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# MATERNAL AND FETAL OUTCOME IN RENAL TRANSPLANT RECIPIENTS

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## ABSTRACT

**Objective:** To determine maternal and fetal outcome in renal transplant recipients.

**Methodology:** Retrospective analysis of the antenatal patients with renal transplant was done between January 1<sup>st</sup> 2005 till December 31<sup>st</sup> 2015 and maternal and fetal outcomes were determined. Data was entered and analyzed in SPSS version 20.

**Results:** 08 pregnancies in 07 women who had undergone renal transplant were included in this study. The mean age at the time of transplantation was 25.29 ±5.5 years (16-32 years). 25% cases had gestational diabetes mellitus, 75% had anemia and 50% had urinary tract infection. The mean birth weight of babies was 2210 ±.638 grams (range 1500-3400g). Preterm deliveries comprised 37.5% before 34 weeks and 50% after 34 weeks. 37.5% of the neonates needed neonatal intensive care unit admission.

**Conclusion:** Pregnancy after renal transplant is safe for mother, fetus and the graft.

**Key Words:** Renal transplant, Maternal outcomes, Fetal outcomes, Dialysis

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## INTRODUCTION

Renal transplantation is the best option to restore fertility in women with end stage renal failure<sup>1,2</sup>. This is due to correction of endocrine function post transplantation<sup>3</sup>. Although these pregnancies are successful in 90% of cases, there is still high chance of maternal and neonatal complications such as pre-eclampsia, gestational diabetes, preterm births and small for gestational age fetuses<sup>4,5</sup>. Premature births (<37 weeks) and low birth weight are among the most common neonatal complications. However studies have shown that maternal and neonatal outcomes remain favourable with successive pregnancies in renal transplant recipients<sup>6</sup>. For those with pre-pregnancy serum creatinine of >1.7mg/dl, there are higher chances of deterioration of renal function after pregnancy<sup>7</sup>.

In this study we describe our experience in Aga Khan University Hospital, Karachi, Pakistan about pregnancy outcome in renal transplant recipients and present a retrospective study for the period 2005-2015. This will create awareness among obstetricians dealing with such pregnancies about the expected maternal and fetal outcomes and will also be helpful in proper counseling of the patients and their families. Also upto our knowledge this is only one of the two studies conduct-

ed on this topic in Pakistan so we are able to generate our local data.

## METHODOLOGY

Records of patients who had pregnancy with renal transplant and had antenatal checkups, delivery and postpartum nephrology follow up at our hospital were retrospectively reviewed between January 1<sup>st</sup> 2005 till December 31<sup>st</sup> 2015. Women who became pregnant before renal transplantation or ongoing dialysis or who were lost to follow up regarding renal status after delivery were excluded.

This study received approval from ethical review committee of Aga Khan University Hospital Karachi. The medical records were reviewed including maternal age at delivery, underlying cause of renal failure, peritoneal or hemodialysis, duration between transplantation and pregnancy, serum creatinine levels, birth weight, gestational age, birth weight centile and Apgar scores at 1 and 5 minutes. Maternal and neonatal complications such as pre-eclampsia, gestational diabetes, anemia, urinary tract infection, small for gestational age, prematurity, mode of delivery and neonatal intensive care unit admission were also collected on a structured proforma. Data was entered and analyzed in SPSS version 20. Mean and standard deviation were calculated for

continuous variables. Frequency and percentages were calculated for categorical variables.

## RESULTS

08 pregnancies in 07 women who had undergone renal transplant were included in this study. All of the pregnancies were conceived naturally. The mean age of the patients at the time of delivery was 30.13 ±5.9 years (range 20 -36 years). The mean age at the time of transplantation was 25.29 ±5.5 years (16-32 years). Immunosuppressant therapy comprised cyclosporine, azathioprine and prednisolone.

The mean gestational age was 34.87 ±1.8 weeks. The mean birth weight of babies was 2210 ±.638 grams (range 1500-3400g). Preterm deliveries comprised

37.5% before 34 weeks and 50% after 34 weeks. 37.5% of the neonates needed neonatal intensive care unit (NICU) admission. 37.5% were normal vaginal deliveries and 62.5% were delivered by cesarean section. There was no miscarriage and only 01 fetus had ventricular septal defect.

The mean serum creatinine level prior to pregnancy was 1.1 ±.48mg/dl (range 0.8-2.3mg/dl) and after pregnancy it was 1.2 ±.65 (range 0.9-2.8mg/dl). All of the patients had hypertension prior to pregnancy while there was no case of superimposed pre-eclampsia. 25% cases had gestational diabetes mellitus, 75% had anemia and 50% had urinary tract infection. There was no case of graft loss up till one year after delivery.

**Table 1: Maternal transplant related data**

S. No.	Underlying Disease	Hemo-Dialysis (HD)	Age at Transplantation	Immunosuppressants use in Pregnancy	Age at Delivery	Duration from Transplantation to Pregnancy
1	Hypertensive nephropathy	HD	27 years	Cyclosporin, Azathioprine	29 years	2 years
2	-----	-----	16 years	Azathioprine, Prednisolone	20 years	4 years
3	Hypertensive nephropathy	HD	32 years	Azathioprine, Prednisolone, Cyclosporin	36 years	4 years
4	IgA nephropathy	HD	22 years	Azathioprine, Prednisolone	23 years	2 years
5	IgA nephropathy	HD	22 years	Azathioprine, Prednisolone, Cyclosporin	30 years	9 years
6	-----	-----	-----	Azathioprine, Prednisolone, Cyclosporin	35 years	2 years
7	Hypertensive nephropathy	HD	30 years	Azathioprine, Prednisolone, Cyclosporin	33 years	3 years
8	Hypertensive nephropathy	HD	28 years	Azathioprine, Prednisolone, Cyclosporin	35 years	7 years

**Table 2: Maternal co-morbidities**

S. No.	Hypertension prior to pregnancy	Pre-Eclampsia	Gestational Diabetes (GDM)	Anemia	UTI	Graft loss	S. Creat. prior to pregnancy (in mg/dl)	Postpartum S.Creat. (in mg/dl)
1	Yes	No	Type 2 DM	Yes	No	Nil	0.8	01
2	Yes	No	No	Yes	No	Nil	0.9	1.5
3	Yes	No	GDM	Yes	Yes	Nil	01	0.9
4	Yes	No	No	No	Yes	Nil	0.9	0.93
5	Yes	No	No	No	Yes	Nil	0.9	0.9
6	Yes	No	GDM	Yes	Yes	Nil	1.1	0.9
7	Yes	No	No	Yes	No	Nil	01	1.2
8	Yes	No	No	Yes	No	Nil	2.3	2.8

**Table 3: Pregnancy outcomes**

S. No.	Gestational Age (in weeks)	Baby Sex	Birth Weight (in kg)	Birth Weight (centile)	Apgar Score (at 1 min.)	Apgar Score (at 5 min.)
1	33	Female	1.5	1.1	8	9
2	33	Male	1.7	1.3	8	9
3	36	Male	2.3	31.1	6	9
4	35	Male	2.4	41.9	8	9
5	36	Male	2.7	24	8	9
6	38	Male	3.4	68	8	9
7	35	Female	1.6	06	8	9
8	33	Female	2.08	20	8	9

**Table 4: Perinatal co-morbidities**

S. No.	Spontaneous Miscarriage	Congenital Anomaly	Preterm <34 weeks	Preterm 34-37 weeks	Stillbirth	Mode of Delivery	Reason for Cesarean	NICU admission
1	Nil	Nil	Yes	No	Nil	C/S*	IUGR**	Yes
2	Nil	Nil	Yes	No	Nil	C/S	IUGR	Yes
3	Nil	Nil	No	Yes	Nil	C/S	Previous 2 cesareans	Nil
4	Nil	Nil	No	Yes	Nil	SVD***	-----	Nil
5	Nil	Nil	No	Yes	Nil	SVD	-----	Nil
6	Nil	VSD***	No	No	Nil	C/S	-----	Nil
7	Nil	Nil	No	Yes	Nil	C/S	Previous 1 cesarean	Yes
8	Nil	Nil	Yes	No	Nil	SVD	-----	Nil

\* C/S= cesarean section, \*\* IUGR= intra-uterine growth restriction, \*\*\*SVD= spontaneous vaginal delivery

## DISCUSSION

Our review of the pregnancies after renal transplant favours the findings of previous studies on same topic. Transplanted kidney does not usually obstruct the birth channel and vaginal delivery can be accomplished in most cases if there are no maternal or fetal contraindications. The cesarean section rate in our study was 62.5% mainly due to obstetrical reasons. Cesarean rate of 55% reported by Ducrime et al<sup>8</sup> and 50% by Bouttar et al<sup>5</sup> are also mainly due to obstetrical indications.

Maternal renal transplant patients with hypertension are at an increased risk of superimposed pre-eclampsia. In our analysis hypertension before pregnancy was present in all cases but there was no case of superimposed pre-eclampsia. Other studies quote figure of 70% for hypertension before pregnancy and 30-40% for pre-eclampsia<sup>9</sup>. The difference may be explained by small sample of our study and also because of good control of blood pressure during pregnancy with only one antihypertensive agent.

02 out of total 8 patients (25%) had gestational diabetes while a rate of 13.3% was found in a study conducted in Taiwan<sup>10</sup>. Use of steroid is one of the predisposing factor for the development of gestational diabetes in patients with renal transplant.

Renal transplant recipients are at an increased risk of infections during pregnancy, especially bacterial urinary tract infections and acute pyelonephritis of the graft. Anemia is common in renal transplant recipients especially iron deficiency due to increase use of iron after transplant. Erythropoietin production from a well functioning allograft begins and sustains to normal within a month after transplantation<sup>11</sup>. There was a high frequency of anemia and urinary tract infection in our study. This corresponds with the results of 40% anemia by del Mar Colon et al<sup>12</sup> and Bouattar et al<sup>5</sup> who found anemia in 80% and urinary tract infection in 20%. No patient in our case however needed erythropoietin or blood transfusion and all the patients responded well to iron therapy.

Prematurity and its associated risks are the main issue in babies born to renal transplant recipients. About 37.5% fetuses were born premature before 34 weeks and 50% were born premature after 34 weeks with NICU admission rate of 37.5% due to severe intra-uterine growth restriction. Prematurity rate of 33-60% has been reported in other studies<sup>13,14</sup>. Use of cyclosporine and azathioprine may account for low birth weight and prematurity<sup>15</sup>. Pregnancy outcome depends on pre-pregnancy serum creatinine level<sup>7</sup>. No miscarriage was observed in our study similar to other studies which show that 95% gestations end successfully<sup>16</sup>. In one of a local study there were 15 miscarriages out of total 68 patients<sup>17</sup>. However these pregnancies were unplanned and conceived with high baseline serum creatinine. There was only one case of ventricular septal defect in our study. Very few studies in literature report association of congenital heart defect with azathioprine. The rate of malformation is however not higher than in general population<sup>18</sup>.

The patients in our study had a relatively short interval between transplantation and pregnancy (4.13 ± 2.588 years). Thompson et al<sup>19</sup> found a mean time of 6.5 years in 48 cases and concluded that early pregnancies after transplantation had a poor prognosis. But our findings differed from their results. We did not observe acute rejection episode and the serum creatinine level remained stable during pregnancy as reported by Bouattar et al<sup>5</sup>. Stable graft function and base line serum creatinine before pregnancy accounts for this. Lindheimer et al<sup>20</sup> noted 5% acute rejection episodes.

## CONCLUSION

Pregnancy after renal transplant is safe for mother, fetus and the graft but multidisciplinary approach is needed to prevent complications.

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## CONTRIBUTORS

WS conceived the idea, planned the study, and drafted the manuscript. LS helped acquisition of data, did statistical analysis and critically revised the manuscript. All authors contributed significantly to the submitted manuscript.