Uterine transposition: a simple yet revolutionary means of fertility preservation for women with cancer

Mario Leitao

The end goal of cancer care is cure. In attaining this goal, issues such as sexual function, ovarian function, and reproductive function in young women have often taken a back seat for both physicians and patients alike. Exceptional advancements in oncologic care over the last few decades have led to increasing cure rates and long-term survivorship for many patients, and concerns related to hormonal and reproductive function, especially in young women with cancer, can no longer be ignored and must be addressed within the continuum of care.

The overall incidence of colorectal cancer is decreasing, except in men and women younger than 49 years of age—a demographic group that has experienced a noticeable increase in incidence. Of note, approximately 42% of these cancers arise in the rectum in this young cohort. Concurrently, the majority of births in the USA now occur in women 25 years of age or older, with 17% occurring in women older than 35 years of age. In short, we are now seeing more young women with cancer of reproductive age who desire fertility preservation and a chance at future motherhood. Many cancer treatments, however, such as pelvic radiation therapy, lead to ovarian failure, immediate menopause, uterine dysfunction, and loss of fertility if the ovaries and uterus are left in situ.

Ovarian transposition has been offered as a potential solution to preserve ovarian function alone in this setting. Critics of this approach, however, point to low success rates and the potential benefit of post-radiation hormone replacement therapy instead. Randomized clinical trial data assessing ovarian transposition are lacking, but it seems reasonable to consider natural ovarian hormonal production a better option over lifelong medication replacement. At our institution we routinely offer ovarian transposition; however, success rates and long-term outcomes are lacking, but to my knowledge there has been only a 38% success rate in women older than 40.5

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To get the greatest mobility of the ovaries out of the radiation field, we routinely transect and remove the fallopian tubes, which will not allow for spontaneous conception. The uterus is also left in situ and will receive a certain fraction of the radiation dose. The effects on uterine volume and distensibility are also of concern.

Pregnancies after pelvic radiation have been reported, but to my knowledge there has been only one full-term birth, in a woman who received pelvic radiation therapy to the central pelvis as an adult. A woman may become pregnant after pelvic radiation and ovarian transposition; however, there is general concern that the uterus may not hold a pregnancy to full term and result in a significantly premature birth, with associated known infant and childhood disabilities. There are multiple artificial reproductive technologies that increase the chances of pregnancy in a radiated uterus. However, these options are often costly, require inconvenient medication schedules, are associated with relatively low success rates, and are not available worldwide.

The lead author of the article by Ribeiro et al described the first uterine transposition in a patient with rectal cancer in 2017. At the time I thought to myself, “Brilliant! I wish I would have thought of this! What an amazing, simple solution!” In the current article, Ribeiro and colleagues present the results of a prospective multicenter observational study of uterine transposition. They report on seven patients with rectal cancer and one with pelvic liposarcoma planned for pelvic radiation therapy. The feasibility rate, defined as the ability to preserve the uterus and fertility, was 75%. One patient experienced uterine necrosis and underwent a subsequent hysterectomy. Another patient developed rapid carcinomatosis and died prior to uterine re-anastomosis. The immediate peri-operative outcomes were excellent, as all procedures were performed via a minimally invasive approach. Most exciting of all, however, was that two (66%) of the three patients who attempted conception became spontaneously pregnant and delivered healthy full-term babies.

I wholeheartedly congratulate the authors on this incredible innovation, which offers young women the possibility of preserving hormonal and reproductive function, allows for spontaneous conception without the need for expensive and inconvenient artificial reproductive technologies, and minimizes concern for

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severe premature delivery. The reported feasibility rate of 75% and spontaneous conception rate of 66%, although in a limited number of patients, is indicative of the great potential of this procedure.

Many of us already offer uterine transposition to our patients, and many more will inevitably do so in the future. The technique will be refined and success rates will rise. The procedure has already undergone modification, with some not bringing the cervix to the umbilicus but rather keeping it all intra-peritoneally and administering gonadotropin-releasing hormone (GnRH) agonists. The value of intra-operative and post-operative perfusion assessments remains to be defined. There are also questions regarding the role, type, and duration of post-operative antibiotics and thromboprophylaxis. We will gather more information about the retention of hormonal and reproductive function in larger cohorts. We will gather more information on full-term pregnancy rates. We will continue to refine patient eligibility for this procedure. And we will continue to work together as a surgical community to teach, learn, and gather outcomes data for uterine transposition.

It is innovations such as this that continue to motivate many of us and truly offer value to the patients we care for, and I truly thank the authors for their groundbreaking work. Most importantly, I thank the brave women who had faith in Dr Ribeiro and his colleagues and underwent this procedure without knowing what the outcome might be.

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REFERENCES