

## Abstract

The purpose of this study was to describe pregnancy outcomes in female liver recipients transplanted under the age of 21. Data were collected from the National Transplantation Pregnancy Registry (NTPR) via questionnaires, phone interviews and medical records. There were a total of 151 liver recipients who reported 261 pregnancies to the NTPR. Of these recipients, 57 were transplanted under the age of 21. There were 109 pregnancies with 111 pregnancy outcomes (including 2 sets twins). The mean age at transplant was 16.6±4.3 yrs with a range of 0.8-20.9 yrs and the mean age at conception was 24.5±4.1 yrs. There were 83 (75%) livebirths, 16 (14%) spontaneous abortions, 9 (8%) therapeutic abortions, 2 (2%) stillbirths, and 1 (1%) ectopic pregnancy reported. The mean transplant to conception interval was 7.7±5.3 yrs; range 0.4-19.9 yrs. Immunosuppression during pregnancy included: cyclosporine-based in 63 (Sandimmune® 37, Neoral® 19, Gengraf® 7), tacrolimus (Prograf®)-based in 38 and no immunosuppression in 8. Mycophenolate mofetil (MMF) was used as adjunctive therapy for 9 pregnancies. Comorbid conditions reported during pregnancy included: drug-treated hypertension 32%, infections 30%, preeclampsia 16%, diabetes 7%, and rejection 5%. Six recipients (10.5%) lost their graft within 2 years of delivery. Follow-up of the mothers 6.8 ± 4.6 yrs. postpartum revealed 40 recipients with adequate graft function, 3 with reduced/poor function; 8 recipients (14%) had died and 6 were lost to follow-up. The mean gestational age of the newborn was 36.5±3.5 wks; 44% were premature; mean birthweight was 2626±753 g; 37% were low birthweight (<2500 g). There were 5 (6%) birth defects reported: multiple anomalies n=2 (both infants died; maternal immunosuppression included MMF), total anomalous pulmonary venous return n=1 (maternal immunosuppression included MMF), pyloric stenosis n=1, and hypospadias n=1. The majority of the children were healthy and developing well with a mean age of 5.9 yrs. at last follow-up.

**Conclusions:** Liver recipients transplanted under the age of 21 are able to maintain pregnancy with 75% resulting in a livebirth. Pregnancy, potential risks for mother and newborn, and long-term maternal survival should be discussed with the recipient and the parents of the recipient. Transplant centers are encouraged to report pregnancy outcomes in these recipients to the NTPR.

## Purpose

The purpose of this study was to describe pregnancy outcomes in female liver recipients transplanted under the age of 21 who reported to the National Transplantation Pregnancy Registry (NTPR).

## Methods

Data were collected via questionnaires, phone interviews and medical records.

## Results

- 151 liver recipients reported 261 pregnancies to the NTPR
- Of these recipients, 57 were transplanted under the age of 21
- There were 109 pregnancies with 111 pregnancy outcomes (including 2 sets twins)
- Mean age at transplant was 16.6 ± 4.3 yrs
  - range 0.8 - 20.9 yrs
- Mean age at conception 24.5 ± 4.1 yrs

## Pregnancy Outcomes\*

Livebirths	83 (75%)
Spontaneous abortions	16 (14%)
Therapeutic abortions	9 (8%)
Stillbirths	2 (2%)
Ectopic pregnancies	1 (1%)
<b>Total</b>	<b>111</b>

\*Includes twins

## Maternal Immunosuppression During 109 Pregnancies

- Cyclosporine based n=63
  - Sandimmune® n=37
  - Neoral® n=19
  - Gengraf® n=7
- Tacrolimus (Prograf®) based n=38
- No immunosuppression n=8
- Mycophenolate mofetil (CellCept®, MMF) was used as adjunctive therapy in 9 pregnancies

## Maternal Conditions During Pregnancy

Hypertension	32%
Infection	30%
Preeclampsia	16%
Diabetes	7%
Rejection	5%

## Newborn Outcomes

- n = 83
- Mean gestational age 36.5 ± 3.5 wks
- Premature (<37 wks) 44%
- Mean birthweight 2,626 ± 753 g
- Low birthweight (<2500 g) 37%

## Structural Birth Defects

- At last follow-up, the majority of the children were reported healthy and developing well with a mean age of 5.9 yrs.
- The total number of liveborn with birth defects among offspring was 5 of 83 children for an incidence of 6%.
  - Birth defects included:
    - pyloric stenosis (n=1)
    - hypospadias (n=1)
    - total anomalous pulmonary venous return (n=1) (maternal immunosuppression included MMF)
- Two infants with multiple anomalies died (maternal immunosuppression included MMF)

## Maternal Graft Function

- Graft function at last follow-up (n=57): (mean 6.8 ± 4.6 yrs)
  - adequate n=40
  - reduced/poor function n=3
  - recipient death n=8
  - lost to follow-up n=6

## Conclusions

- Liver recipients transplanted under the age of 21 are able to maintain pregnancy with 75% resulting in a livebirth.
- Pregnancy, potential risks for mother and newborn, and long-term maternal survival should be discussed with the recipient and the parents of the recipient.
- Transplant centers are encouraged to report pregnancy outcomes in these recipients to the NTPR.

To contact the NTPR and report additional pregnancies:

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 fax 215-923-1420  
 Email: [NTPR.Registry@jefferson.edu](mailto:NTPR.Registry@jefferson.edu)  
 Website: <http://www.jefferson.edu/ntp>

The NTPR is supported by grants from:

Novartis Pharmaceuticals, Corp.  
 Astellas Pharma US, Inc.  
 Genentech, Inc.  
 Pfizer Inc.  
 Teva Pharmaceuticals USA