

Pregnancy after Kidney or Liver Donation

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Summary:

Studies conducted in Canada, Norway, and the United States have all shown an increased risk, approximately 5.5%, of gestational hypertension and/or preeclampsia, post living kidney donation. Low rates of other risk factors have also been reported; these include a lower likelihood of full-term deliveries, higher likelihood of fetal loss, higher associations with gestational diabetes, and higher risk of proteinuria. However, these statistics have been highly debated due to the inability to design comprehensive studies that restrict the cause of complications directly to living kidney donation and not an amalgamation of underlying factors.

No complications during pregnancy due to living liver donation have been cited. Though complications are not expected on a physiological basis, there has not been sufficient research conducted regarding this potential long-term effect, as this procedure is recent and uncommonly practiced.

Nationwide, there are over 118,000 people waiting for lifesaving organ transplants (1). In reaction to the dire need of organs, some people have responded by offering to become living organ donors. While recipients are often promised futures with fewer complications, donors sometimes carry a greater burden for their sacrifice. In order to support donors in the most effective way possible, it is important to engage in research that elucidates as many potential risk factors that donors may face so that both the medical community and donors themselves are aware and can take precautions if necessary. Some common potential risks for living kidney donors include: hypertension, reduced kidney function, and hernia. Some common potential risks for living liver donors include: hernia, wound infections, and organ failure (1). Nonetheless, the number of successful living donor transplants is increasing, and people are beginning to further inquire about different risk factors. One question that comes up is about the effects of living organ donation on future pregnancies. Mothers deserve to be as informed as possible on the potential effects that volunteering to be an organ donor could have on the safety of their future pregnancies. In order to provide a better answer for this specific population, research was conducted on related, existing studies to provide a more comprehensive understanding. This analysis takes into consideration the most recent studies looking at the effects of live kidney and liver donations on future pregnancies.

In 2013, 34% of kidney transplants came from living donors (5731/16,892) (2).

Because living donors make approximately a third of kidney transplantations possible, there is a larger set of data available to use in the search for answers. Three major studies have pointed towards an increased frequency of hypertension and pre-eclampsia in women with pregnancies post kidney donation as compared to women with pregnancies prior to kidney donation. A brief discussion of each of those studies follows.

First, a study published in 2009, at a center in the United States, observed 1085 living kidney donors who reported 3213 pregnancies, 490 being post-donation. Both maternal and fetal outcomes were collected via surveys and compared to published rates among the general population. Women with pregnancies post-donation were associated with a higher prospect of fetal loss (19.2% vs. 11.3%), and lower prospect of full-term deliveries (73.7% vs. 84.6%) in comparison with those with pre-donation pregnancies. They were also associated with a higher risk of gestational diabetes (2.7% vs. 0.7%), gestational hypertension (5.7% vs. 0.6%), preeclampsia (5.5% vs. 0.8%), and proteinuria (4.3% vs. 1.1%). While post-donation outcomes present themselves to be riskier than pre-donation outcomes, they are similar to outcomes reported from the general population (7).

Second, another study published in 2009 in Norway, observed 326 living kidney donors who reported 726 pregnancies, 106 being post-donation. A control group made using the Medical Birth Registry was cross-linked with data from the Norwegian Renal Registry. The differences in groups were assessed by two-sided Fisher's exact tests, and generalized linear mixed models. In the unadjusted analysis, there were no differences in the pregnancy outcomes between kidney donors and the general population. However, in the adjusted analysis that accounted for mothers contributing with more than one birth, maternal age, birth order, and year of birth, preeclampsia was 5.7% more common, and stillbirths were 1.7% more common, in post-donation pregnancies (8).

Third, a study published in 2015 in Canada, observed 85 donors who reported 131 pregnancies, matched to 510 non-donors who reported 788 pregnancies. Each donor was matched to six healthy non-donors based on baseline characteristics that may have been related to the risk of gestational hypertension or preeclampsia. These characteristics included cohort entry date, maternal age at the time of cohort entry, financial status, type of residence, number of previous pregnancies carried to at least twenty weeks, and time period to the first birth after cohort entry. Data showed that there was a 6% increase in frequency of preeclampsia and hypertension in donors as compared to non-donors. There were no significant differences between donors and non-donors with respect to rates of preterm birth or low birth weight (19).

Although the Canadian study was significant in the way its experimental design accounted for discrepancies left in the US and Norwegian studies due to an inability to control for baseline characteristics, other researchers have contested the results by questioning methods used in data collection. For example, registries are not infallible, blood pressure results were not always reported, and self-reported surveys, due to potential changes in response as a result of time delay and only partial participation, cannot guarantee accurate responses (10).

In an in-depth review of the two 2009 studies, Michelle A. Josephson continued to question results obtained. Regarding the study conducted in the United States, Michelle pointed out the flaws that may be introduced from such a small sample size, using data from a retrospective analysis instead of original data, and differences that may be attributable to discrepancies in diagnosis as opposed to disorder. In response to the study conducted in Norway, Michelle highlighted factors that may have resulted in pitfalls, such as not being able to contact 333 individuals, not receiving a response from 180 individuals, and some responses being turned in after a 40 year time period (11).

In comparison to live kidney transplants, live liver transplants occur far less often. In 2013, only 4% of liver transplants were from live donors (252/6455) (2). According to Mayo Clinic, relative to other transplant operations, the live liver transplantation is a relatively recent and uncommonly practiced procedure (3). Within existing research, the focus is often on recipients of the transplant as opposed to the effects on the donor. Among the studies conducted, no complications during pregnancy due to living liver donation have been cited. In 2004, researchers used the University of Chicago Hospital transplant program database to identify adult-to-pediatric donors since November 1989. 15 living liver donors were interviewed in depth. Of the 15, 8 female donors had full-term pregnancies without complications associated with the donation. The remaining 7 families chose not to have children for a variety of personal reasons (4). Institutions such as the Cleveland Clinic have recommended a 3-6 month waiting period after surgery before becoming pregnant (5). However, in 2007, a study followed a 29-year-old female who donated the right lobe of her liver to her mother, became pregnant within 6 months, and had a successful pregnancy and delivery. This study also acknowledged that no case series on pregnancy in donors has been conducted, and addressed the need for it in future studies (6). Overall, there has not been adequate research conducted regarding potential long-term effects on liver donors, specifically on how these procedures affect future pregnancies. Though no complications have been officially associated, there is a chance this is due to a lack of trending research, as opposed to being risk-free.

Studies have built off each other, trying to provide answers for living donors. Living liver donation is less practiced than living kidney donation, making advancements in this field a large hurdle as no case series has been conducted (12). Though no direct complications during pregnancies have been officially associated with live liver donation, this information must be prefaced with the understanding that there is limited research regarding this topic, and there is a possibility that potential risks may just not have been identified yet. On the contrary, a greater number of studies have resulted in more answers to those who question the potential effects on being a living kidney donor on future pregnancies. While some studies claimed to have observed an increased frequency of hypertension and preeclampsia in women with pregnancies post donation, other studies have questioned the legitimacy of the experimental design, and therefore the conclusions drawn. It is unlikely that an experiment will ever be able to account for all underlying, potential factors that may contribute to skewing results. Experimenters do consider this when designing their studies, therefore, their research should not be disregarded, but considered with the knowledge that their results are a reflection of their data, and cannot provide foolproof conclusions.

Though questions remain unanswered, it is important that women interested in being a live organ donor are fully informed of the current research, and the potential ways their future life decisions may be affected. It is also vitally important to protect the interest of all living organ donors, and perhaps particularly those interested in starting a family in the future, by doing more research on the effects living organ donation has on donors.

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