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CLINICAL REVIEW ON UTERUS TRANSPLANT PROGRAM AS A SURGICAL INNOVATION

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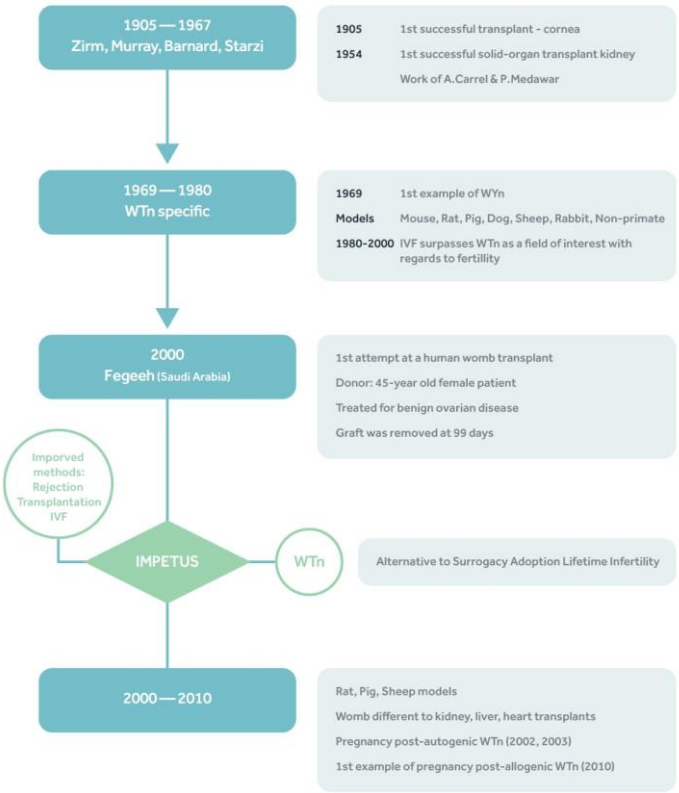
ABSTRACT
Uterus transplantation is an emerging therapy for absolute uterine factor infertility, a condition previously without direct treatment options. It is paramount that reproductive health care providers are familiar with the uterus transplantation process as more patients seek and receive this treatment. Our data serve as a guide for health care professionals caring for patients affected by AUFI or institutions seeking to expand treatment options for patients who have a dream of parenthood.

KEYWORDS: Uterus, Reproductive surgery; Uterine factor, infertility; Uterus transplantation, IVF, donors, live donor, surgery, AUFI, UTx.

BACKGROUND

Since the 1970s a number of teams around the world have been researching the possibility of developing a womb transplant procedure and, unfortunately, often without collaboration between those teams.



In 2000 the world's first womb transplant was performed on a 26 year old woman in Saudi Arabia. She had lost her own womb as a result of heavy bleeding following the birth of her child. However, the transplanted womb

survived for only 99 days and it has now been acknowledged that the attempt was premature and research shows the failure of the blood supply to the womb was predictable.

In 2015 surgeons in China performed the first womb transplant in Asia. Robotic-assisted laparoscopic uterus retrieval was performed on the donor. After five unsuccessful attempts, a pre-frozen embryo was successfully implanted in the patient's womb on June 13, 2018 and a healthy baby boy was delivered as a result.

A uterus transplant was performed for the first time in the USA in February 2016 at Cleveland Clinic. Between 2016 and 2020, the team at Baylor University Medical Center, Dallas, USA, performed 20 uterus transplants involving both living and deceased donors. There have been 14 children born from 12 uterus transplant procedures.
A baby girl born last month at Cleveland Clinic. She was the first baby in North America delivered by a mother who received a uterus transplant from a deceased donor.

As at 1st June 2023, there have been around 100 uterus transplants performed worldwide and about 50 healthy babies have been born as a result.

In India
The first uterine transplant performed in India took place on 18 May 2017 at the Galaxy Care Hospital in Pune, Maharashtra. The 26-year-old patient had been born without a uterus, and received her mother's womb in the transplant. India's first uterine transplant baby, weighing 1.45 kg, was delivered through a Caesarean section at Galaxy Care Hospital in Pune on Thursday.

Docs perform third uterus transplant in six hours

Doctors perform 2nd womb transplant within 24 hours

Woman From Vadodara Undergoes Op

FRIDAY SURGERY

TOI REPORT MAY 26, 2023

Pune: After country's seeing success in the first two cases of uterine transplant, doctors attached with Galaxy Care Hospital in the city performed the third uterine transplant on a 21-year-old woman from Karnataka on Friday, January 26.

The patient's mother donated her uterus. According to the doctors, it took them six hours to perform the surgery. Surgeon Shailesh Puntambekar said, "We did the uterus transplant in six hours. For the first transplant, we had taken 11 hours while it took us 10 hours for the second surgery."

The removal of uterus was done in two-and-half hours. The doctors said that the surgery was performed using the laparoscopic technique.

"The woman has been married for five years. She suffers from congenital absence of uterus. Her mother agreed to donate her uterus," Puntambekar explained.

Closer to motherhood

The team of doctors also carried out embryo transfer in the first two patients, who underwent uterus transplant at the hospital in May last year. "We will get to know if they can conceive or not over the next 10 days," said gynaecologists Pankaj Kulkarni and Milind Teling, who carried out the embryo transfer.

If everything goes as per plan, the women will deliver either in the last week of September or in the first week of October, which will make them the first women in the country to deliver a child after undergoing a uterus transplant.

Prior to the transplant, doctors had extracted eggs (ovum) from their normal functioning ovaries and fused them with their husbands' sperms in a laboratory set up (in-vitro fertilization) and cryopreserved the embryos for transfer at the right time to enable conception.

The hospital administration claimed that they have received as many as 400 inquiries for uterus transplants and they aim to perform 10 uterus transplants within the year.

The surgery was performed by a team of doctors at Pune's Galaxy Care Hospital and led by the hospital's medical director, Shailesh Puntambekar.

What is Uterus transplant.?
AUFI (Absolute uterine factor infertility) representing approximately 3% to 5% of the female general population is linked to either congenital uterine agenesis (Mayer-Rokitansky-Küster-Hauser syndrome), major congenital uterine malformation (hypoplastic uterus, fraction of bicornuate/unicornuate uterus), a surgically absent uterus, or an acquired condition (intrauterine adhesions, leiomyoma) linked to uterine malfunction that causes implantation failure or defect placentation. A uterine transplant is a surgical procedure whereby a healthy uterus is transplanted into an organism of which the uterus is absent or diseased. As part of normal mammalian sexual reproduction, a diseased or absent uterus does not allow normal embryonic implantation, effectively rendering the female infertile. This phenomenon is known as absolute uterine factor infertility (AUFI). Uterine transplant is a potential treatment for this form of infertility.

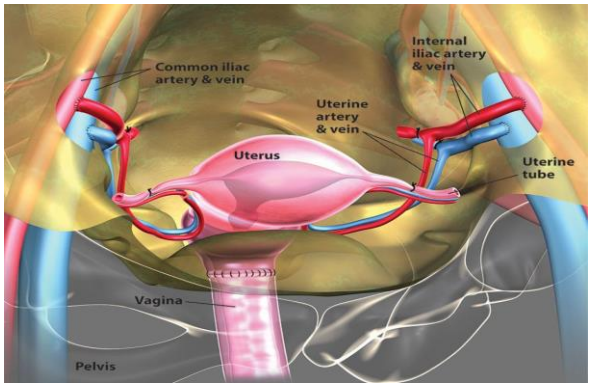
Surgical Process
The womb and cervix are removed from the donor and implanted into the recipient. Once the uterus is in the recipient, surgeons work diligently to connect muscles, arteries, veins, and other blood vessels in order to allow the uterus to function. The surgery to transplant the uterus takes several hours to perform. It requires a large team of medical professionals. This is due to the likelihood of a live donor who also needs to be operated on, monitored, and rehabilitated after the surgery.

Recipient evolution
Before transplantation recipients undergo evolutions to assess their physical and mental health.

Donor assessment and Types of Donors
A uterus transplant can come from either a living or deceased donor. whether donor is living or diseased their uterus undergoes viability checks before qualifying for donation. The risk of infection and transplant rejection is much higher when a recipient receives the uterus of a deceased donor. This is thought to be due to the anatomical and vascular changes which occur in the body after death. Live donors also undergo comprehensive gynecological examination including imaging scans and cancer screenings.

Risks
For living donors physical risks arise from surgery duration (6-11hours) and operative and post operative complications. The most common being urinary tract injury and infection. There are also ethical and physiological risks. Deceased donor transplantation carries less surgical time (typically 1-2 hours), so less demand on medical resources and personal.

The ideal candidate is someone who has a similar blood type as the recipient and someone who is in relatively good health, especially reproductive health.



In Vitro Fertilization (IVF)
UTx always requires performing IVF from 6 to 18 months before surgery, due to the conditioning regimen for immunosuppressive therapy, specially in AUFI (absolute uterine factor infertility) couples to reduce the risks concerning bleeding and pelvic infections associated with oocyte retrieval. Specifically, the risk of bleeding is related to the presence of abnormal uterine vascular pedicles and anastomosis sites caused by UTx surgery, and the risk of pelvic infections may constitute a complication of surgical retrieval operations.

The procedure does not connect the uterus to the fallopian tubes, which ensures the ovum from the ovaries moves to the uterus, so the individual can't become pregnant through natural means. Instead doctors remove the recipients ova, create embryos using in vitro fertilization and freeze them embryos (cryopreservation). Once the newly transplanted uterus is ready, doctors implant the embryos in the uterus. Robot assisted laparoscopy is used to precisely remove the donors uterus, making the process less invasive.

After the transplantation procedure, the vital uterine vasculature (the network of vessels connecting the heart to other organs and tissues in the body) and other important linkages are methodically re- established.

Post transplant pregnancy
Success is determined in 3 stages
Monitoring graft viability in the first 3 months. Assessing uterus function between 6 months to 1 year. Attempting pregnancy with in vitro fertilization but with higher risks like rejections or complications. The final stage of success is a successful child birth. Frequent checkups are essential due to potential risks like rejection, abortion, low birth weight and premature birth.

Prognosis
It's important to note uterus transplants are not intended to be permanent options in response to infertility or uterine conditions. While you have the transplanted uterus, you need to take immunosuppressive drugs. The risk of taking immunosuppressive drugs long-term, especially during and before pregnancy, is harmful and not advised.

The transplanted uterus is intended to be temporary while attempting pregnancy, and a hysterectomy will be indicated in order to ensure optimal health of the recipient.

Due to the occurrence of this transplant in different countries and the variable long-term results of the transplant, there are no definite numbers regarding the survival rate for women who undergo uterus transplants. Much of the literature discourages women from receiving uterus transplants due to the high risk involved in treating a non-life threatening condition (infertility).

Considerations and side effects

Immunosuppressant drugs are necessary to prevent rejection but may cause side effects, include kidney and bone marrow toxicity and an increased risk of diabetes and cancer. For these concerns, the uterus must be removed after successful child birth. Regular follow-ups for at least a decade are recommended after child birth.

The main disadvantages of uterus transplants are Prenatal medical complications and the risk for preterm delivery and low birth weight are increased after uterine transplant, possibly as a result of underlying maternal medical problems, suboptimal function of the transplanted uterus, or the need for immunosuppressant therapy.

The risks of the uterine transplant surgery includes bleeding, infection, injury to nerves, blood vessels, bowel, bladder or ureters, uterine transplant rejection, and side effects from immunosuppressive medications, including diabetes and renal damage with long term of use.

Considerations for future possibilities

Successful uterus transplants open doors to explore artificial uteri. Artificial uteri could eliminate the need for live donors, addressing ethical concerns and reducing the potential risks to healthy donors. These bioengineered organs, grown from steam cells on 3D Scaffolds, could eliminate the need for live donors and ethical concerns. However research is still in its early stages, it may take decade to make efficient and safe for human use. Artificial uterus could not benefit not only woman but also members of the LGBTQ+ community. However certain hormone related complications remain to be addressed.

CONCLUSION

The comprehensive reports of outcome following uterus transplant in the world (Source: US demonstrate)that suggests uterus transplant is safe for mother and child. Success is reproducible and not limited to single centers and success rate is comparable with the most effective infertility treatments. For these reasons, uterus transplant should be considered a clinical reality in the world and presented as an option for individuals with absolute uterine factor infertility (AUFI) interested in parenthood and for many women with uterine factor infertility (UFI) with dream of pregnancy would never be fulfilled.

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REFERENCES

1. Tissue Engineering in Gynecology - PubMed (nih.gov).
2. Analysis of Predictive Factors for Successful Vascular Anastomoses in a Sheep Uterine Transplantation Model - PubMed (nih.gov).
3. Standards of Care for the Health of Transgender and Gender Diverse People, Version 8 - PubMed (nih.gov).
4. Global results of human uterus transplantation and strategies for pre-transplantation screening of donors - PubMed (nih.gov).
5. Uterus transplantation: from research, through human trials and into the future - PubMed (nih.gov).
6. https://blog.petrieflom.law.harvard.edu/2023/05/16/uterus-transplants-and-the-right-to-experience-pregnancy.
7. Laparotomy or minimal invasive surgery in uterus transplantation: a comparison - PubMed (nih.gov).
8. Assisted reproductive technology strategies in uterus transplantation - PubMed (nih.gov).
9. https://www.britannica.com/topic/uterus-transplant.
10. Introduction to healthcare for transgender and gender-diverse people - PubMed (nih.gov).
11. Uterus transplantation: state of the art in 2021 - PubMed (nih.gov).
12. Costimulation Blockade in Vascularized Composite Allotransplantation - PubMed (nih.gov).