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THE NEW MATERNITY ORDER: UTERUS TRANSPLANT WITH ITS ETHICAL AND LEGAL ASPECTS

YENİ ANNELİK DÜZENİ: ETİK VE HUKUKİ BOYUTLARIYLA RAHİM NAKLİ

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Anahtar Kelimeler

Rahim Nakli, Biyo-etik İlkeler, Utiliteryanizm, Kant'ın Ödev Etiği, Çifte Etki Kuramı, Kompozit Doku Nakilleri.

Özet

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Rahim, sperm ile yumurtanın döllenmesiyle oluşan embriyonun yerleştiği ve doğuma kadar gelişimini sürdürdüğü üreme organıdır. Mutlak uterin faktör infertilitesi, küresel ölçekte üreme çağındaki kısır kadınların %3 ila %5'ini etkilemektedir. Rahim naklinin deneysel çalışmalardan klinik denemelere geçmesi ve bu yolla bebek sahibi olunmaya başlanmasıyla birlikte rahim nakli, bu kadınların kendilerine genetik olarak ait çocuk sahibi olmalarını üstelik kendi rahimlerinde büyütebilmelerini sağlayabilecek bir çözüm sunmaktadır. Rahim nakli, tüp bebek ve embriyo dondurulması ön prosedürü gerekliliği nedeniyle hem yardımcı üreme teknolojisini hem de organ naklini birleştiren bir işlemdir ve bu nedenle 'ikisi arasında yeni bir iş birliği seviyesini' temsil eder. Rahim naklinin deneysel bir klinik prosedürden klinik denemelere geçişi ve olumlu erken sonuçlar vermesi ile bu çalışmada paydaşların her biri için geçerli olan etik tartışmalar, bu çalışma kapsamında biyo-etik ilkeleriyle ve belli başlı teoriler ile gözden geçirilecektir. Rahim nakli yaşam kurtarıcı olmayan fakat yaşam kalitesini arttırıcı nakillerdir. Bu bağlamda rahim nakli de Organ ve Doku Nakli Hizmetleri Yönetmeliği'nin kapsamına alınan kompozit doku nakli türü olarak kabul edilmektedir. Bununla birlikte rahim nakli, içerisinde yer aldığı kompozit doku nakillerinden de farklılıklar taşır. Türk Hukuk düzeninde Kompozit Doku Nakli Merkezleri Yönergesi'nin "donör" tanımı gereğince, yaşayan kişilerin kompozit doku verme borcu altına giremeyecekleri kabul görmektedir. Bu durumda rahim nakli de kompozit doku kapsamına girmekle hukuk düzenimize göre yalnızca ölü vericiden yapılabilecektir sonucu çıkmaktadır. Ayrıca Kompozit Doku Nakli Yönergesi'nde bu tür nakillerdeki tıbbi endikasyon türleri arasında da rahim nakilleri açık bir şekilde zikredilmemektedir. Bu hukuki belirsizlik dahi rahim nakillerinin kompozit doku nakli şemsiyesinden ayrı bir düzenleme ile ele alınması gereğine işaret etmektedir.

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Keywords

Uterine Transplantation, Bioethical Principles, Utilitarianism, Kant's Duty Ethics, Double Effect Theory, Composite Tissue Transplants.

Abstract

The uterus is the reproductive organ where the embryo formed by the fertilization of the sperm and egg settles and continues its development until birth. With the transition of uterus transplantation from experimental studies to clinical trials and starting to have babies in this way, uterus transplantation offers a solution that can enable these women to have children genetically on their own and grow them in their wombs. Uterine transplant is a procedure that combines both assisted reproductive technology and organ transplantation due to the necessity of in vitro fertilization and embryo freezing pre-procedure and thus represents a new level of cooperation between the two. With the transition of uterus transplantation from an experimental clinical procedure to clinical trials and its positive early results, ethical discussions applicable to each of the stakeholders in this study will be reviewed with bioethical principles and major theories. Uterine transplants are not life-saving, but life-enhancing transplants. In this context, uterus transplantation is accepted as a type of composite tissue transplantation included in the Organ and Tissue Transplant Services Regulation. However, uterus transplantation is also different from composite tissue transplantations in which it is included. By the definition of "donor" in the Composite Tissue Transplant Centers Directive in the Turkish legal system, it is accepted that living persons cannot be obliged to donate composite tissue. In this case, it is concluded that uterus transplantation is also included in the scope of composite tissue, and according to our legal order, it can only be done from a dead donor. In addition, in the Composite Tissue Transplantation Directive, uterine transplantation is not mentioned among the medical indications for such transplantations. Even this legal uncertainty points out that uterus transplants should be handled with a separate arrangement from the composite tissue transplant umbrella.

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I. INTRODUCTION

The uterus is the reproductive organ where the embryo formed by the fertilization of the sperm and egg settles and continues to develop until the moment of birth. Absolute uterine factor infertility (AUFI) affects 3% to 5% of infertile women of reproductive age globally[1]. Congenital absence of the uterus may be present in women suffering from uterine structural defects, as in Mayer-Rokitansky-Kuster-Hauser syndrome. Or infertility with uterine factor is not congenital and may develop later hysterectomy due to fibroids, severe postpartum hemorrhage, or cancer[2].

Since there is no successful treatment for infertility caused by the absence of the uterus, patients suffering from it can become mothers through adoption or surrogacy. In countries where surrogacy is not legal, uterus transplantation offers a solution that can enable these women to have children genetically linked to them and make them grow in their wombs[3]. In contrast to a more passive role in adoption and surrogacy practices, uterus transplant appears to be an option that gives women the opportunity to play an active role in the health and well-being of their children[4].

Uterine transplantation is a procedure that combines both assisted reproductive technology and organ transplantation and thus represents a new level of cooperation between the two, due to the necessity of in vitro fertilization and embryo freezing pre-procedure[5].

Uterus transplantation studies on animals have been carried out since the 1960s[6]. The first human-to-human uterus transplant was performed in Saudi Arabia in 2000, but the uterus had to be removed as a result of the blockage of the vessels feeding the uterus. Following this, the first baby from a living donor was born in 2014 in Sweden[7]. The first live birth after a uterus transplant from a dead donor took place in Brazil (in 2018), followed by the United States in 2019[8]. The first clinical pregnancy in the world as a result of uterus transplantation from a dead body was performed in 2011 by Prof. Dr. Ömer Özkan, who is a member of Akdeniz University Faculty of Medicine, on a 21-year-old woman who did not have a congenital uterus[9]. 9 years after the uterus transplant surgery, a baby boy weighing 760 grams was born in 2020, in the 28th week of pregnancy. The second transplant in Turkey was performed with a uterus taken from a dead donor in July 2021, also at Akdeniz University.

II. ETHICAL ASPECTS OF UTERUS TRANSPLANTATION

Given the transition of uterus transplantation from an experimental clinical procedure to clinical trials and its positive early results; this chapter will review the ethical debates applicable to each of the stakeholders involved, first with bio-ethical principles and then with major ethical theories.

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[1] This means that 1.5 million women of reproductive age are affected by uterine factor infertility. KIRCA, Nuran/ÖNGEN, Meryem: "İnfertilite Tedavilerinde Etik Sorunlar", Türkiye Biyoetik Dergisi, 7(1), 2020, p.12,14.

[2] WALL, Anji E/TESTA, Giuliano/AXELROD, David/JOHANNESSON Liza: "Uterus transplantation-questions and answers about the procedure that is expanding the field of solid organ transplantation", Baylor University Medical Center Proceedings, 34(5), 2021, p.581–585.

[3] ÖZTÜRK, Ruşen/SEVİL, Ümran: "Uterus Transplantasyonu ve Etik", Gümüşhane Üniversitesi Sağlık Bilimleri Dergisi, 2(4), 2013, p.535-536; 'Kısırlık Tedavisinde Rahim Nakli', https://www.drhit.com/kisirlik-tedavisinde-rahim-nakli/, (Erişim: 10.11.2022).

[4] Results of a semi-structured interview with patients in the UK; revealed that they preferred uterine transplantation to surrogacy and adoption due to pregnancy experience and their desire for biological connection and bureaucratic difficulties. Surveys of pregnant women in Sweden and Japan also have shown that uterus transplant is preferred over surrogacy. WALL/TESTA/AXELROD/JOHANNESSON, p.581–585; KOPLİN, Julian/KENDAL, Evie: "Ethical issues in uterine transplantation", Korean J Transplant, (34), 2020, p.78-83; ALJERİAN, Khaldoon: "Uterine Transplant: An Ethical Framework Analysis From A Middle Eastern Perspective", Current Medical Research And Opinion, 37(6), 2021, p.1049–1060.

[5] VALİ, Saaliha/JONES, Benjamin. P/SASO, Srdjan/FERTLEMAN, M/TESTA, Giuliano/JOHANESSON, Liza/ALGHRANİ, Amal/SMITH, Richard: "Uterine transplantation: legal and regulatory implications in England", BJOG, 2021, https://doi.org/10.1111/1471-0528.16927 (Erişim: 02.02.2022).

[6] Clinical research on uterus transplants has progressed from animal studies beginning in the 1960s to human transplants. The first uterus transplantation was performed in a dog in 1966, and into many other animal models successfully in subsequent years following advances in immunosuppressant drugs and microsurgical procedures. In 2015, researchers from Japan took a step forward by performing the first minimally invasive uterus transplant surgery in non-human primates (cynomolgus monkeys) using a living donor. Surgical results have shown that the ovarian vein method for living donor surgery is less invasive than the deep uterine vein method. ALJERİAN, p.1049–1060; USLU, Nihal/AVCI, Mehmet Zeki/HAYLI, Çiğdem Müge: "Ethical Aspects of Uterus Transplantation", Journal of International Health Sciences and Management, 8(15), 2020, p.84.

[7] PAÇACI, İbrahim: "İslâm Hukukunda Kadın İç Üreme Organları Naklinin Hükmü", Aksaray Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 2(2), 2018, p.38.
The uterus donor was 61 years old and doctors expressed that they were astonished that such an old womb could work. DİCKENS, Bernard M: "Legal and ethical issues of uterus transplantation", International Journal of Gynecology and Obstetrics, (133), 2016, p.125–128.

[8] GARBUZOVA, Elizaveta: "Addressing Infertility with Uterine Transplant: An Ethical Analysis of Three Categories of Donors", Voices in Bioethics, (7), 2021, p.1-5.

[9] In this first uterus transplant performed at Akdeniz University Hospital in Turkey, the donor was a 22-year-old woman who had brain death as a result of a traffic accident, and the recipient was a 21-year-old woman with MRKH (Mayer Rokitansky Kuster Hauser) syndrome. The transplant lasted six hours and daily thymoglobulin was given for 10 days, followed by tacrolimus and prednisolone. Menstruation occurred 20 days after the operation and the menstrual cycle continued for one year without rejection. Despite multiple embryo transfer attempts over four years, no successful pregnancy has been observed. Finally, in 2013, the first clinical pregnancy in the world after uterine transplantation was achieved in this case, but the pregnancy was terminated in 8th week. ÜN, Mine/ERBAŞ, Oytun: "Uterus Nakli", FNG & Demiroğlu Bilim Tıp Transplantasyon Dergisi, 3(1-2), 2018, p.42-46; KOYUN, Ayşe: "Uterus Naklinde Etik: Değerler ve İlkeler", Turkiye Klinikleri J Med Ethics, 25(3), 2017, p.117.

A. Principles of Beneficence and Do No Harm

Principles of beneficence and non-maleficence require a judgment as to whether or where the benefits of uterine transplantation outweigh the risks. Uterine transplantation is more complex than other organ transplants and involves additional risks. This is because to have a live birth after a uterus transplant, several medical procedures are required before and after the transplant. First, the recipient's eggs and her partner's sperm are subjected to in vitro fertilization and the resulting embryos are cryopreserved[10]. Then the uterus taken from the donor is transferred to the recipient. Since this is an organ and tissue transplantation procedure; the recipient receives an immunosuppressant to combat organ rejection. After successful transplantation, the cryopreserved embryos are transferred into the uterus. Pregnancy occurs and the recipient gives birth by cesarean section. A hysterectomy is then performed to eliminate the need for immunosuppression therapy. Therefore, uterine transplant recipients are at significant risk of physical harm, including immunosuppression to prevent graft rejection and pregnancy risks in a treatment process that involves multiple surgeries and procedures such as IVF, transplant surgery, embryo transfer, cesarean delivery, and graft hysterectomy.

The question of the risk-benefit ratio arises because uterine transplantation is a life-enhancing procedure rather than a life-saving treatment like heart transplantation. It is therefore recommended to remove the uterus after two birth cycles (or after five years as stated in some transplant centres). This criterion is to avoid lifelong intake of immunosuppressive drugs that may have adverse effects such as the increased chance of malignancy (cancer), bone marrow suppression, infections, and cardiovascular system diseases. In addition to the effects of immunosuppression, the transplanted uterus is also at risk of vascularization, which can affect both the development of the baby and the health of the mother Immunosuppressive drugs also cause serious pregnancy complications such as ectopic pregnancy, miscarriage, pregnancy toxicity (preeclampsia), premature birth, low birth weight, and stillbirth. Therefore, participants should be informed about the short- and long-term risks of surgery and the adverse effects of immunosuppression on the fetus in case of pregnancy[11].

However, after weighing the risks and benefits, the primary benefit to be considered is the opportunity to experience pregnancy[12] and childbearing. Uterine transplantation is the only treatment option that anatomically and physiologically restores fertility due to the absence of the uterus and enables biological, legal, and social parenthood. It is these goals that distinguish uterus transplants not only from other forms of organ transplants but also from other ways of achieving parenthood such as adoption or surrogacy[13].

Uterus transplants also carry risks for parties other than recipients, especially children who will be subjected to immunosuppressive treatment in the womb. Drugs that suppress the immune system are likely to cause serious harm to the unborn baby[14]. The vascular anatomy of a transplanted uterus differs from that of a natural uterus because the blood supply is connected only to the lower uterine arteries and blood outflow is connected to two vessels instead of the natural four. Because of the altered blood flow, questions have arisen as to whether the transplanted uterus can function as well as a natural uterus in meeting nutritional demands and providing an environment for fetal growth. Other major concerns are related to the risks of teratogenic i.e. congenital defects or defects in fetal development and immunosuppressive therapy.

However, long-term exposure to these immunosuppressive drugs would be impossible since the uterus can be removed after a successful pregnancy. In addition, data that can be obtained from birth statistics after other solid organ transplants may shed some light on this issue. Although few deliveries have been reported following uterus transplant to date, the safety of certain immunosuppression drugs during pregnancy has been demonstrated in other solid organ transplant recipients. Registry data from more than 15,000 women worldwide who experienced pregnancies after organ transplantation suggest an increased risk of mild prematurity, low birth weight, and hypertension. However, the risks of structural malformations/anomalies are not increased when FDA*-approved immunosuppressants are used during pregnancy[15]. Although there are few studies on babies born after uterus transplantation, some data also support this result[16]. In addition,

[10] There is a possibility of damage to the ovaries during the surgical procedure. Therefore, before uterine transplantation, the ovaries should be harvested by in vitro fertilization and frozen. KOYUN, p.119.

[11] ALJERİAN, p.1049–1060; GRACA, Briget da/JOHANNESSON, Liza/TESTA, Giuliano/WALL, Anji: "Uterus transplantation: ethical considerations", Current Opinion in Organ Transplantation, 26(6), 2021, p.664-668; ÖZTÜRK/SEVİL, p.540-542.

[12] Considering that neural innervation, i.e. the construction of nerves entering and leaving the organ, is not currently possible and therefore many pregnancy-related sensations cannot be felt, the risk of disappointment for the recipients is high even in the case of a successful transplant. For this view, see. KOPLİN/KENDAL, p.78-83.

[13] KOPLİN/KENDAL, p.78-83; GRACA/JOHANNESSON/TESTA/WALL, p.664-668.

[14] 'Kısırlık Tedavisinde Rahim Nakli', https://www.drhit.com/kisirlik-tedavisinde-rahim-nakli/, (Erişim: 10.11.2022).

* Preeclampsia, also known as pregnancy poisoning, is a condition in which pregnancy progresses abnormally. Hypertension, protein in the urine, and oedema (swelling in the body) that develops from the second half of pregnancy are called preeclampsia.

* FDA: United States Food and Drug Administration.

[15] YORK, Jackie R/TESTA, Giuliano/GUNBY, Robert T/PUTMAN, J. Michael/MCKENNA, Gregory J. /KOON, Eric/ BAYER, Johanna/ ZHANG, Lilly/GREGG, AR, JOHANNESSON, Liza: "Neonatal Outcomes after Uterus Transplantation: Dallas Uterus Transplant Study", American Journal of Perinatology, 2021, DOI:10.1055/s-0041-1727212 (Erişim: 10.01.2022); WALL/TESTA/AXELROD/JOHANNESSON, p.581–585; ALJERİAN, p.1049–1060; GRACA/JOHANNESSON/TESTA/WALL, p.664-668; KOYUN, p.121.

[16] The first 12 babies born after uterine transplantation at a center in the USA (Baylor University Medical Center, Dallas) are described in detail. According to the data collected over three years (September 2016-August 2019), the study shows that preterm birth mostly had respiratory-related complications in the infant. On the other hand, it was observed that all babies grew properly in the womb during the gestation period and there were no adverse effects of immunosuppressive drugs. A concern after pregnancy

the fact that the child in question would not have existed if a different path had been followed is an issue that should be considered when weighing the balance of benefit and harm to the unborn child.

Uterine transplants from both living and brain-dead donors can result in a live birth. Although the majority of uterine transplants resulting in a live birth have been obtained from a living donor rather than a brain-dead donor, there is insufficient data to make definitive comparisons between living and deceased donors[17]. The ethical issue, which is also of primary concern for living donors, is not to harm these women for undergoing uterine removal surgery for a purpose unrelated to their physical health. Therefore, the risk they take is completely unnecessary for them.

On the other hand, uterine transplantation from a living donor; benefits include closer tissue matching where relatives are used, higher organ quality due to significantly reduced hot and cold ischemia times, and reduced waiting times due to dead donor organ shortages. While maximizing success rates and practical benefits lead to a preference for living donors, the principles of donor well-being and autonomy work against living donors[18].

These risks are likely to decrease over time through surgical techniques and post-operative care improvement. Ongoing research into the use of robotic-assisted surgery to reduce the operative time for donors and recipients is also directed toward this goal[19].

Since the removal of the uterus from a living donor is ethically controversial for the reasons mentioned above, the option of another living donor group is discussed as a solution. This group of candidates is female-to-male (FtM) transgender individuals who have voluntarily undergone hysterectomy. In a study of female-to-male transitions, participants were interviewed about their attitudes toward uterus donation. Of the 31 participants, 96.7% had favorable attitudes at the beginning, but this rate decreased slightly after learning detailed procedural information about the operation, and 84% remained willing to volunteer for uterus donation. Since a hysterectomy to obtain a uterus is more complex than a hysterectomy performed as part of sex reassignment surgery, this explanation will need to be carefully made during the informed consent process[20].

B. Autonomy

Uterine transplantation is a medical treatment that expands reproductive options for women with reproductive dysfunction to form and complete their families according to their values and preferences. The ability to shape one's life according to own values is a central aspect of self-determination and thus of the principle of autonomy. From this perspective alone, however, we may miss some difficult issues about how best to respect and promote autonomy in the context of uterine transplantation. Pressure from family members to continue the process to the recipient and donor runs the risk of making consent purely voluntary. These are related to socially repressive norms and stereotypes about reproduction and can exert pressure on the decisions of both donors and especially recipient women in the process of uterine transplantation. Many feminists recognize pronatalism as an oppressive social force[21]. "Pronatalist" norms are those that portray childbearing and childrearing as always central and even a necessary element of life. Related "essentialist" norms are those that link being a "real" woman to childbearing and motherhood. Ultimately, it is genetic norms that define genetic offspring as 'ideal' and favor genetically linked families to socially constructed families. Whether these pervasive social pressures pose a real option for realizing the autonomy of uterine

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and the birth of a uterus-transplanted woman with immunosuppressive medication is the transmission of immunosuppression in breast milk prenatally (via the placenta) and/or postnatal. Most of the mothers in the study continued on tacrolimus, an immunosuppressant drug, after delivery, and although all infants were breastfed from birth, tacrolimus levels decreased in all infants from birth and reached sub therapeutic levels with DOL 5. Besides that, blood urea nitrogen and creatinine levels were tested in five infants and no renal dysfunction was found. YORK/TESTA/GUNBY/PUTMAN/MCKENNA/KOON/BAYER/ZHANG/GREGG/JOHANNESSON DOI:10.1055/S-0041-1727212 (Erişim 10.01.2022).

[17] GRACA/JOHANNESSON/TESTA/WALL, p.664-668.

[18] O'DONOVAN, Laura/WİLLİAMS, Nicola Jane/WİLKİNSON, Stephen: "Ethical and policy issues raised by uterus transplants", British Medical Bulletin, (131), 2019, p. 22; KOPLİN/KENDAL, p.78-83.

[19] CHMEL, Roman Jr/PASTOR, Zlatko/NOVACKOVA, Marta/CHMEL, Roman: 'Robot-assisted donor hysterectomy in uterus transplantation — a modality to increase reproducibility', 92(7), 2021, Ginekologia Polska, p.528, 528–531; GRACA/JOHANNESSON/TESTA/WALL, p.664-668.

[20] APİ, Murat/BOZA, Ayşen/CEYHAN, Mehmet: "Could the female-to-male transgender population be donor candidates for uterus transplantation?", Turk J Obstet Gynecol, 14(4), 2017, p.233-237; JAHROMİ, Alireza Hamidian/HOREN, Sydney R/DORAFSHAR, Amir H/SEU, Michelle L/RADİX, Asa/ANDERSON, Erica/JAMİSON, Green/FRASER, Lin/JOHANNESSON, Liza/TESTA, G & SCHECHTER, S.M/SCHECHTER, Lore: "Uterine transplantation and donation in transgender individuals; proof of concept", International Journal of Transgender Health, 22(4), 2021, p.349-352.

[21] Criticisms of uterus transplant are "to what extent it serves to reinforce societal prejudices about reproduction, whether it exacerbates the harm caused by infertility, and whether alternative options, particularly adoption, make it less desirable." O'DONOVAN/WİLLİAMS/WİLKİNSON, p.23; KOPLİN/KENDAL, p.78-83.
In a qualitative study on uterine transplantation, face-to-face interviews were conducted with the recipients of the donation from relative donors. The material analyzed in this article reports interviews with 10 women aged 26-37 years who discovered in adolescents that they had no uterus. The results of this research on the relational complexities and possibilities of organ donation from relatives suggest that there is a risk of pressure and emotional burden on both the uterine donor and recipient. There are also previous studies in which parents described donating a kidney to their children as 'natural'. In this context, it is not surprising that the interviewees openly expressed their wishes for their mothers to be voluntary uterus donors for them. However, expectations of what a mother should be willing to 'do' for her child and the relational dilemmas that can arise when such expectations are not met are also reflected in this research. GUNTRAM, Lisa: "May I have your uterus? The contribution of considering complexities preceding live uterus transplantation", Med Humanit, 2021, p.1–13. DOI:10.1136/medhum-2020-011864.

transplant donors and recipients and, if so, how best to address this challenge, remains an important and under-researched ethical question[22].

In addition to the principle of autonomy and connected with the principle of justice, the continuation of this question is about whether the uterus transplant should be financed by the public. State-approved and state-funded practices that aim to fulfil reproductive choices supported by the social norms that place the highest value on biological and genetic reproduction may lend legitimacy to these norms and thus - knowingly or unknowingly - contribute to their reinforcement. If skin-whitening treatments can prevent the harms of racism from being experienced, should we provide publicly funded skin-whitening treatments until such a time when white privilege no longer exists in cultures alongside educational strategies aimed at undermining racial norms against people of color? Such treatments may not only fruitful help to eliminate problematic norms but may also play a role in undermining elimination by legitimizing and reinforcing them. Here's to apply this hypothetical example by analogy: if public funding of these treatments potentially reinforces rather than counteract the social norms that make biological infertility painful and stigmatized, it is far from clear that such funding would benefit infertile women. Even if a uterine transplant is considered to meet a medical need for some women; this need does not support prioritizing other medical needs that we must meet in the context of limited medical resources[23]. What exactly is the importance of fulfilling the desire to have a genetically related child through pregnancy, and to what extent do we have a responsibility as a society to support the fulfilment of this desire? Is it necessary to financially support all breeding projects regardless of risk, cost, and, the chance of success?

Leaving these fundamental questions aside; public funding is unlikely to guarantee coverage at this stage, as a uterus transplant is currently not the standard treatment and is a costly undertaking. However, this may change as uterine transplants become more common and more live births occur.

C. A Small Contribution to the Living-Dead Donor Debate through Ethical Theories

It is argued that while utilitarianism favors uterine transplants from living and deceased donors, Kantian ethics is at least against uterine transplants from living donors. Taking the principle of benefit or the greatest happiness as the basis of ethics, utilitarianism accepts actions right that increases the happiness or pleasure or well-being of the maximum number of people by the principle of maximizing; otherwise, they are wrong when they tend to produce the opposite. Utilitarianism would mainly favor uterus transplants from both living and dead donors. This is because the principle of respect for the autonomy of both donor and the recipient would be fulfilled and the total happiness would increase compared to before the uterus transplant. The expansion of the recipient's family with the baby and the birth of a baby who has otherwise no chance to be born are positive factors that can be written in favor of profit in the profit and loss account. When the health risk to the uterus donor is bearable in proportion to the benefit, the act of donation can be justified with a pragmatic approach. From a pragmatic ethical point of view, uterus transplantation also benefits the woman culturally, since not only medical benefits but also other social benefits are to be considered. In this way, the woman's social status is raised; and her role as a mother is enhanced. The realization of reproductive rights through uterus transplantation is a state of complete well-being in utilitarian philosophy[24].

However, this ethical theory which evaluates actions according to their consequences; would support donation from a living donor, based on empirical data on more successful outcomes of transplants from living donors and its increasing access to the organ. According to Locke's theory of natural rights individuals "have the right, under the law of nature, to regulate their actions and dispose of their property and lives as they see fit, without asking permission or being subject to the will of others." Locke claims that everyone has the freedom to do what he or she wants as long as it does not violate the freedom of others. While traditional Lockean theory acknowledges that the individual "does not have the liberty of self-destruction", contemporary Lockean interpretations argue that individuals can renounce their right to life by disposing of it[25].

Against that uterine transplantation with living donors would violate Kant's categorical imperative. According to Kant's categorical imperative, which states 'Always treat humanity, whether in your person or the person of another, in such a way as to treat it as an end, never merely as a means, living donors are only a means to the recipient's restored ability to conceive. The removal of the uterus after live birth illustrates how the living donor is purely an instrument in practice. The living person who donates an organ temporarily, not for the survival of the recipient; serves as a tool for the recipient's ability to experience pregnancy. The failure to treat living donors as an end in themselves indicates that uterus transplants with living donors are morally unacceptable. In terms of Kant's ethics, the maxim that guides the action of the living donor cannot become a universal moral law that everyone can expect to follow without contradicting themselves. That is, it is difficult to speak of a general maxim of action that everyone can be expected to be a donor of the uterus even if they recognize themselves as a living donor. Also in the context of the principle of autonomy, the

[22] LOTZ, Mianna: "Public Funding of Uterus Transplantation: Deepening the Socio-moral Critique", Bioethics, 35(7), 2021, p.664-666; O'DONOVAN/WİLLİAMS/WİLKİNSON, p.21.
[23] LOTZ, p.668.
[24] DOĞAN, Cahid: "Rahim (Uteris) Nakli: Hukuki Görünümler ve Etik Gerçekler", in Doğan, Murat/Doğan, Cahid (ed.), Organ ve Doku Naklinde Hukuki ve Cezai Sorunlar Paneli, Adalet Yayınevi, Ankara, 2020, p.61-62.
[25] BUİ, Lilian: "(Uterus) Wanted: Dead or Alive Ethical Organ Procurement from Living and Deceased Donors for Uterine Transplantation", Veritas: Villanova Research Journal, (2), 2020, p.45-46.

fact that the living donor should not act on emotions to be recognized as autonomous seems to be a difficult factor to actualize in uterus transplants.

Thomas Aquinas' view of natural law derives from the principle that "goods must be done and evil must be avoided" and the principle of double effect is used to balance benefit and harm. An action that has both good and bad effects is morally permissible if and only if the following conditions are fulfilled:

(1) The action itself is not morally wrong and in itself does not violate any moral norms and ultimately the principles of beneficence and non-maleficence;
(2) The good effect intended by the perpetrator(s) is not achieved by the bad effect;
(3) The bad effect is not intended by the perpetrator, but is only foreseen and tolerated;
(4) There is proportionality between the good and bad effects. If the good effect is minimal and the bad effect is significant, the action will be wrong because there is no proportionality. Also, if there is an alternative course of action that does not cause bad effects, that course should be pursued.

The principle of double effects states 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. Uterine transplantation does not necessarily violate the principles of beneficence or non-maleficence per se. In the case of uterus transplantation by living donors, the good effect is that the recipient is given the ability to experience pregnancy, and the bad effect is that it harms the living donor. Considering the latter condition, the good effect is achieved through the bad effect if unnecessary invasive surgery and hours of anesthesia are seen as harmful, and both need to obtain a uterus from a currently living donor. Regarding the third condition, although adverse effects are anticipated, harm to the living donor to obtain the uterus is not intended. Finally, the fourth proportionality condition is violated in living donor uterus transplantation. The potential harm to the living donor is not equal to the potential benefit to the recipient(s). In organ transplants from a living person, the greater benefit of saving the recipient's life outweighs the harm to the donor. However, a uterus transplant is not a life-saving treatment and may not balance worth the risk. An alternative course of action is to remove the uterus from a dead donor to avoid harming the living donor. As can be seen, uterus transplantation through living donors fulfils the first and third conditions; but violates the second and fourth conditions. According to the principle of double effect, it is morally unacceptable to donate with living donors, and therefore it is appropriate to prefer dead donors for organ harvesting. However, in this interpretation, the inference that uterine transplantation violates the second and fourth principles is also open to discussion[26].

III. LEGAL DIMENSION

In addition to being an assisted reproductive treatment, uterus transplantation is an organ transplant, but not a transplantation of life-threatening internal solid organs. Article 4/1/ğ of the Regulation on Organ and Tissue Transplant Services defines organ and tissue transplantation as a method "applied in the treatment of terminal diseases". Compared to solid organ transplants, uterine transplant is neither life-saving nor increases survival time, besides that recipients of uterus transplants cannot be considered terminally ill. Uterine transplants are not life-saving, but life-enhancing transplants. In this context, uterus transplantation is accepted as a type of composite tissue transplantation within the scope of organ transplants under article 5/1/f of the Regulation on Organ and Tissue Transplant Services[27]. Uterus deficiency is not a disease, but a reproductive organ deprivation subjected to the psychological pressure of the social environment. While the social stigmatization of women who do not have a uterus and thus lack reproductive capacity in society can cause socio-psychological trauma, just like face transplantation, there are socio-psychological indications for uterine transplantation as well (albeit the counter-criticism mentioned above under the principle of autonomy). Therefore, uterine transplantation is classified as a temporary composite organ transplant that improves the quality of life and provides life motivation by gaining reproductive ability[28].

Transplantation of composite tissues is regulated separately from other solid organ transplants by the Composite Tissue Transplant Centers Directive published in 2011. According to the Directive, composite transplant centers are to be established in hospitals belonging to the Ministry of Health, university hospitals, and private hospitals, or as a separate unit within a licensed organ transplant center, if any. It is mandatory to obtain a license and an operating permit from the Ministry for the center to start operations. According to the Directive on Composite Tissue Transplant Centers, two committees have been established to regulate composite transplants. The first of these committees, the Composite Tissue Transplant Council, which must be established in the hospital where each composite tissue transplant center is located; has the main task of evaluating the compliance of transplants with the list of indications. Thus, in composite transplants, unlike other medical interventions, the indication decision, which is essentially a matter to be determined by the physician, is given to the council. Furthermore, if this council deems it ethically appropriate, organ transfer

[26] BUİ, p.46-47.
[27] BADUR, Emel: "Organ veya Doku Verme Borcu Altına Giren Kişinin Cayması", Çankaya Üniversitesi Hukuk Fakültesi Dergisi, 5(1), 2020, p.283; DOĞAN, p.58-59.
Composite tissue refers to a structure consisting of different, multiple tissues and organ parts that do not have a homogeneous structure. Tissues such as the face, hands, feet, uterus, intestines, and abdominal wall are examples of composite tissues. For example, we have different types of tissue in our hands, such as skin, muscle, bone, nerve, and all of them are contained within the composite tissue. BİLGİN, Ömer Fazıl: "Kompozit Doku Nakli" in Doğan, Murat/Doğan, Cahid (ed.), Organ ve Doku Naklinde Hukuki ve Cezai Sorunlar Paneli, Adalet Yayınevi, Ankara, 2020, p.85-90.
[28] DOĞAN, p.60.

can be performed. Council decisions are evaluated by the Composite Tissue Transplantation Scientific Advisory Commission established in the Ministry of Health[29].

However, uterus transplantation is also different from composite tissue transplantation. Composite tissue transplants; (arms, legs, hands, feet, face and scalp, upper respiratory and digestive tracts, etc.) are not structures that can be taken from a living person and transferred to the patient due to their nature. These tissues are taken from brain death patients and cadavers, provided that they are donated. On the other hand, uterus transplants differ from other composite tissue transplants because the uterus can be taken from both living and dead donors. Unlike composite tissue transplants such as face or limb, there is no physical deformity in uterus removal, which involves the same laparotomy incision as for the removal of other solid organs. So, the uterus is more similar to conventional solid organ transplants. In these respects, leaving the umbrella of vascular composite transplantation, having policies and regulations specific to uterine transplants may come to the fore in the future[30].

In the Turkish legal system, the definition of "donor" made in article 3/1/c of the Composite Tissue Transplant Centers Directive, is argued that living persons cannot be obliged to donate composite tissue. According to the Directive:

> "donor is whose brain death has been determined by the competent committee, or a cadaver within the first 3 hours after a doctor's determination that the heartbeat has stopped and is considered dead".

In this case, it can be concluded that uterus transplantation can only be performed from a dead donor, as it is within the scope of composite tissue in terms of Turkish legal regulation. However, by the hierarchy of norms, although the regulation was made by a directive, when the provisions of the Convention on Human Rights and Biomedicine and the Law on the Retrieval, Storage, Vaccination, and Transplantation of Organs and Tissues are analyzed together, it is argued that there is no regulation prohibiting a living donor from donation composite tissue[31]. Both practices in Turkey have been carried out by donation of uterus transplantation from the deceased. Even this legal uncertainty points out that uterus transplants should be handled under a separate arrangement from the umbrella of composite tissue transplantation. Also, it should be noted that uterine transplants are not mentioned in the Composite Tissue Transplantation Directive among the medical indications for such transplants. Namely;

Composite Tissue Transplantation Directive article 10:

> "The Center performs at least one of the following types of transplantation, provided that it is included in the activity authorization license. Types of transplantation that can be included in the license of authorization; a) Extremity transplantation, (arm, leg, hand, foot) b) Face and scalp transplantation, c) Upper respiratory-upper digestive tract transplantation, ç) Intestine transplantation."

If it is accepted that the composite tissues that can be transplanted are counted with a limited number (namely as numerous clauses); it can even be claimed that uterus transplantations do not have a legal basis since uterus transplants are not mentioned.

A. Uterine Transplantation from a Living Donor

According to Law No. 2238 on Removal, Storage, Vaccination, and Transplantation of Organs and Tissues, the living donor and the recipient must meet certain legal conditions for uterus transplantation. Organs and tissues can only be harvested from a living donor for the superior purpose as to heal another person. The legitimate reason for harvesting organs and tissues from a living donor is the supreme aim of saving the life of another person. As stated in articles 3 and 4 of the ODASNHK, the procurement of organs and tissues cannot be carried out for price or profit, or advertising purposes. One of the conditions for obtaining organs and tissues from a living donor is harmlessness and suitability. Organ or tissue donation must not cause excessive harm to the donor and must not pose a great danger. In terms of suitability, there must be tissue and blood compatibility between the donor and the recipient, and article 9 of ODASNHK stipulates that the necessary tests to determine this must be carried out before transplantation. Another necessary condition for organ and tissue transplantation from a living being is the presence of consent. Legally valid consent must be given freely, unaffected, and consciously by the person authorized to give consent. As can be understood from the provision of the Law, the persons who can give consent are those who are over 18 years of age and have the discernment capacity. In this case, minors and mentally ill persons cannot be uterus donors and their legal representatives can't give consent on their behalf. As a matter of fact, according to article 5 of the Law, It is forbidden to take organs and tissues from persons who have not completed the age of eighteen and are deprived of discernment. How consent should be expressed is regulated in article 6 of ODASNHK. According to Article 6; to be harvested organs and tissues from a person who has completed the age of eighteen and has discernment capacity, the donor's written and signed

[29] The commission assesses the cases when applied to the ministry for the recipient who is under age and other cases where it is not possible to decide according to the list of indications. ÖZÇETİN, Arzu Batur: "Kompozit Doku Naklinin (Yüz, Kol, Bacak) Ülkemizdeki Uygulaması ve Yasal Durumlar" in Cahid Doğan and Pınar Aksoy Gülaslan (ed), V. Sağlık Hukuku Kurultayı, Ankara Barosu Yayını, Ankara, 2014, s.149,151-152; ZİROĞLU, Şefik: "Türkiye'de Organ Ve Doku Naklinde Yasal Çerçeve Ve Etik Tartışmalar", İstanbul Medipol Üniversitesi Sosyal Bilimler Enstitüsü, YL Tezi**,** İstanbul 2019, p.22-26; BİLGİN, p.85-90.

[30] VALİ/JONES/SASO/FERTLEMAN/TESTA/JOHANESSON/ALGHRANİ/SMİTH, p.4-5; POLK, Heather/JOHANESSON, Liza/TESTA, Giuliano/WALL, Anjie E.: "The Future of Uterus Transplantation: Cost, Regulations and Outcomes", Clinical Obstetrics and Gynecology, 65(1), March 2022, p.104.

[31] BADUR, p.284.

statement must be given clearly, consciously, and unaffected in the presence of at least two witnesses. Or verbal statement, in front of at least two witnesses, must be approved by a physician[32].

Life-threatening organ and tissue donations are not legally possible. The uterine donation represents the act of removing a part of a woman's body in to gain an advantage ver another woman. For such an act to be considered legal, it must not jeopardize the physical and functional integrity of the female donor. Based on such a principle, it seems ethically and legally more appropriate to recognize menopausal women as uterus donors who are no longer reproducing, and therefore their physical integrity would not be affected by the loss of their uterus. However, donor choices may also be made from women who have not lost their ability to give birth, but are close to menopause and have children, and who think that they have completed their family. In such a case, the donor still has the opportunity to have children in the future while donating her uterus for transplant. In such a case as well, a uterine transplant may be considered legal[33].

Legal regulation on sterilization may come to mind in this context. Sterilization refers to a surgical intervention to prevent the ability to conceive and give birth without affecting the sexual ability of individuals. Consensual termination of one's reproductive ability through sterilization is a permissible act in our legal system. Reproductive freedom including having or not having children equally has brought with it the permission to perform some procedures such as sterilization that prevents reproductive activity[34]. The donor woman who donates her uterus is not sterilized, nevertheless, she is not able to have children in her own body, and since surrogacy is also prohibited in our law, she loses her ability to have children. Although sterilization is a permanent method of birth control, it is not irreversible. A hysterectomy, on the other hand, is to terminate the ability to reproduce irreversibly and, unlike sterilization, is the removal of an organ from the body in such a way that it ceases to function. Despite such differences, I think that there is no legal obstacle for a woman to give up her reproductive ability (whether she has a child or not) and her uterus even if there is no medical necessity. Because in our legal system, sterilization is allowed with the consent of the person under certain conditions[35].

In organ transplants, if the donor is married, the consent of her/his spouse is not required, but she/he must be informed. The physician also has to find out whether the spouse of the married donor is aware of the situation and record what she/he has learned. Thus, if the donor is still of reproductive age, the consent of the spouse will also be obtained when the removal of the uterus is considered sterilization, but not obtaining it will not constitute a crime[36].

B. Uterine Transplant from a Dead Donor

There is no risk of physical harm to the donor in the possibility of a uterus transplant from a dead donor. However, depending on the order of organ harvesting, the risk of harming potential recipients of life-saving organs from the same donor comes into question. To avoid this risk, it is recommended to remove all vital organs first[37], but also this time difficulties arise in terms of obtaining uterine grafts[38]. For this reason, some transplant centers follow an alternative protocol, which involves removing the uterus first, but stopping the procedure to save vital organs if hemodynamic instability develops, that is, if blood flow is impaired[39].

A second issue raised for dead donors is about the reflection of the donation will. In order to be able to transplant organs and tissues from the dead, it is necessary to determine that the person whose organs and

[32] The last requirement for organ and tissue transplantation from living donors is the obligation to provide proper information to donors and research. The donor must be informed before organ and tissue harvesting. The regulation on this matter is contained in article 7 of ODASNHK. In this context, the donor must be informed by the physician about the risks of organ and tissue transplantation, its benefits for the recipient, and its medical, psychological, familial, and social consequences. Although its scope is narrower, the recipient must also be informed about the transplantation. However, according to the same regulation, the physician is obliged to refuse the harvesting of organs and tissues from those who do not have the mental capacity to make a decision and those who aim to provide financial profit and other benefits.

[33] ZAAMI, Simona/MARINELLI, Susanna/DI LUCA, Natale Mario/VERGALLO, Montanari: "Ethical and medico-legal remarks on uterus transplantation: may it solve uterine factor infertility?", European Review for Medical and Pharmacological Sciences, (21), 2017, p.5290-5296.

[34] ERBAŞ, Rahime: "Türk Ceza Hukuku Açısından Kısırlaştırma (TCK Md. 101)", İÜHFM, LXXIII(1), 2015, p.91-92.

[35] Article 101 (1) Any person who sterilizes a man or woman, without their consent, shall be sentenced to a penalty of imprisonment for a term of three to six years. If the act is performed by a person who is unauthorized to sterilize, then the penalty shall be increased by one-third.
(2) Where the sterilization is performed by an unauthorized person, even with the person's consent, a penalty of imprisonment for a term of one to three years shall be imposed.
DOĞAN, p.75-76.

[36] Because what constitutes injustice in the offense of sterilization (in terms of the first paragraph of Article 101) is the lack of consent of the person to whom the sterilization procedure was performed. In the doctrine, it is pointed out that consent is strictly dependent on the individual about this type of offense. So, the consent of the spouse should not be included in the TPC and should not be sought. However, there are also opposing views on the doctrine. For these comments, see ERBAŞ, p.116-117.

[37] "Removal of the uterus, which is a non-vital organ, should be left until after the removal of the vital organs. Removal of organs to improve quality of life should not affect the removal of organs for life-saving transplants, given the seriousness and urgency of transplants. For this reason, the removal of the uterus should only be done after the removal of vital organs. BRUNO, Bethany/ARORA, Kavita Shah: "Uterus Transplantation: The Ethics of Using Deceased Versus Living Donors", The American Journal of Bioethics, 18(7), 2018, p.6, 8.

[38] In this case, since the removal of the uterus will be delayed, various complications may develop for the uterus recipient and may cause unsuccessful pregnancy results. KIRCA/ÖNGEN, p.15.

[39] DA GRACA/JOHANNESSON/TESTA/WALL, p.664-668.
Referring to the opinion that vital organs will not be damaged if the uterus is removed by an experienced team, see. KIRCA/ÖNGEN, p.15.

tissues are to be taken is dead. Brain death is defined in Annex-1 of the Regulation on Organ and Tissue/Graft Transplantation Services, and its criteria and detection process, are regulated in detail under the title of prerequisites, clinical findings, and continuity of findings. Organ and tissue harvesting from the dead; is regulated in article 14 of Law No. 2238 on Harvesting, Storage, Grafting, and Transplantation of Organs and Tissues. According to this provision, a woman can donate her uterus while she is alive, but if she did not make such a donation while alive, her uterus can be donated by her relatives after her death. If she has prohibited the removal of the organs or tissues after death, her relatives cannot give her uterus to anyone[40]. However, the donor is expected to also mention the uterus separately as one of the organs to be donated when signing the organ donation consent form or discussing organ donation with family members in general. Several jurisdictions require separate special authorization for uterine donation (or any other vascular composite allograft). This is because, to collect composite tissue, the donation of composite tissues must be stated in a separate article on the donation form signed by the potential donor while she/he was alive or signed by the relatives authorized to donate after the death of the donor. In fact, in Turkish law, Article 28/1 of the Directive on Composite Tissue Transplantation Centers stipulates that to obtain composite tissue from a cadaver, the will of donation must be stated as a separate article in the donation form[41].

Furthermore, because of the distinction between traditional solid organs and composite tissues, informed consent for composite tissue donation from the deceased should be obtained differently from routine consent for solid organ donation. There is some additional information about uterine transplantation that should be disclosed to the families of dead donors. For example, if the donor's uterus is used, it is important to inform the family that none of the donor's genetic information would be transferred to the baby. In addition, the donor family must be informed that they have no legal rights or obligations to the baby born[42].

Article 14/4 of Law No. 2238 stipulates that a person's organ/tissue whose life has ended as a result of an accident or natural disaster can transplant immediately without the will or consent of the donor or donor's relatives, to another person whose lives are dependent on organ and tissue transplantation. Here, since the uterus is not a life-saving organ, it is not possible to perform a uterus transplant based on art.14 f.4[43].

C. Informed Consent Issues

One of the legal issues that may come to the fore within the framework of autonomy may be the possible possession of the transplanted uterus. Essentially, this procedure is intended to be a temporary transplant that will result in the removal of the transplanted uterus after the baby is born[44]. In this regard, the recipient is informed and clarified. However, even with initial consent being given, a symbolic value may be attached to this organ later, and problems may arise if a woman refuses to consent to the removal of the organ after transplantation. For example:

- Let’s say R has a uterus transplant then gives birth to two children and completes her family. However, she doesn't want it to be removed as the uterus has strengthened her maternal identity and now makes her feel complete. She understands the risks of long-term use of anti-rejection drugs and is prepared to assume these risks. She refuses to consent to a hysterectomy.
- In the second possibility, R, who was unable to conceive successfully after the transplant, refuses the medical team's recommendation to remove the uterus after four unsuccessful abortions.
- In the sixth month of pregnancy, R's body begins to reject the transplanted uterus. The continuation of pregnancy is a threat to her life and the fetus. R is aware that if a cesarean section is performed when the baby is at the limit of viability, the baby will not survive and there is a high chance of disability. She refuses to consent to a cesarean section until she is at least 8 months pregnant when her baby has a better chance of survival.

In all the above hypothetical scenarios, assuming the recipient is a capable adult patient; legally the recipient has the right to refuse the hysterectomy[45]. The recipient can also choose to retain the uterus because they want a second and subsequent pregnancy after the first pregnancy. Therefore, the recipient, who assumes the risks, will make the final decision on the subject of immunosuppressive drugs, if adequate

[40] DOĞAN, p.74.
Article 14 – If a person has not stated in his/her official or written will that he/she left his/her whole body or organs and tissues for treatment, diagnosis, and scientific purposes; or has not expressed his/her will on this matter in the presence of two witnesses; his/her spouse, adult children, mother or father, who were with him at the time of death, respectively one of his/her brothers; if these are not available, organs or tissues can be taken from the dead with the consent of any of their relatives. Organs and tissues cannot be removed if the deceased person has expressed his/her objection to the removal of organs or tissues after his/her death.

[41] While people prefer to donate their vital organs, they may not want to donate their uterus. BATUR OZCETİN, p.153; GRACA/JOHANNESSON/TESTA/WALL, p.664-668; KIRCA, ÖNGEN, p.15.

[42] POLK/JOHANNESSON/TESTA/WALL, p.104.

[43] DOĞAN, p.74.

[44] The uterus, which is the first example of a temporary transplant in the world, completes its task after one or two live births, so it is no longer needed and is removed. Although empirical data are lacking on the possibility of transplanting the removed uterus to another recipient and on the carrying capacity of further pregnancy, the chain of transplantation and pregnancy does not seem to work in practice. However, given its temporary therapeutic purpose, questions arise about whether the uterus is analogous to an implantable medical device, theoretically after removal, whether the disposed of uterus belongs to the surgical team, or the first donor or first recipient. VALİ/JONES/SASO/FERTLEMAN/TESTA/JOHANESSON/ALGHRANİ/SMİTH, p.3-4.

[45] VALİ/JONES/SASO/FERTLEMAN/TESTA/JOHANESSON/ALGHRANİ/SMİTH, p.4.

information has been provided. For this reason, it would not be correct to include directives in the consent form that will bind the receiver in this regard.

However, the decision of a second pregnancy may result in a conflict of interest between the medical team and the recipient. While the recipient's desire for a second pregnancy should play an important role in the decision, the medical team must ensure that the benefits and the likelihood of success of a second pregnancy do outweigh the risks to the mother or fetus and that psychological input is required. A recipient-centered approach is recommended for the decision to pursue a second pregnancy after a uterus transplant, taking into account the risks of a second pregnancy due to maternal and obstetric complications during pregnancy[46].

IV. CONCLUSION

Future research projects in uterine transplants have focused on creating a biologically engineered uterus. These projects aim to overcome the ethical problems caused by transplantation from a living donor, the shortage of needed organs and to prevent the recipient's immune response against the transplanted uterus. The uterus, which will be constructed biotechnologically, would be formed from the recipient's stem cell, which eliminates the problem of the recipient's immune system responding and the recipient's exposure to immunosuppressive drugs. Thus, uterus transplantation would be unnecessary for the treatment of uterine factor infertility and leave its place to other ethical and legal debates.

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