



International
Transplant Nurses
Society

PREGNANCY AND PARENTHOOD AFTER TRANSPLANT

What You Should Know





Transplantation and Pregnancy

Transplantation offers a second chance for life for many people with end-stage organ disease. Survival rates have improved over the last 20 years and many recipients are healthy and active with an improved quality of life. After being ill, transplant recipients are excited about their ability to participate in life again. Women and men who have been thinking about parenthood for the first time or having more children may have questions about being able to conceive or to father a child following transplantation. With appropriate medical care, planning, and close follow-up, successful parenthood is possible for many female and male transplant recipients.

The first pregnancy in a transplant recipient occurred in 1958. A kidney recipient who received a kidney from her identical twin delivered a healthy baby boy. Since then, there have been thousands of pregnancies in liver, kidney, heart, and lung transplant recipients throughout the world. Most of the reported pregnancies have happened in kidney transplant recipients.

If you are thinking about getting pregnant after your transplant, it is important to remember that each pregnancy has its own unique concerns and possible risks. Your pregnancy should be well planned. Before becoming pregnant, transplant recipients are encouraged to discuss childbearing with their transplant physicians and team and obstetrician gynecologist (ob-gyn). There are many issues to think about: your current health, how your transplanted organ is working, and your transplant medications. Reviewing the information that is available about pregnancy following transplantation is advised so you can be aware of the information that has been published. Thinking about pregnancy with a complete understanding of the issues and with good medical care before, during, and after pregnancy can lead to the best outcome for you and your child.

When does fertility return after transplant?

Fertility for both men and women may return quickly after transplant. Studies report that regular menstrual cycles start within a few months to a year after transplant for most women. Many men who had difficulty with sexual activity before transplant report improvements in erections. It is common for men and women before transplant to have low levels of sexual activity because of their illness and low desire (libido). Although some differences are reported with the type of organ transplant, most men and women report an improvement in their desire for sexual activity and in their sexual functioning after they have recuperated from transplant.

There are many reasons why patients can have problems with sexual activity. Difficulties could be from complications related to their original disease, medications, or problems in their relationship with their partner. If you have any questions or concerns about resuming sexual activity, be sure to talk with your health care providers.

When is the best time to become pregnant?

It is possible for women to become pregnant within a few months following transplantation. Although an early pregnancy can be successful, it is wise to wait at least one year following transplant to become pregnant. Some centers recommend waiting two years. This allows for a reasonable amount of time to make certain that the transplanted organ is healthy and functioning well. Immunosuppression levels should be stable and at a maintenance level, the lowest level you need so that you do not have rejection.

If it has been one to two years since your transplant and you are thinking about having a baby, you should have:

- Stable function of the transplanted organ
- A stable level of immunosuppression
- Good kidney function in non-kidney transplant recipients
- Normal blood pressure or well-controlled high blood pressure
- Normal blood glucose levels or well-controlled diabetes
- Overall good health

Discuss your health issues with your transplant team and ob-gyn as you begin to think about if becoming pregnant is right for you after transplant.

What about birth control?

It is recommended that you use an appropriate method of birth control when you start having sex again. Barrier methods (condoms, diaphragms, and spermicidal jellies) are advised most often. If you use a barrier method with condoms, pregnancy and sexually transmitted diseases (STD) can be prevented.

Some transplant centers have approved the use of low-dose oral contraception (“the pill”). However, the pill places the transplant recipient at greater risk for blood clots, high blood pressure, gastrointestinal (GI) problems, coronary artery disease, and depression. Oral contraception also can increase levels of some immunosuppressive medications.

It is important to remember that although the pill prevents pregnancy when taken correctly, it does not protect against STDs. Condoms decrease the risk of sexually transmitted disease.

Recently, it has been proposed that intrauterine devices (IUDs) could also be considered for transplant recipients with uncomplicated courses or for those who have IUDs that were inserted pre-transplantation.

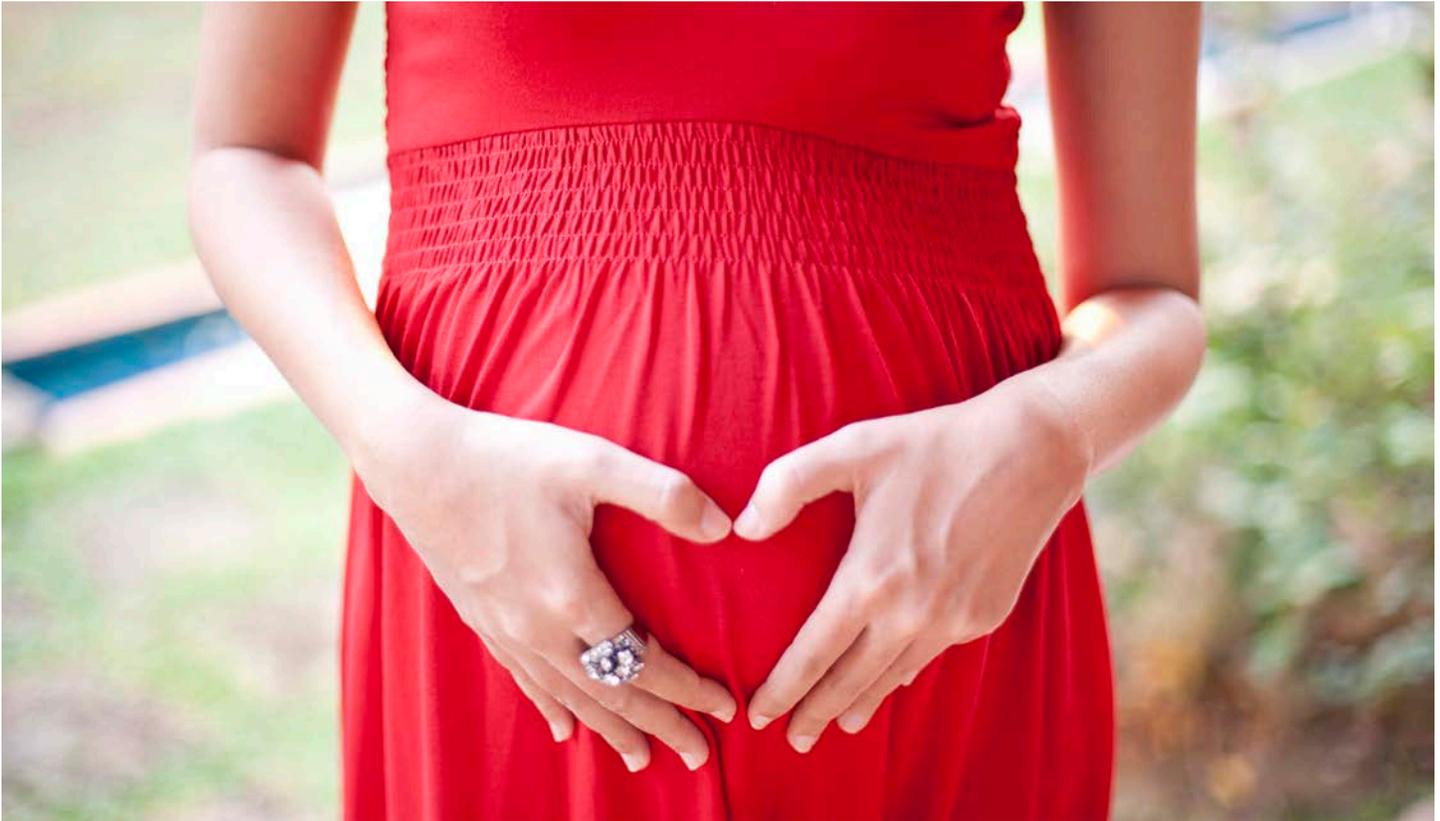
Can complications occur during pregnancy?

Complications can occur during any pregnancy. As a transplant recipient, you and your baby will be monitored closely to identify and treat any potential complications as early as possible. Your routine transplant blood tests may be obtained more often. Blood tests will be done to check for anemia (a low red blood cell count). Your blood pressure will be checked regularly at medical appointments, and you may be instructed to take and record your blood pressure at home. Urine tests will be done for protein and glucose. You will be weighed at each visit and examined for any signs of fluid retention

or edema (“puffy” face, hands or feet). As in any pregnancy, the growth and development of your baby will be monitored through your physical exam and ultrasounds.

Common complications that can occur during any pregnancy include:

- **High blood pressure**
- **Protein in the urine (proteinuria):** Usually, protein is not present in the urine, but there are some instances when protein is found. Proteinuria can occur during pregnancy and in some diseases, especially kidney disease. It also can be seen with fever and hard exercise.
- **Urinary tract infections (UTI):** This is an infection that is caused by a lot of bacteria in the urine. UTIs are usually treated with oral antibiotics.
- **Gestational diabetes:** A high blood glucose level can be a sign of diabetes. Some women may develop high blood glucose during pregnancy, called gestational diabetes. This is because the developing infant has an increased need for nutrients, and at the same time, the mother has hormone changes that affect how her insulin works. Although blood glucose levels usually return to normal after delivery, patients with gestational diabetes are watched very closely so that any possible complications for the mother and infant can be treated.
- **Anemia:** Anemia occurs when there is a decrease in hemoglobin, the oxygen-carrying substance found in red blood cells. If you are anemic, you may be very tired and weak, and your skin may be pale. Anemia is sometimes treated with iron supplements.
- **Pre-eclampsia:** Pre-eclampsia is another possible complication of pregnancy. It causes high blood pressure, protein in urine and swelling (edema) of the feet. These symptoms usually occur after 20 weeks gestation.



Is pregnancy safe for female transplant recipients?

Safe includes the mother, the baby, and the transplanted organ. Most women have no complications with the transplanted organ during pregnancy if the function of the organ was stable and healthy before they became pregnant. Although pregnancy is generally safe, every transplant patient is different. Your medical team needs to examine any specific problems that may affect your pregnancy. There are some risks related to each organ:

- **Kidney transplant recipients:** Patients who had high creatinine levels before becoming pregnant or who had uncontrolled high blood pressure may have more complications with the transplanted kidney.
- **Liver transplant recipients:** There have been reports of high blood pressure, increased bilirubin levels,

gestational diabetes, pre-eclampsia, and rejection during pregnancy in liver transplant patients. Liver recipients with hepatitis C or chronic rejection have more problems with pregnancy.

- **Heart transplant recipients:** These patients need to have normal cardiac function before becoming pregnant because the transplanted heart must be strong enough to support the added workload that occurs in the last trimester of pregnancy. If cardiac function is normal before pregnancy, the transplanted heart usually is able to adjust to this extra demand.
- **Lung transplant recipients:** There have been reports of successful pregnancy outcomes after lung transplant recipients, but in general, lung recipients appear to have the greatest risk of problems during pregnancy.

Does pregnancy affect how my anti-rejection medications work? Will there be any changes in my anti-rejection medications?

Pregnancy can affect the immunosuppressant level because you gain weight and develop an increased blood volume to support the fetus. Changes in blood volume or weight may require an increased dose of your anti-rejection medicine to maintain your pre-pregnancy level. Your cyclosporine or tacrolimus level will be monitored frequently so that your body maintains the level that is right for you and prevents rejection of your organ. Some medications may need to be adjusted before, during, and even immediately following pregnancy.

Do my anti-rejection medications affect the fetus?

Most of the immunosuppressive medications taken by transplant recipients are considered “safe” during pregnancy, including cyclosporine, tacrolimus, prednisone, and azathioprine. Mycophenolate mofetil (CellCept) and mycophenolate sodium (Myfortic) are considered harmful to the fetus, and you should not become pregnant while taking these medications. These medications have been shown to cause more miscarriages, and surviving infants have more birth defects. There is not enough information about other transplant medications, including sirolimus, everolimus, and belatacept, and their use during pregnancy. Following discussions with your transplant team, you must think about the possible risks and benefits of taking some of these medications during pregnancy. Your transplant team may consider changing your immunosuppression to ensure a safe pregnancy and still decrease the risk of rejection.

What about the other medications that I take?

Most transplant recipients take several medications. Before you become pregnant, your list of medications must be reviewed to be sure that the medications you are taking will not harm your baby. Some medications may be stopped or replaced by others that will not affect the fetus. Some drugs may be stopped while you are pregnant and restarted after your baby is born. If you are taking a drug that is potentially harmful to your baby, your health care provider may stop that drug and also ask that you not become pregnant for a while to be sure that the drug is completely out of your system. The goal is to maintain your health and the function of the transplanted organ during your pregnancy while keeping the baby healthy as well.



What happens if I reject my organ while I am pregnant?

If the transplanted organ is functioning well before you become pregnant, there does not seem to be a greater risk of rejection during pregnancy. If rejection does occur, it can be treated by increasing the amount of immunosuppression you receive, often steroids (prednisone). However, higher levels of immunosuppression can increase your risk of infection.

Although rejection is a concern when you are pregnant, both mothers and infants have done well after being treated with anti-rejection medications for rejection. However, there have been some reports of lower birth weights and premature births in mothers who have had rejection during their pregnancy.

Are there other risks to the baby?

When the transplanted organ is working well and the mother is not taking mycophenolate, the risk of miscarriage is about the same as in the general population. Recipients who have worsening transplant function prior to or during pregnancy have a greater risk of miscarriage than the general population.

Prematurity and lower birth weights are seen more often in infants of women who have poor function of their transplanted organ, kidneys that are not working well, poorly controlled blood pressure or diabetes, or treatment for rejection during the pregnancy.



Are children of transplant recipients healthy?

Generally, children of transplant recipients are reported to be healthy and developing well, although occasional health or developmental problems have occurred. These children are being watched to see how they grow and develop over time.

If there is a family history of a genetic or inherited condition, the infant may be at risk for inheriting or carrying that condition. If you have a family history of a genetic problem, you can discuss any concerns with your obstetrician and transplant team. You may be referred to a health care provider who specializes in genetic disorders for further counseling.



What are the most common complications seen in the newborns of transplant recipients?

For female transplant recipients, there is about a three times greater risk of having a premature infant (less than 37 weeks gestation) or a low birth weight infant (less than 5 pounds) compared to the general population. Recipients are encouraged to be seen by an obstetrician working with high-risk cases and to be watched closely throughout the pregnancy.

As long as the mother was not taking mycophenolate during her pregnancy, the incidence of birth defects in children of transplant recipients is similar to the incidence in the general population.

Can I have a normal delivery?

You may be able to have a normal vaginal delivery. Your obstetrician will continue to assess you throughout your pregnancy to be sure that a normal delivery is possible. More cesarean sections (C-sections) are done in transplant recipients than in the general population, although most health care providers agree that a C-section delivery should be done only if there are complications with the delivery. Sometimes labor may be induced to be certain that all of the medical team and resources are available as needed. Epidural anesthesia is used for both vaginal deliveries and cesarean sections.



Are some transplant recipients at higher risk for complications than others during pregnancy?

Some transplant recipients are at greater risk for complications if they become pregnant. Any patient with worsening function of the transplanted organ is at greater risk. Kidney recipients with high creatinine levels, liver recipients with recurrent hepatitis, or heart recipients with post-transplant coronary artery disease should think about whether the risks of becoming pregnant are too high. Pre-pregnancy counseling is strongly advised for any transplant recipient who would like to become pregnant but their transplanted organ is not functioning well.

Can I breastfeed my infant?

Historically, transplant recipients have been told not to breastfeed. However, some more recent studies have shown that it appears safe to breastfeed while taking normal maintenance doses of prednisone, azathioprine, cyclosporine, and tacrolimus. On the other hand, recipients should avoid breastfeeding if they take mycophenolate, sirolimus, everolimus, or belatacept since there is not enough information about the safety with breastfeeding. To reduce concerns, your health care team could check infant blood for drug levels. You should speak with your transplant team, obstetrician, and pediatrician prior to delivery to see if breastfeeding might be an option for you. Whether there are long-term effects on the children who were breastfed by mothers taking immunosuppressive medications requires additional studies, but the preliminary results are encouraging.

Is it safe to have more than one pregnancy after transplant?

Some women have reported more than one pregnancy after transplant. Recipients should have stable function of the transplanted organ, good kidney function and stable immunosuppressive levels before conceiving again. Talk with your transplant team and obstetrician if you are considering conceiving again.

Have transplant recipients used assisted fertility methods?

Transplant recipients have reported using medications, intrauterine insemination and in vitro fertilization in order to become pregnant. There is not much information available as to whether transplant recipients have more infertility compared to the general population.



Have transplant recipients adopted or used a surrogate?

Transplant recipients have chosen to adopt or use a gestational carrier to start a family as well. Pregnancy is not recommended for everyone and it is important to discuss family planning with your transplant team.

Are there any concerns about pregnancies being fathered by male transplant recipients?

The outcomes of pregnancies fathered by male transplant recipients are generally good. The infants' age at birth (gestational age), birth weights, frequency of prematurity, and the frequency of birth defects are similar to outcomes in the general population. There have been no reports of any complications in infants fathered by transplant recipients taking MMF (mycophenolate mofetil) or sirolimus, although sirolimus may affect male fertility.

How can I receive more information about pregnancy following transplantation?

Information is being collected about parenthood following transplantation by individual centers to help transplant recipients make the best decisions about parenthood. Ask your physician, advanced practice registered nurse, or transplant coordinator for more information and the guidelines provided by your transplant center. You can also look at websites for various transplant centers to find information about pregnancy after transplantation at that specific center.

Another way to get more information is through a large organization, or registry, where researchers gather data about patients from many transplant centers. This information is passed on to other transplant recipients considering parenthood and to the health care teams who are managing their care.

The Transplant Pregnancy International (TPR) was established in the United States in 1991 to study the outcomes of pregnancies in female transplant recipients and pregnancies fathered by male transplant recipients. The TPR collects data from transplant recipients throughout the world. The TPR has received reports on more than 4000 pregnancies in solid organ transplantation by male and female transplant recipients. The registry follows women who have become pregnant after transplant, men who have fathered children after transplantation, and their offspring. The TPR also provides the opportunity for transplant recipients considering parenthood to talk to other recipients who have become pregnant or fathered a child. The TPR welcomes inquiries regarding parenthood after transplantation. If you are pregnant, have ever been pregnant, or have fathered a pregnancy, you can call the TPR at any time, and they would be happy to speak with you. Every pregnancy is unique and could help other transplant recipients in the future.

Conclusion

Overall, parenthood can be safe and successful for many women and men who have received solid organ transplants. Problems can occur and have been reported in a small number of cases. Pre-pregnancy counseling is important so that you can plan your pregnancy to have the best possible outcome for you and your baby.

RELATED LINK FOR MORE INFORMATION

ITNS is not responsible or liable for any information received from websites. These sites are provided as a network resource. Information from the Internet in regard to your transplant should always be discussed with your transplant team.

ITNS is the first professional nursing organization to focus on the professional growth and development of the transplant clinician. ITNS offers nurses a forum for learning about the latest advances in transplantation and transplant patient care. To access more transplant education materials for patients and healthcare workers please visit the International Transplant Nurses website at itns.org.

Resource:

Transplant Pregnancy Registry International (TPR)

Gift of Life Institute

401 N. 3rd Street

Philadelphia, PA 19123

Phone: 01-215-599-2078

Toll-Free: 877-955-6877 (in the US)

Email: tpr@transplantpregnancyregistry.org

Website: www.transplantpregnancyregistry.org

References used to prepare this pamphlet may be obtained from ITNS upon request.

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Original Contributors:

Lisa Coscia RN, BSN

Beverly Kosmach-Park MSN, CRNP

Kathy Lawrence MN, RN

Vincent T. Armenti MD, PhD

Clare Whittaker RN, BSc

Barbara Schroeder MS, CNS

Revisions 2017:

Ann Herbage Busch, MS, RN, CWOON, ACNS-BC-PP, FAAN

Lisa Coscia RN, BSN

