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Uterine Transplantation- Minimally Invasive Approach

With any novel reproductive procedure, the ultimate proof of concept is a healthy live birth. Uterine transplant, once thought to be only theoretical in nature, has now resulted in live births in North America, South America and Scandinavia (1). Subsequently, discussions of uterine transplantation have shifted from whether the procedure can be successful to additional modifications designed to improve the risk:benefit for donors, recipients, and children born from transplant procedures. With steadily more research teams worldwide undertaking trials in this area, it is more critical than ever to reduce risks at each stage of the procedure.

A primary question in uterine transplant research has been whether the use living or deceased donors can better achieve the goal of minimizing risks. Clearly, there are risks to a living donor that do not exist with a deceased donor. One of the main concerns regarding living donors for uterine transplant is the risk to a healthy woman undergoing a lengthy (up to 10-12 hours) and potentially morbid laparotomy for the purposes of donating a uterus (2, 3). In these cases, the donor's uterus does not have pathology; thus the woman undergoes a surgery that would otherwise not be medically indicated. Indeed, groups using living donor models have reported complications, including ureterovaginal fistula and vaginal cuff dehiscence (2,4). Often, donors are mothers or relatives of recipients (2) but donors may also be unrelated altruistic donors (5). One solution to decrease risk is the use of a deceased donor model (6), which circumvents the issue of donor risk completely.

When a living donor transplant model is used, the major surgical challenge lies in the complex dissection of the uterine vessels, specifically the uterine vein. This vessel can be difficult to identify and runs in close association with the ureter, which can easily be injured with radical dissection. Although minimally invasive uterine procurement is desirable to speed recovery and reduce the morbidity of a laparotomy for a living donor, it has previously been uncertain whether the uterine vein could be successfully recovered laparoscopically or robotically (7).

In this issue of the *Journal of Minimally Invasive Gynecology*, Dr. Puntambekar and colleagues describe their laparoscopic-assisted approach to uterine procurement from living donors. This article is notable for the achievement of obtaining the length and caliber of uterine vessels necessary for successful uterine transplant through a laparoscopic-assisted approach. This accomplishment advances the field of uterine transplant by adding necessary evidence for the feasibility of minimally invasive techniques in living donor models. The length of the surgery (reported as approximately 4 hours) is shorter than has been described for laparotomy and the donors had no complications, with an intraoperative blood loss of approximately 100cc. As is appropriate, the authors had considerable experience in laparoscopic radical hysterectomy and practiced their techniques in both cadavers and human subjects prior to performing the procedure. This work is noteworthy and the authors should be commended on accomplishing this innovative surgery.

However, some aspects of this work are worth further discussion. As of yet, there remain many uncertainties about optimal approaches to uterine transplant. In the setting of uncertainty and emerging data, any new approach should be carefully evaluated as it may introduce new risks; this is relevant when considering this article. Here, the surgical approach entailed that the living donor undergo a bilateral oophorectomy. Both donors in this series (mothers) were in their fourth decade. Although there is debate about the hormonal functions of an ovary after menopause, there is no such debate regarding the health risks of premature surgical menopause. This raises the concern that the donors were exposed to additional and new risks, both in the immediate post-operative period, and in the decades to come. As of yet, the justification for exposing the living donors to additional and cumulative risks is unclear. The use