International Journal of Gynecology and Obstetrics (2007) **96**, 76–79

available at www.sciencedirect.com

www.elsevier.com/locate/ijgo

www.figo.org

CLINICAL ARTICLE

Perinatal outcome following renal transplantation

M.C. Cruz Lemini*, F. Ibargüengoitia Ochoa, M.A. Villanueva González

Department of Obstetrics, National Institute of Perinatology, Mexico City, Mexico

Received 28 June 2006; received in revised form 28 October 2006; accepted 1 November 2006

KEYWORDS
High-risk pregnancy;
Perinatal outcome;
Renal allograft;
Renal transplantation

Abstract

Objective: To assess pregnancy outcomes in a population of renal transplant recipients in Mexico. *Method:* A total of 75 pregnancies in 60 patients managed at the National Institute of Perinatology, Mexico City, Mexico, were reviewed. *Result:* The mean age at conception was 26.97 ± 5.42 years and the mean time from transplantation to pregnancy was 5.49 ± 3.6 years. Prepregnancy renal function was determined by serum creatinine level (mean, 1.32 ± 0.73 mg/dL). Prepregnancy hypertension was noted in 45.3% of the patients. Urinary tract infection was the most common complication, followed by pregnancy-induced hypertension. The pregnancy resulted in abortion in 11 patients and in live birth for the remaining 64 participants. The mean ± SD gestational age at birth was 37.1 ± 3 weeks, and intrauterine growth restriction was noted in 12 newborns. A serum creatinine level of 1.5 mg/dL or higher prior to pregnancy was associated with delivery before the 34th week and low birth weight. *Conclusion:* In this study, pregnancy ended in a live birth in 84% of women with a renal transplant.

1. Introduction

There have been many reports of successful pregnancies in women with a renal transplant since the first one in 1963 [1–4]. Even so, the incidence of spontaneous abortion, therapeutic abortion, preterm birth, low birth weight, and intrauterine growth restriction (IUGR) is high for these women, in whom pregnancy outcome has been strongly linked to renal function prior to pregnancy [5–7].

This retrospective study presents pregnancy outcomes in a population of renal transplant recipients managed at the National Institute of Perinatology in Mexico City since 1990, and compares these outcomes with those reported in the medical literature worldwide.

2. Patients and methods

All pregnancies that occurred in women with renal transplants from 1990 to 2005 at the Institute were included. Pregnancy outcome was determined by a review of case notes. The following data were obtained: maternal age at pregnancy, interval between transplantation and conception, parity, allograft type, immunosuppressive therapy,

* Corresponding author. Cordilleras 129, Las Aguilas, CP 01710, Mexico, DF, Mexico. Tel.: +52 55 55937960.
E-mail address: cruzlemini@prodigy.net.mx (M.C. Cruz Lemini).

0020-7292/$ - see front matter © 2006 International Federation of Gynecology and Obstetrics. Published by Elsevier Ireland Ltd. All rights reserved.
doi:10.1016/j.ijgo.2006.11.006

Table 1 Maternal characteristics

Characteristic	Value [a]
Maternal age during pregnancy, y	26.97 ± 5.42 (17-41)
Time between transplantation and pregnancy, y	5.49 ± 3.6 (1-18)
Parity	
1	37 (49.3)
2	25 (33.3)
≥3	13 (17.3)
Allograft type	
Live related donor	47 (78.3)
Live nonrelated donor	10 (16.7)
Cadaveric donor	3 (5)
Associated hypertension	34 (45.3)

[a] Values are given as mean ± SD (range) or number (percentage).

associated hypertension, and pregnancy duration at the first prenatal visit.

During the first prenatal visit, blood pressure was determined and general laboratory tests performed (complete blood cell count, assessment of blood levels of analytes, general urine evaluation, and blood group verification). Moreover, a urine culture, an ultrasonographic examination, and renal function tests (i.e., serum creatinine levels and values for 24-hour proteinuria) were performed in all patients. Results from prepregnancy renal function tests were obtained from the referring institution and results from predelivery renal function tests were obtained from case notes at the time of delivery admission. Adequate prepregnancy renal function was defined as a serum creatinine level less than 1.5 mg/dL. Proteinuria was defined as an albuminuria of 300 mg or greater per 24 h. Complications during pregnancy were reviewed, as were pregnancy duration at delivery, mode of delivery, indication for operative delivery (forceps or cesarean delivery), preferred contraceptive method, and maternal need for hospitalization in the intensive care unit (ICU).

Neonatal outcome was determined from birth weight and length, Apgar scores at 1 and 5 min, Silverman-Andersen score, need for intubation, gestational age as determined by the Capurro/Ballard method and intrauterine growth restriction (IUGR) as determined by pediatricians upon delivery based on neonatal and maternal characteristics. Whether the newborn needed to be treated in the neonatal intensive care unit (NICU) or was discharged with its mother was also obtained, as was the presence of congenital anomalies.

Statistical significance among groups was assessed by Kruskal-Wallis 1-way analysis of variance on ranks (ANOVA). $P < 0.05$ was considered statistically significant. Analysis was performed using SigmaStat statistical software, version 3.1, copyright 2004 (Systat Software, Inc., Richmond, California, USA).

Table 2 Immunosuppressive therapy

Medication	Number (%)
AZA-PDN	45 (60)
CyA-AZA-PDN	19 (25.3)
CyA-PDN	4 (5.3)
AZA-PDN-TCR	4 (5.3)
CyA-AZA	2 (2.7)
AZA	1 (1.6)

Abbreviations: AZA, azathioprine; PDN, prednisone; CyA, cyclosporine A; TCR, tacrolimus.

Table 3 Complications during pregnancy

Complication	Number (%)
Urinary tract infection	34 (45.3)
Pregnancy-induced hypertension	22 (29.3)
Premature rupture of membranes	13 (17.3)
Preterm labor	10 (13.3)
Allograft rejection	4 (5.3)
Intensive care unit management	6 (8.2)

3. Results

During the 15-year period reviewed by the study, 75 pregnancies in 60 women with renal transplants were managed at the National Institute of Perinatology in Mexico City. The transplantations were performed at different hospitals in Mexico and the women were referred for prenatal visits and management upon diagnosis of pregnancy. The women had received no counseling regarding contraception prior to becoming pregnant.

Maternal characteristics at their first visit at the Institute are summarized in Table 1. Nine of the women experienced 2 pregnancies and 3 experienced 3 pregnancies each. Prepregnancy renal function values were provided by the referring institution. These were serum creatinine levels (mean ± SD, 1.32 ± 0.73 mg/dL [range, 0.6-3.9 mg/dL]) and proteinuria (13 patients [17.33%] had a mean of 1.45 ± 0.93 g/24 h [range, 0.42-3.00 g/24 h]). Thirty-four women (45.3%) had hypertension and used antihypertensive agents prior to becoming pregnant.

Table 2 lists the immunosuppressive treatments the women were taking when they were referred to the Institute, and these treatments were not modified during pregnancy.

Twenty-five women (33.33%) began their prenatal visits in the first trimester, 42 (56%) in second trimester, and 8 (10.67%) in the third trimester. Complications during pregnancy are shown in Table 3. The mean serum creatinine level at delivery was 1.34 ± 0.88 mg/dL (range, 0.4-6.2 mg/

Table 4 Renal function

Studied variable	Value [a]
Renal function before pregnancy	
Serum creatinine, mg/dL	0.32 ± 0.73 (0.6-3.9)
Proteinuria per 24 h, g (n=13)	1.45 ± 0.93 (0.42-3)
Renal function at delivery	
Serum creatinine, mg/dL	1.34 ± 0.88 (0.4-6.2)
Proteinuria per 24 h, g (n=40)	1.53 ± 1.17 (0.3-5.6)

[a] Values are given as mean ± SD (range).