

(Uterus) Wanted: Dead or Alive

Ethical Organ Procurement from Living and Deceased Donors for Uterine Transplantation

Lilian Bui

This article explores the novel uterine transplantation procedure and the procurement of uteri from living and deceased donors. The procedure allows women lacking a functional uterus to experience gestation and give birth to genetically related children. At the time the article was written, clinical trials had been conducted in several places globally, including the United States. Donations from both living and deceased donors had resulted in successful pregnancies and live births, but the ethics associated with each method had not been evaluated thoroughly. Kantian principles, natural law, natural rights, and utilitarianism were employed to evaluate the ethicality of procuring uteri from living and deceased donors for the elective uterine transplantation. Despite the possibility and benefits of live donations, uteri for the elective uterine transplantation procedure should not be obtained from living donors, in both clinical trials and practice. Utilitarianism and natural rights ethical frameworks bolster the argument for live donations; however, the merits of such an argument are outweighed by the merits of the Kantian and natural law ethical frameworks when applied to the novel medical procedure. If uterine transplantation becomes available to the public as a fertility treatment, uteri should only be procured from deceased donors.

I. INTRODUCTION

On December 15, 2017, the first live birth after uterine transplantation (UTx) from a deceased donor was achieved at Hospital das Clínicas, University of São Paulo, Brazil. The success revolutionized the field of assisted reproductive technology. Four months before UTx, the recipient, a 32-year-old woman born without a uterus, and her partner underwent in-vitro fertilization. She then received a uterus from a 45-year-old woman who had died of a subarachnoid hemorrhage. She experienced menstruation 37 days later and a regular menstrual cycle afterward. Seven months after UTx, the first embryo was transferred, and pregnancy occurred. In the 35th week of pregnancy, the female baby was delivered via cesarean section. The mother and baby were both reported as healthy during the live birth. After the cesarean section, the uterus was removed. Seven months after the live birth, the mother and baby were reported as healthy.¹ Multiple live births after UTx from living donors had occurred prior. However, the case in Brazil marks the first instance of a live birth after UTx from a deceased donor.

Now that uteri from deceased donors can result in live births, the medical community must discern whether the procurement of uteri from living donors is still morally permissible. Although UTx from both living and deceased donors can result in live births, upon ethical scrutiny, only UTx from deceased donors should be used. Multiple ethical frameworks can be used to evaluate

the ethical permissibility of UTx with living donors. As utilitarianism is best summarized as “the greatest good for the greatest possible number,” UTx from living donors increases access to the procedure and would be supported in this framework. Correspondingly, Locke’s natural rights theory supports UTx from living donors. Locke claims every person has freedom to do as they wish, so long as they do not infringe on the freedom of others. If a living person volunteers to donate her uterus to a recipient, then UTx from a living donor is permissible under natural rights theory. In contrast to utilitarianism and natural rights theory, Kant and natural law theory do not support UTx from living donors. Kant states people should be treated as ends, not as a means. A living person who donates an organ for temporary, and not life-sustaining use, acts as a means to the recipient’s ability to experience gestation. Similarly, natural law does not support UTx from living donors. The theory establishes that an action’s harms should not outweigh its benefits, and personal autonomy cannot be violated. The potential of physical and psychological harm to the donor, as well as susceptibility to coercion, deem UTx from living donors impermissible. While utilitarianism and Locke’s natural rights theory support both UTx from living and deceased donors, the arguments derived from Kant and natural law, which emphasize the protection of potential vulnerable living donors, provide stronger support against UTx from living donors.

All other live births after UTx, besides the case in Brazil, have occurred with living donors. In September 2014, the first live birth after UTx was reported in Sweden. A 35-year-old woman born without a uterus

¹ Ejzenberg et al., “Livebirth after Uterus Transplantation from a Deceased Donor in a Recipient with Uterine Infertility.” 2697.

received a uterus from a 61-year-old living donor.² Despite a premature birth in the 31st week of pregnancy, the mother and baby were later reported healthy by the Swedish team.^{3,4} At least 40 transplants have been performed.⁵ Of those, twelve UTx procedures have resulted in live births, eleven via living donors and one via a deceased donor.⁶ Two of those live births occurred in the U.S. and were performed with uteri from living donors.⁷ Thus far, the majority of live births after UTx have been from a living donor rather than a deceased donor.

As clinical trials of UTx are currently being performed, UTx could potentially be a therapeutic treatment for women with absolute uterine factor infertility (AUI). AUI affects “approximately 85,000 women in the United States and 1.5 million women worldwide.”⁸ Women affected by congenital disorder and acquired AUI do not have a functioning uterus, and as a result, cannot experience gestation. The psychological consequences of AUI support the need for a therapeutic treatment. Bruno and Arora write, “In one study, more than half of the women seen for pre-infertility treatment consultation described their infertility as the most upsetting experience of their lives.”⁹ Moreover, some women who become infertile as a result of cancer treatment report “their loss of fertility as causing as much emotional pain as the cancer itself.”¹⁰ Thus, the psychological pain of infertility must be addressed. The current options for women with AUI to become parents are surrogacy and adoption, though neither of these options are a medical treatment. Only UTx enables women with AUI to experience both genetic and gestational motherhood.¹¹ By providing a functional uterus, UTx enables women with AUI to experience pregnancy. With a large population of women afflicted by AUI and the psychological harm associated with infertility, a therapeutic treatment, such as UTx, ought to be pursued.¹²

In this paper, I will use the ethical premises of Kantian categorical imperatives and natural law principle of double effect and respect for autonomy to argue that it is morally impermissible to perform UTx with living

donors in clinical research and practice. In Section II, I will outline the medical procedure and existing criteria for the ethical procurement of uteri from living and deceased donors. In Section III, I will present arguments for the procurement of uteri from living donors based on utilitarianism and Locke’s natural rights theory. I will refute the counterarguments through an explication of UTx as a nonvital and transient transplant, thereby distinguishing it from vital and permanent transplants. In Section IV, I will present my argument against uteri procurement from living donors. UTx with living donors fails to respect donors as ends in themselves, incurs disproportionate risk, and potentially violates their right to autonomy. Through a non-consequentialist perspective, the Kantian and natural laws approach to UTx elucidates the moral impermissibility of UTx with living donors.

II. MEDICAL PROCEDURE AND EXISTING GUIDELINES FOR ORGAN PROCUREMENT

The medical procedure for live birth after UTx requires multiple steps. First, eggs and sperm of the recipient and her partner undergo in vitro fertilization, and the resulting embryos are saved through cryopreservation. Then, the uterus, procured from the donor via radical hysterectomy, is transplanted into the recipient. The recipient takes immunosuppressants to combat organ rejection. Once successful transplantation is confirmed, the cryopreserved embryos are transplanted into the uterus. The recipient experiences pregnancy and gives birth via cesarean section. Afterwards, a hysterectomy is performed to remove the uterus to eliminate the need for immunosuppression therapy.¹³ Overall, the general procedure to experience pregnancy via UTx requires many elements.

UTx is a complex surgical procedure for both the living donor and recipient. Removing the uterus from the living donor is time consuming and invasive. In the 2014 clinical trial in Sweden, the average procedure time for living donors was 11.5 hours.¹⁴ Other countries have reported operative times ranging from 8 to 13 hours.¹⁵ With robot-assisted and laparoscopic techniques, however, the procedure could be reduced to 6 hours.¹⁶ The long operative time can be attributed to the difficulty of dissecting blood vessels around the uterus. Kisu et al. write, “In particular, donor surgery is highly invasive due to the difficulty of procuring the uterine veins running along the pelvic floor.”¹⁷ Consequently, the donor may experience major bleeding. In contrast,

2 Ejzenberg et al., “Uterine Transplantation.” 679.

3 Ejzenberg et al., 680.

4 The age of living donors is a relevant confounding factor, but at present, there has not been enough research on UTx with living donors with a broad age range to provide a conclusive statement.

5 “Wonder within Wonder.”

6 Flynn and Ramji, “Uterine Transplantation.” 1.

7 “Wonder within Wonder.”

8 Bruno and Arora, “Uterus Transplantation.” 6.

9 Bruno and Arora, 7.

10 Bruno and Arora, 7.

11 Bruno and Arora, 6.

12 For the purposes of this paper, I will assume UTx is ethical based on an obligation to treat women with AUI. I recognize the strong arguments against the procedure. These include the basis of UTx on pro-natalism and biologism, sole benefit of UTx restoring the experience of gestation rather than parenthood, UTx as a non-vital and transient procedure, and great risk incurred to the recipient, donor, and fetus. Setting the counterarguments aside, I will focus on the ethical procurement of uteri.

13 Kisu et al., “Emerging Problems in Uterus Transplantation.” 1352-3.

14 Kisu et al., 1354.

15 Kisu et al., 1354.

16 Kisu et al., 1354.

17 Kisu et al., 1354.

the procedure to transplant the uterus in the recipient is less time consuming though still invasive. In the Sweden trials, the average operative time was 4.5 hours, significantly less than the operative time on the donor.¹⁸ However, the need to reconnect the uterine vessels to the iliac vessels incurs major bleeding, comparable to that in the donors.¹⁹ While the operative time varies greatly between the living donor and recipient, the donor and recipient experienced similar levels of blood loss. Hence, UTX incurs medical risk to both the donor and recipient.

Because UTX is a complicated and risky procedure, ethical criteria have been established to protect all moral agents involved: the donor, recipient, and healthcare team. The Montreal Criteria for the Ethical Feasibility of Uterine Transplantation, outlines criteria, all of which must be met, for the three parties. The criteria attempt to protect the autonomy of both living and deceased donors. The Montreal Criteria reads, “The donor has repeatedly attested to her conclusion of parity or has signed an advanced directive for post-mortem organ donation” as well as, “The donor is responsible enough to consent, informed enough to make a responsible decision, and not under coercion.”²⁰ Therefore, so long as autonomy is respected, a person may choose to donate her uterus for UTX while alive or posthumously.

Measures are taken to ensure informed consent from donors. These include providing a potential donor with “both comprehensive information relating to giving up a healthy uterus and time to consider such a significant and irrevocable decision.”²¹ The procedure to obtain informed consent differs for UTX with living and deceased donors. Consent for living donation in UTX should follow guidelines established by the Live Organ Donor Consensus Group (2000) for living kidney and liver donation. Potential living donors should also be consulted separately from all involved parties (family, friends, healthcare team, etc.) and be ensured of her ability to change her mind at any time without explanation to the recipient.²² In clinical trials, it is especially important that the voluntary participants “understand the potential risks and benefits of the intervention and be able to make sense of the chances of success and failure.”²³ This is because in research, the outcomes are uncertain. In contrast, obtaining informed consent from deceased donors follows procedures outlined by the Organ Procurement Transplantation Network (OPTN) for vascularized composite allografts (VCAs). Because the uterus is a VCA, like the hand or

face, separate and specific consent from the donor or surrogate donation decision maker is required to remove the uterus from a deceased donor.²⁴ In the current practice of UTX in clinical trials, existing frameworks for other organ donations are used to navigate informed consent for living and deceased donors.

III. ARGUMENTS FAVORING UTX WITH LIVING DONORS

A. Utilitarian Practicality and Likelihood of Success

The greater chance of live birth after UTX with living donors than deceased donors supports the argument for living donors in a utilitarian context. However, I will later demonstrate that utilitarianism is an insufficient framework to justify UTX with living donors. John Stuart Mill’s utilitarianism is a teleological, consequentialist view focused solely on the ends. Mill writes, “The creed which accepts as the foundation of morals, Utility, or the Greatest Happiness Principle, holds that actions are right in proportion as they tend to promote happiness, wrong as they tend to produce the reverse of happiness.”²⁵ Utilitarianism distinguishes transplantation via living and deceased donors by the outcomes of each procedure. As empirical evidence shows, only one live birth following UTX with a deceased donor as opposed to eleven live births following UTX with living donors, utilitarianism favors UTX with living donors. Thus far, the living donor option has led to better outcomes. Hence, living donors are preferred to deceased donors due to maximized access to UTX for eligible women and greater chances of live births.

Practical arguments support the preference for living donors. UTX performed with uteri from living donors may result in higher chance of successful pregnancy and live birth. In kidney and liver transplantation, living donation leads to “better patient outcomes, long-term graft survival rates, and decreased need for strong immunosuppressive regimes.”²⁶ The same benefits are expected of living donation in UTX. Higher success rates with living donors can be attributed to the decay of organs in deceased donors and inefficient procurement. Research shows “brain death induces systemic inflammation that negatively affects organ quality,” and because non-vital organs, such as uteri, are removed after vital organs, “increases in warm ischemia time may reduce organ quality and functioning.”²⁷ The

18 Kisu et al., 1354.

19 Kisu et al., 1354.

20 Lefkowitz, Edwards, and Balayla, “The Montreal Criteria for the Ethical Feasibility of Uterine Transplantation.” 444.

21 Lefkowitz, Edwards, and Balayla, 443.

22 Bruno and Arora, 10.

23 Lefkowitz, Edwards, and Balayla, 442.

24 OPTN Policy 2.15.C Authorization Requirement states: Recovery of vascularized composite allograft for transplant must be specifically authorized from the individual(s) authorizing the donation whether that is the donor or a surrogate donation decision maker consistent with the applicable state law.

25 Mill, Utilitarianism. II.7.

26 Williams, “Should Deceased Donation Be Morally Preferred in Uterine Transplantation Trials?” 417.

27 Williams, 417.

nature of procuring organs from deceased donors seems to decrease success rates and justify the preference for living donors.

I refute the utilitarian argument favoring living donors in UTx as the living donor and advantages of UTx with deceased donors cannot be disregarded. The living donor as an individual is not of concern in utilitarianism. Mill writes, “The happiness which forms the utilitarian standard of what is right in conduct, is not the agent’s own happiness, but that of all concerned.”²⁸ The lack of consideration for the individual in utilitarianism implies the health and autonomy of the living donor can be sacrificed so that the recipient can experience happiness from gestation. Clearly, the living donor is of moral concern as the Montreal Criteria establish grounds for ethical treatment of the living donor. Lastly, there are practical advantages to UTx with deceased donors.²⁹ Taneja et al. write, “Experts from the UK, Turkey and USA argue that a younger graft with longer lengths of vessels can be obtained from a deceased donor which makes it a better option than living donations.”³⁰ Having access to better blood vessels, specifically ovarian veins, in a deceased donor can contribute to successful transplantation and subsequent live birth for the recipient. In a living donor, clinicians have fewer options of blood vessels that can be removed for the recipient. Therefore, utilitarianism is insufficient to support UTx with living donors.

B. The Right to Donate

Another argument favoring living donors in UTx is based on John Locke’s natural rights theory though I will assert that natural rights alone do not allow living persons to donate their organs. Locke asserts individuals have the right to “order their actions and dispose of their possessions and persons as they think fit, within the bounds of the law of Nature, without asking leave or depending on the will of any other man.”³¹ In this context, eligible donors have the right to donate their uteri if they so choose. Although traditional Lockean theory holds that an individual “has not liberty to destroy himself,” contemporary Lockean theory allows individuals to waive their rights, including the right to life. The right of living persons to donate has been recognized in the case of vital organs. More than one-third of kidney donations are from living donors in the UK.³² With the same ability to waive rights, a potential living donor can likewise waive her right to a uterus

28 Mill, II.17.

29 This medical advantage with deceased donors has likely not been capitalized on due to logistical barriers with post-mortem non-vital organ donation for a novel procedure. Specific consent is needed to procure a uterus from a deceased donor, which is difficult if the practice is not widely advertised and used yet.

30 Taneja et al., “Uterine Transplant.”

31 Locke, *The Second Treatise on Civil Government*.

32 Williams, 419.

and the experience of gestation. Through Lockean natural rights theory, UTx with living donors is morally permissible if individuals choose to donate their uteri.

However, the justifications for living vital organ donations do not apply to UTx. While the right to donate, in part, supports living vital organ donations, the practice is also supported by a favorable harm to benefit ratio as the recipient needs the organ to survive.³³ The right to donate alone does not justify living vital organ donations. The harms incurred to the living donor are outweighed by the benefit of prolonging the recipient’s life. In contrast, the donation of a uterus from a living donor is not essential to the recipient’s life. The uterus is a non-vital organ. UTx, if successful, only provides the temporary experience of gestation. The favorable harm to benefit ratio that justifies living vital organ donation cannot be applied to UTx. With the current low success rate of live births after UTx, even the potential joy and fulfillment a living donor may feel from helping an infertile woman cannot warrant the practice. Overall, the ethical arguments in favor of living vital organ donation cannot be applied to living *non-vital* uteri donation.

IV. MORAL IMPERMISSIBILITY OF UTx WITH LIVING DONORS

A. Kant’s Categorical Imperatives

Even though utilitarianism favors UTx with living donors and natural rights deems it morally permissible, Kant’s categorical imperatives and natural law stress why UTx with living donors is morally impermissible. UTx with living donors violates Kant’s categorical imperatives. According to Kant’s categorical imperatives, rational beings are ends in themselves, because they are beings capable of morality. This would include the recipient and donor. Kant writes, “Act so that you treat humanity, whether in your own person or in that of another, always as an end and never as a means solely.”³⁴ In UTx with living donors, the donor is merely a means to the recipient’s restored gestational ability. The removal of the uterus after live birth showcases how the living donor is purely instrumental in the practice. The use and discard of the organ correlates to the use of the living donor in UTx. The failure to treat living donors as ends in themselves in UTx deems UTx with living donors morally impermissible. Therefore, UTx must rely on deceased donors.

33 Williams, 420.

34 Kant, *Foundations of the Metaphysics of Morals*. II.429.

B. Natural Law

Natural law also prohibits UTx with living donors. It originates from Thomas Aquinas's principle that "good is to be done and pursued, and evil is to be avoided."³⁵ In UTx, however, the good of enabling a woman afflicted with AUI to experience gestation must be balanced with the evil of harm to the living donor. In natural law, the principle of double effect is used to balance beneficence and non-maleficence. The principle of double effect holds:

An action that has a good and bad effect is morally permissible if and only if the following conditions are satisfied:

(1) The action itself is not morally incorrect—that is, does not violate by itself any moral norm and ultimately the principles of beneficence and nonmaleficence;

(2) The good effect intended by the agent is not achieved through the bad effect;

(3) The bad effect is not intended by the agent but only foreseen and tolerated; and

(4) There is proportionality between the good effect and the bad one. If the good effect is minimal and the bad effect considerable, such that there is no proportionality, the action will be wrong. Moreover, if there is an alternative course of action that does not involve producing the bad effect, that course should be followed.³⁶

The principle of double effect establishes that a morally neutral action with both good and bad effects is permissible if the bad effect is not necessary or intended and the good effect outweighs the bad effect. UTx via living donors satisfies the first and third conditions but violates the second and the fourth condition. In the case of UTx via living donors, the good effect is the recipient's restored ability to experience gestation and the bad effect is harm to the living donor. UTx does not necessarily violate the principles of beneficence or non-maleficence. Considering the second condition, if unnecessary invasive surgery and hours of anesthesia are considered harm, and they are both presently necessary to procure a uterus from a living donor, then the good effect is achieved through the bad effect. With regards to the third condition, harm to the living donor is not intended to obtain the uterus, although the negative effects are foreseen. Lastly, the fourth condition of proportionality is violated in UTx with living donors. The potential harm to the living donor does not equate to the potential benefit for the recipient. Flynn and Ramji note, "We must appreciate this potential to compromise the donor's vital organs (the kidneys) or essential daily functioning (as a result of fistula, which may be present

as persistent vaginal leakage of urine) in order to obtain a nonvital organ (the uterus) for the recipient."³⁷ Whereas in living vital organ transplants, similar harms are justified through the greater benefit of saving the recipient's life, the benefit of gestation is not necessarily a good worth the same risk. An alternative course of action, UTx with deceased donors, avoids harm to the living donor and ought to be pursued. Overall, UTx with living donors is morally impermissible through the principle of double effect, and thus we should favor deceased donors in organ procurement.

In addition to the physical harm to living donors, UTx with living donors can cause psychological harm in unsuccessful cases. Living kidney donors have reported "depression, anger, disillusionment, and a sense of betrayal."³⁸ In more extreme cases, suicides have occurred.³⁹ This is because living donors become invested in the recipient's outcome. In the context of UTx, living donors can become invested in the outcome of a live birth. Given that clinical trials so far have only approximately a 25 percent chance of successful live birth after UTx with living donors, there is greater chance of psychological harm to the living donor.⁴⁰ Precautions are taken to ensure psychological stability of living kidney donations as to prevent psychological harm. While similar psychological evaluations are conducted for living uterus donors, the greater chance of failure in UTx, compared with kidney transplants, implies greater risk of psychological harm. To avoid the psychological harm living donors may experience, UTx ought to use uteri from deceased donors only.

Correspondingly, UTx with living donors entails more potential violation of autonomy as there are more factors influencing a potential living donor than a deceased donor. The principle of respect for autonomy, which operates in discourses of natural law, states, "Every agent should respect the freely chosen actions of a person as long as they do not harm others."⁴¹ In cases of UTx in which the donor and recipient are related, the donor's autonomy may be especially at stake. Living donors, unlike deceased donors, "have the burden that they may experience pressure to give and take the uterus."⁴² Consequently, the potential living donor's decision to donate may not be entirely freely chosen. A living donor may also regret her decision if she later desires children, though this could be circumvented by only allowing post-menopausal women to donate. Nonetheless, despite the existing procedures to obtain informed consent, it may not be possible to guarantee fully informed consent in every instance of UTx. If

37 Flynn and Ramji, "Uterine Transplantation." 4.

38 Lefkowitz, Edwards, and Balayla, 443.

39 Lefkowitz, Edwards, and Balayla, 443.

40 Wonder within Wonder."

41 Gómez-Lobo and Keown, 21.

42 Williams, 422.

35 Gómez-Lobo and Keown, *Bioethics and the Human Goods*. 11.

36 Gómez-Lobo and Keown, 59-60.

UTx becomes widespread, some centers may “lack the resources or institutional stability required to afford such protections to donors.”⁴³ Thus, Williams asserts, “The possibility of a failure to obtain informed consent and regret may provide adequate reason to suggest that only deceased donors should be used.”⁴⁴ It is unnecessary to risk a failure to respect a living donor’s autonomy for a non-vital transplant when it can be avoided by procuring uteri solely from deceased donors.

Because UTx with living donors is morally impermissible, UTx should only be performed with deceased donors. UTx with deceased donors eliminates the risk of physical and psychological harm to the donor. Likewise, the implications of a failure to respect autonomy are less severe in UTx with deceased donors than with living donors. Unlike a living donor, a deceased donor is not susceptible to coercion and will not experience regret after donation. To conclude, as supported by Kant’s categorical imperatives and natural law, UTx with living donors is unethical.

A counterargument to the exclusive procurement of uteri from deceased donors is the problem of distributive justice. There is a limited supply of organs from deceased donors. According to the U.S. OPTN, only 3400 of 4000 total female donors were between the ages of 18 and 64.⁴⁵ As this is far less than the number of women afflicted with AUI, organ supply cannot meet the potential demand. Another problem of distributive justice is the inability of all women with AUI to afford UTx if it becomes clinically available. If UTx was offered to the 85,000 potentially appropriate recipients in the U.S., it would cost \$8.5 to \$21.25 billion.⁴⁶ It is unlikely UTx would be covered by public funding in the U.S. Given the inability to provide UTx with deceased donors such that distributive justice exists, some argue UTx with living donors is morally defensible while others argue UTx cannot be performed at all.

To refute the counterargument of distributive justice, I assert the non-vital nature of UTx and the options of surrogacy and adoption women with AUI may choose instead. Because the procedure is not lifesaving, there is not an urgent need for the demand for organs to be met. Moreover, the demand for uteri is not as great as perceived. This is because surrogacy and adoption are alternative routes to parenthood women may choose. The limited supply forces clinicians and patients to consider other options so that only women whose psychological pain from infertility cannot be alleviated through surrogacy and adoption will be offered the procedure. Lastly, the procurement of uteri from deceased donors will decrease the estimated costs.

Without the need to treat the donor as a patient and follow-up after organ removal, UTx with deceased donors will be more affordable. In general, the practical problems raised by the counterargument can be addressed.

V. CONCLUSION

A. Practical Recommendations

As UTx with living donors is morally impermissible due to the treatment of individuals as means to an end, disproportionate risk of harm, and potential violation of autonomy, UTx ought to be improved in other ways. I propose practical recommendations for clinical trials, research, and organ procurement if UTx becomes publicly available. Clinical trials should focus on increasing the rate of successful live births after UTx with deceased donors. I recommend improving the management of uteri from deceased donors between removal and transplantation to maximize uterine function, improving the transplantation surgery for the recipient, and investigating less harmful immunosuppression regimes. Alternative methods of UTx through bioengineered uteri should be researched. Uteri could be developed from the recipients’ stem cells, which would minimize or eliminate the need for immunosuppression.⁴⁷ Bioengineered uteri could be a favorable alternative to uteri from deceased donors. If UTx passes clinical trials and becomes publicly available, the supply of uteri from deceased donors can be increased by making comprehensive information about the procedure accessible. Valid and unbiased information about UTx should be available to the public so that potential donors and surrogate decision makers will not have misconceptions that inhibit donation. Overall, improvements can be made to UTx, so that it is a viable option for women with AUI, without subjecting living donors to potential harm.

B. Final Notes

In this paper, the moral difference between UTx with living and deceased donors has been established such that UTx ought to be done exclusively with deceased donors. The non-vital and temporary nature of UTx distinguishes it from other organ donations from living donors. Thus, organ procurement for UTx from living donors is unethical. With the ethicality of uteri procurement defined, further questions regarding UTx must be answered before it becomes publicly available. As with other organ transplants, a fair allocation system must be in place. It has been suggested that the uteri

43 Williams, 423.

44 Williams, 423.

45 Shapiro and Ward, “Uterus Transplantation.” 36.

46 Shapiro and Ward, 37.

47 Brännström, “Uterus Transplantation and Beyond.” 70.

allocation system resemble that of other VCAs like the hand and face. Whether UTX ought to be performed on transgender individuals, if it is medically possible for a live birth to follow, is another question to be answered. Setting aside other considerations in UTX, by establishing the moral impermissibility of UTX with living donors, the efficacy of UTX can be improved so that women with AEFI experiencing psychological pain, whereby adoption and surrogacy are inadequate solutions, can have the option of a medical treatment.

ACKNOWLEDGEMENTS

Acknowledgement info goes here (from title page).

WORKS CITED

- Brännström, Mats. "Uterus Transplantation and Beyond." *Journal of Materials Science. Materials in Medicine* 28, no. 5 (2017). <https://doi.org/10.1007/s10856-017-5872-0>.
- Bruno, Bethany, and Kavita Shah Arora. "Uterus Transplantation: The Ethics of Using Deceased Versus Living Donors." *The American Journal of Bioethics* 18, no. 7 (July 3, 2018): 6–15. <https://doi.org/10.1080/15265161.2018.1478018>.
- Ejzenberg, Dani, Wellington Andraus, Luana Regina Baratelli Carelli Mendes, Liliana Ducatti, Alice Song, Ryan Tanigawa, Vinicius Rocha-Santos, et al. "Livebirth after Uterus Transplantation from a Deceased Donor in a Recipient with Uterine Infertility." *The Lancet; London* 392, no. 10165 (December 22, 2018): 2697–2704. [http://dx.doi.org/10.1016/S0140-6736\(18\)31766-5](http://dx.doi.org/10.1016/S0140-6736(18)31766-5).
- Ejzenberg, Dani, Luana Regina Baratelli Carelli Mendes, Luciana Bertocco de Paiva Haddad, Edmund Chada Baracat, Luiz Augusto Carneiro D'Albuquerque, Wellington Andraus, Dani Ejzenberg, et al. "Uterine Transplantation: A Systematic Review." *Clinics* 71, no. 11 (November 2016): 679–83. [https://doi.org/10.6061/clinics/2016\(11\)10](https://doi.org/10.6061/clinics/2016(11)10).
- Flynn, Jennifer, and Naila Ramji. "Uterine Transplantation: Ethics in Light of Recent Successes." *IJFAB: International Journal of Feminist Approaches to Bioethics* 12, no. 1 (March 7, 2019): 1–23.
- Gómez-Lobo, Alfonso, and John Keown. *Bioethics and the Human Goods: An Introduction to Natural Law Bioethics*. Georgetown University Press, 2015. <https://muse.jhu.edu/book/44746>.
- "Guidance to Organ Procurement Programs (OPOs) For VCA Deceased Donor Authorization." Organ Procurement Transplantation Network. Accessed April 27, 2019. https://optn.transplant.hrsa.gov/media/1137/vca_donor_guidance.pdf.
- Kant, Immanuel. *Foundations of the Metaphysics of Morals*. Translated by Lewis White Beck, n.d.
- Kisu, I., Y. Kato, H. Obara, K. Matsubara, Y. Matoba, K. Banno, and D. Aoki. "Emerging Problems in Uterus Transplantation." *BJOG: An International Journal of Obstetrics & Gynaecology* 125, no. 11 (2018): 1352–56. <https://doi.org/10.1111/1471-0528.15230>.
- Lefkowitz, Ariel, Marcel Edwards, and Jacques Balayla. "The Montreal Criteria for the Ethical Feasibility of Uterine Transplantation." *Transplant International* 25, no. 4 (2012): 439–47. <https://doi.org/10.1111/j.1432-2277.2012.01438.x>.
- Locke, John. *The Second Treatise on Civil Government*, n.d.
- Mill, John Stuart. *Utilitarianism*. Edited by George Sher. Second. Hackett Publishing Company, Inc., 2001.
- Shapiro, Michael E., and Frances Rieth Ward. "Uterus Transplantation: A Step Too Far." *The American Journal of Bioethics* 18, no. 7 (July 3, 2018): 36–37. <https://doi.org/10.1080/15265161.2018.1478027>.
- Taneja, Alankrita, Siddhartha Das, Syed Ather Hussain, Mohammed Madadin, Stany Wilfred Lobo, Huda Fatima, and Ritesh G. Menezes. "Uterine Transplant: A Risk to Life or a Chance for Life?" *Science and Engineering Ethics*; New York, February 2018, 1–8. <http://dx.doi.org/10.1007/s11948-018-0018-4>.
- Williams, Nicola. "Should Deceased Donation Be Morally Preferred in Uterine Transplantation Trials?" *Bioethics* 30, no. 6 (2016): 415–24. <https://doi.org/10.1111/bioe.12247>.
- "Wonder within Wonder." Penn Today. Accessed April 28, 2019. <https://penntoday.upenn.edu/news/wonder-within-wonder-uterus-transplant-trial>.



Author

Lilian Bui

Lilian (Lily) Bui is a member of the Villanova Class of 2021, pursuing degrees in Biology, Peace and Justice, and Honors. She researches *Candida glabrata* under the mentorship of Dr. Dennis Wykoff. In 2019, she conducted research on rapid diagnostic testing at Nemours/AID-HC through the Nemours Summer Undergraduate Research Program. She is the senior editor of the *Care Chronicles* and head chair for Hunger and Homelessness Awareness Week committee. After graduation, she plans on becoming a primary care physician and continuing to study the ethical and social impact of medicine. Lily is a Villanova Presidential Scholar.



Mentor

Dr. Sarah-Vaughan Brakman

Sarah-Vaughan Brakman is a professor of philosophy at Villanova University. She received her Ph.D. from Rice University and researches ethics of adoption, biomedical ethics, clinical ethics, and philosophy of medicine. She also serves as an ethics consultant and chair for the National Ethics Committee with Devereux Advanced Behavioral Health. Brakman is co-editor of *The Ethics of Embryo Adoption and the Catholic Tradition: Moral Arguments, Economic Reality and Social Analysis* (2007) and has authored scholarly articles and book chapters in her field.