after transplantation. For the purposes of this review, PTDM describes patients who develop new-onset diabetes after transplantation. However, data reported herein are derived from sources using different definitions of PTDM. Whereas the management of hyperglycemia associated with new-onset diabetes after transplantation and preexisting diabetes are managed similarly, the former does not necessarily require interval screening for complications.

Studies have shown that preexisting diabetes mellitus is associated with adverse outcomes in recipients of heart and kidney transplantations.^{1,15} In pancreas transplantation, although the purpose is to cure diabetes, there is potential risk for allograft failure leading to continuing type 1 diabetes. Diabetes may also persist or develop after pancreas transplantation in the presence of functioning allograft, possibly due to insulin resistance associated with increased weight and high-dose glucocorticoid use.⁶ PTDM is associated with compli-

cations, including risk for infection, cardiovascular events, graft failure, and death (**Table 4**).^{1,3,8-10,13,15-18} In one study, as many as 50% of patients with PTDM developed kidney graft failure within 4 years as opposed to 18% of patients without diabetes.¹⁹ Overall, the incidence of new-onset diabetes after transplantation appears to be declining.^{1,9} In addition, the associated long-term poor outcomes are also decreasing.^{1,9}

PRETRANSPLANT ASSESSMENT

- **What should be included in the pretransplant assessment?**

A careful assessment of the patient before transplantation can reduce the risk of new-onset diabetes after transplantation.⁷ The patient's glycemic status should be assessed before transplantation by measuring fasting plasma glucose concentrations; this will help differentiate between a preexisting abnormality in glucose control and new-onset diabetes after transplantation.²⁰ Patients should also be screened for risk factors for diabetes, including obesity, ethnicity predisposed to developing diabetes (eg, African American, Native American), family history of diabetes, infections (eg, hepatitis C), and use of high-dose glucocorticoids or certain immunosuppressive agents (eg, tacrolimus) (**Table 5**).^{8,10,13,19} Based on the presence or absence of risk factors, immunosuppressive therapy can be individualized. Previous history of type 2 diabetes, impaired fasting glucose, and impaired glucose tolerance should be elucidated, since patients with these metabolic abnormalities are at much higher risk of worsening hyperglycemia after transplantation with use of high-dose glucocorticoids. Patients undergoing transplantation may have received a blood transfusion and may have bleeding or hemolysis for various reasons. In this case, fructosamine may be a more reliable marker of previous glycemic control, since hemoglobin A_{1c} values will be distorted by an altered lifespan of red blood cells.