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Successful Pregnancy Outcome in a Renal Transplant Recipient with New-Onset Diabetes: A Case Report

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Abstract

Pregnancy in a kidney transplant recipient remains inherently challenging due to the complex interplay between allograft survival, immunosuppressive medications, and maternal-fetal physiology. We present the case of a 25-year-old woman who underwent live unrelated renal transplantation for chronic kidney disease secondary to chronic glomerulonephritis in 2007. Over the subsequent six months, she developed new-onset diabetes after transplantation (NODAT) requiring insulin therapy. Despite this metabolic complication combined with hypertension and left ventricular dysfunction, she successfully carried a pregnancy to 35 weeks, at which point an emergency lower uterine cesarean section was performed due to abnormal fetal Doppler studies. Both mother and infant recovered well and were discharged home in stable condition. This case illustrates the feasibility of successful pregnancy outcomes in carefully managed renal transplant recipients with multiple comorbidities, while underscoring the necessity of a multidisciplinary approach and close maternal-fetal surveillance.

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Introduction

Renal transplantation represents the gold standard in renal replacement therapy, offering superior long-term patient and graft survival compared to dialysis. Yet among transplant recipients of childbearing age, the desire to conceive introduces a layer of medical complexity that demands careful consideration and individualized risk stratification. Pregnancy in the setting of a functioning allograft is no longer considered an absolute contraindication; however, it remains associated with significantly higher rates of maternal and fetal complications

compared to the general obstetric population. The development of new-onset diabetes after transplantation (NODAT) itself a frequent metabolic complication of immunosuppressive therapy further compounds the challenges when pregnancy is contemplated. This case report highlights the clinical course, management decisions, and favorable outcome of a young transplant recipient who conceived and successfully delivered despite facing multiple post-transplant complications.

Case Presentation

A 25-year-old woman with child-bearing potential and a diagnosis of chronic kidney disease stage 5D (CKD-5D) secondary to chronic glomerulonephritis presented to our center for renal transplantation. At the time of presentation, she had been undergoing maintenance hemodialysis for approximately three months. She carried a significant medical history of hypertension but was notably non-diabetic at baseline. She subsequently underwent living unrelated donor renal transplantation. The transplant procedure incorporated ant thymocyte globulin (ATG) as induction immunotherapy, followed by initiation of triple-drug immunosuppressive therapy. The immediate post-operative period proceeded without significant complications, and she was discharged with a serum creatinine of 1.3 mg/dL, reflecting excellent early allograft function. By six months after her transplant, she developed new-onset diabetes after transplantation. Serum glucose monitoring and formal oral glucose tolerance testing confirmed the diagnosis, and she was initiated on insulin therapy to achieve glycemic control.

Despite explicit counseling regarding delaying conception, she had spontaneous unplanned pregnancy one year after her transplant. Her glycemic control was poor with HbA1c of 10.3%, as she was non complaint with insulin regime and monitoring. This represented a significant metabolic complication superimposed on her existing hypertension and requires ongoing monitoring for potential effects on both maternal health and allograft function. Considering the potential teratogenic risks associated with her immunosuppressive medications and poor glycemic control in the early post-transplant period, a shared decision was made to proceed with medical termination of the pregnancy. She was managed conservatively throughout this course and returned to her baseline clinical status.

Given her strong desire to have a child, the clinical team made the judicious decision to modify her immunosuppressive regimen. She was gradually transitioned from her original triple-drug regimen to azathioprine monotherapy over a three-month period approximately one year after transplantation. She was counselled about glycemic control prior to conception and during pregnancy. She was on basal bolus insulin with rapid acting aspart bolus insulin and Degludec as basal insulin.

She again conceived and achieved a viable intrauterine pregnancy. At conception her HbA1c was 6.3% with fasting plasma glucose (FPG) of 92mg/dl and 1 hour post prandial glucose PPG of 118. She maintained a good glycemic control throughout her pregnancy with HbA1c of 6.2, 6.1, 6.3 in each trimester and maintained a target FPG below 95 mg/dl and 1 hr PPG less than 140mg/dl as per guidelines. Her early antenatal course proceeded without major incident through 33 weeks of gestation. At this juncture, she presented with clinical features suggestive of preeclampsia including hypertensive episodes, left ventricular dysfunction on cardiac assessment, and anemia of pregnancy. A multidisciplinary conference involving nephrology, obstetrics, and cardiology concluded that continuing the pregnancy to at least 36 weeks of gestation was justified and would optimize neonatal outcomes. Throughout this extended period, she required multiple hospital visits to manage recurrent episodes of left ventricular dysfunction, each of which was addressed with conservative medical management including diuretics and afterload reduction.

At 35 weeks of gestation, abnormal fetal Doppler studies necessitated emergency delivery via lower uterine cesarean section. The procedure was performed successfully, and the infant was born in acceptable condition with birth weight of 2.2 kg. Both mother and infant required intensive care unit admission for several days in the immediate post-operative period. The mother developed no major complications and was eventually discharged home on her chronic regimen of prednisolone, azathioprine, and insulin therapy. Her infant likewise recovered well and was discharged home in stable condition after appropriate

neonatal management. At the time of last follow-up, the patient remained in good health with a five-month-old daughter.

Discussion

New-onset diabetes after transplantation (NODAT) represents one of the most frequent metabolic complications affecting renal transplant recipients, with incidence estimates ranging between 4% and 25% depending on the population studied and duration of follow-up. More recent investigations have reported post-first-year incidence of NODAT ranging from 7% to 30%, reflecting the progressive nature of this complication. The pathophysiologic mechanisms underlying NODAT are multifactorial and include increased insulin resistance, impaired pancreatic beta-cell function, and the direct diabetogenic effects of certain immunosuppressive agents, particularly corticosteroids and tacrolimus. NODAT carries substantial clinical significance, as it directly adversely impacts patient and graft survival while simultaneously increasing the risk of acute rejection, progressive graft loss, and infectious complications. These observations underscore the importance of vigilant screening and aggressive glycemic management in transplant recipients.

The coexistence of NODAT with pregnancy represents a particularly challenging clinical scenario, as metabolic derangements inherent to normal pregnancy are superimposed upon existing abnormalities of insulin secretion and action. Planning a pregnancy in a post-transplant recipient necessitates comprehensive evaluation of allograft function, blood pressure control, presence or absence of proteinuria, and timing relative to the transplant procedure. Epidemiologic data suggest that therapeutic abortion is undertaken in approximately 20% of conceptions in transplant recipients, with spontaneous abortion occurring in roughly 14% of pregnancies a rate comparable to the general obstetric population. Among pregnancies that progress beyond the first trimester, approximately 93% culminate in successful delivery. However, these pregnancies carry well-documented increased risks of adverse maternal and fetal outcomes. Permanent renal functional impairment occurs in about 15% of pregnancies, while others may experience transient deterioration in renal function during late gestation, occasionally accompanied by proteinuria. The maternal complication rate is substantial, with hypertension, preeclampsia, or both occurring in approximately 30% of cases. Adverse fetal outcomes are similarly frequent, with preterm delivery documented in 45% to 60% of pregnancies and intrauterine growth restriction identified in at least 20% of cases. These sobering statistics reflect the physiologic stress that pregnancy imposes upon a marginal allograft in the setting of chronic immunosuppression.

Contemporary literature emphasizes that baseline renal function, blood pressure control, and proteinuria at the time of conception are closely linked to post-partum renal outcomes. An ideal candidate for pregnancy in a kidney transplant recipient would possess normal or near-normal renal function (glomerular filtration rate $\geq$ 60 mL/min/1.73 m^2), minimal or absent proteinuria (typically < 500 mg per 24 hours), well-controlled blood pressure ideally on monotherapy without evidence of end-organ damage, absence of recent acute rejection episodes, demonstrated compliance with immunosuppressive medications, receipt of low-dose immunosuppression without teratogenic agents such as mycophenolic acid or mTOR inhibitors, and an interval of at least one to two years from the transplant procedure. Our patient, at the time of her successful pregnancy, was two years post-transplant with well-preserved allograft function despite her NODAT, though she did carry the comorbidities of insulin-requiring diabetes and hypertension.

Several large observational series have examined pregnancy outcomes after kidney transplantation and provide valuable insights into the risk-benefit profile of conception in this population. Kihara and colleagues demonstrated that baseline renal function parameters, presence of proteinuria, and blood pressure control at the time of pregnancy serve as independent predictors of post-partum renal function trajectory. The work of Warzecha and colleagues highlighted the increased complexity when assisted reproductive techniques are employed in transplant recipients and underscored the necessity of multidisciplinary collaboration. A retrospective analysis by Amine and colleagues of transplant pregnancies in Tunisia over a twenty-year period demonstrated that pregnancy did not universally result in graft loss or significantly reduced graft function, providing somewhat reassuring data. Conversely, Mohammadi and colleagues identified a substantially

elevated risk of obstetric complications, particularly preeclampsia, in women with a prior kidney transplant compared to non-transplant controls. A comprehensive position statement from Cabildo and colleagues on behalf of the Italian Society of Nephrology synthesized current evidence and articulated the aforementioned ideal candidate profile for transplant pregnancy.

Our patient's clinical trajectory demonstrates both the challenges and possibilities inherent to pregnancy after kidney transplantation. However, she had by this time developed NODAT requiring insulin therapy, and she carried hypertension requiring pharmacotherapy. She became pregnant at one year's post-transplant, at which point the consensus recommendation was to defer conception, leading to the medically indicated termination. One year later, when she again conceived, she had the advantage of greater post-transplant stability and established baseline allograft function. During her pregnancy, she experienced the anticipated complications of hypertensive episodes, left ventricular dysfunction. The presence of abnormal fetal Doppler studies necessitated preterm delivery at 35 weeks, a timing that balanced the increasing risk to the fetus from placental insufficiency against the morbidities associated with extreme prematurity. Her successful delivery and recovery, coupled with an infant who tolerated the premature birth well, represents a favorable outcome in this high-risk scenario. The complications experienced hypertension, LVF, NODAT, are well-described in the literature and align with published prevalence estimates for pregnancy in transplant recipients. Her case reinforces that with appropriate patient selection, detailed multidisciplinary planning, and close surveillance, successful pregnancy outcomes are achievable even in the presence of multiple complicating factors [1-9].

Conclusion

This case illustrates the feasibility of achieving a successful pregnancy outcome in a carefully selected and intensively monitored renal transplant recipient. Although pregnancy after kidney transplantation remains fraught with increased maternal and fetal risks, the absolute contraindication to conception in transplant patients has been replaced by a paradigm of individualized risk assessment and shared decision making between patient and physician team. Our patient, despite carrying the added metabolic burden of NODAT, successfully carried a pregnancy to a gestational age compatible with reasonable neonatal viability and delivered a healthy infant. Her experience underscores several important principles: the critical importance of timing conception at an adequate interval after transplantation, the necessity of multidisciplinary collaboration, the value of intensive maternal and fetal surveillance during pregnancy, and the feasibility of good outcomes when a committed team and informed patient work in concert. For transplant recipients of childbearing age who desire to have a family, pregnancy is no longer categorically forbidden, provided careful selection criteria are met and comprehensive peripartum care is available.

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