

Short Commentary

Fertility Preservation and Breast Cancer Patients

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Abstract

Breast cancer is a devastating disease that affects thousands of women each year. In many cases, the victims of breast cancer are young and still in their childbearing years. Oncology treatments commonly employed to treat breast cancer often confer a deleterious effect on reproductive potential. Multiple strategies to mitigate the negative reproductive effects of these oncology treatments have been proposed. This article briefly summarizes the available strategies for fertility preservation in the context of breast cancer.

Keywords: Fertility preservation; Cryopreservation; Freezing; Egg; Sperm; Oocyte; Cancer; Oncology; Breast

Short Commentary

Breast cancer is a devastating disease for many women in the United States and internationally. In the United States alone, 77,317 new cases of cancer in women aged 15 to 44 years of age were diagnosed in 2008 with over 9,000 of these cases in women under the age of 39 [1]. Many women in our society choose to delay childbearing for social and professional reasons [2]. Consequently, many women diagnosed with breast cancer in their 20's or 30's may not have achieved a pregnancy or may desire more children. Therefore it is not surprising that one of the chief concerns for younger women diagnosed with breast cancer is the possible compromise of future fertility that may be associated with oncology treatments [1,3]. However, several recent studies have demonstrated that for many women fertility preservation is not addressed prior to cancer treatment [4,5].

Advances in assisted reproduction technologies now allow women with many different forms of cancers to pursue fertility preservation. Many women diagnosed with breast cancer may be appropriate candidates for fertility preservation. It is well accepted that women desiring such fertility preservation are best served by pursuing treatment prior to the administration of chemo and radiation therapy. Concerns regarding elevated estradiol levels resulting from controlled ovarian hyper stimulation in breast cancer patients may be blunted with new stimulation protocols that incorporate the use of letrozole [6]. The appropriate treatment is tailored to best meet the needs of each patient, but basic approaches to preserving fertility prior to oncology treatment are outlined below [1,2,6-9].

- *In Vitro* Fertilization (IVF) with cryopreservation of embryos and subsequent transfer into uterus following oncology treatments
 - o Advantages
 1. Traditionally confers the highest pregnancy rates (up to 40%)
 - o Disadvantages
 1. Requires an IVF stimulation cycle (2 weeks following menses)
 2. Expense of cycle (Approximately \$10,000 - \$12,000)

3. Requires use of sperm at time of procedure
 - IVF with cryopreservation of oocytes with subsequent fertilization with sperm and transfer into uterus following oncology treatments
 - o Advantages
 1. Latest techniques show pregnancy rates comparable to embryo cryopreservation approach
 2. Allows patients to cryopreserve their eggs prior to fertilization. This means that patients are able to delay the decision as to which sperm will be used for fertilization
 - o Disadvantages
 1. Requires an IVF stimulation cycle (2 weeks following menses)
 2. Expense of cycle (Approximately \$8,000 - \$10,000)
 - Surgical removal of ovarian cortex strips with subsequent reimplantation into the patient following oncology treatments
 - o Advantages
 1. Able to be performed without waiting for an IVF stimulation cycle
 2. Allows patients to delay the decision as to which sperm will be used for fertilization
 - o Disadvantages
 1. Still considered experimental with less than 20 cases reported
 2. In metastatic disease there is the possibility for malignant cells adherent to ovarian tissue to be reimplanted at a later time
 - Ovarian suppression with such agents as Gonadotropin Releasing Hormone (GnRH) agonists or antagonists
 - o Advantages
 1. Ease of administration

- o Disadvantages
- 1. Controversial efficacy

While the field of fertility preservation is still evolving, current Assisted Reproductive Technologies (ART) are capable of delivering more options and greater success rates to patients diagnosed with cancer than ever before. Certainly as these technologies continue to be perfected further, the role for some form of these interventions in many young women with cancer will become better defined.

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