Oocyte cryopreservation in women after childhood and adolescent cancer

Ovarian reserve impairment is common in childhood and in adolescent female tumor survivors. As their 5-year survival rates have continued to improve over the last few decades, with >80% of patients surviving into adulthood, fertility preservation has become an important quality-of-life issue for them. Because of this, a large body of literature explores fertility preservation of patients at the time of cancer diagnosis or early treatment. What has been lacking is fertility preservation discussion and treatments during and after cancer treatment. Because childhood and adolescent cancer patients are diagnosed at an early age, the decline in fertility after cancer treatment is often overlooked. Therefore, fertility counseling and preservation are more common when they reach reproductive age after treatment. Cryopreservation of postcancer oocytes is an emerging option for these patients, but evidence is extremely scanty, and it is these data that Filippi et al. (1) report in *Fertility and Sterility*.

In fact, Filippi et al. (2) had reported a case of oocyte cryopreservation after anticancer treatment five years ago. The following is a summary of the many cases in which the procedure was successfully performed and pregnancies were obtained. Nine of 126 young female tumor survivors were included. A total of 126 patients attended the oncofertility service over a 5-year period, and 90 completed the assessments; they were provided individual fertility assessment and profertility counseling. In all 90 preserved ovarian reserve, diminished ovarian reserve (DOR), or premature ovarian insufficiency cases, 13 subjects with DOR were eligible for oocyte cryostorage, of whom nine underwent the procedure. Finally, nine women started looking for pregnancy after the fertility counseling (six with DOR), and seven of them became pregnant. The research team provided a detailed assessment for implementation oocyte cryotherapy, which is of great significance for subsequent consultation and treatment of these patients.

Filippi et al. showed that ovarian reserve impairment is common, oocyte cryopreservation is feasible, and empowerment can lead to anticipation of motherhood. As the authors described, previous evidence on postcancer fertility counseling in the literature is scant. Evidence specifically focusing on the peculiar population of childhood and adolescent female tumor survivors is even more limited. European Society of Human Reproduction and Embryology female fertility preservation guideline development group released new guideline in 2020, but childhood and adolescent female tumor survivors were still rarely mentioned. The PanCareLIFE Consortium and the International Late Effects of Childhood Cancer Guideline Harmonization Group had provided recommendations for preservation of reproductive fertility for female patients with childhood, adolescent, and young adult cancer (3). They suggest that fertility preservation methods should be selected according to the risk of infertility during all stages of anticancer treatment. This article focuses on posttreatment fertility counseling and treatment and provides some evidence that oocyte cryopreservation can lead to live birth in DOR caused by anticancer drugs.

Female cancer survivors differ from male cancer survivors in terms of fertility preservation, as their unique structure is the ovary. In female cancer survivors, fertility preservation techniques include oocyte or embryo cryopreservation, ovarian tissue cryopreservation, and oophoropexy based on the evidence (3). These techniques are feasible, and multiple live births have been reported after their use (4). However, for children and adolescents, when deciding whether to carry out fertility preservation and which method to use, we should consider the patient's age, type and stage of cancer, and ovarian function. Psychological and ethical issues also need to be considered because adolescent patients require informed consent forms to be signed by their parents on their behalf. How to make these choices depends on the indications, such as the tumor stage and degree of malignancy, and whether the treatment is hormone-sensitive. However, the age limit of oocyte preservation for minors may not be a problem. Azem et al. (5) reports the first successful oocyte cryopreservation in a prepubertal girl with Turner syndrome mosaicism. This heralds that, in a way, oocyte preservation is technically feasible in adolescent patients. In addition, the immature oocyte cryopreservation combined with in vitro maturation can also be used. The evidence above suggests that there is no time conflict between anticancer treatment and fertility preservation. Excluding technical limitations, this involves ethical values of patient empowerment, the psychological stress of the patient during the treatment process, and the economic cost-benefit. Perhaps these data can be supplemented to provide more adequate clinical recommendations.

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