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Case Report

A Difficult Decision in Fertility Preservation in a Young Patient with Breast Cancer: A Case Report

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Abstract

Breast cancer is one the leading cancers in women of reproductive age. Recent advances in early diagnostic and treatment plans have improved the prognosis and leads to successful treatment of these patients. This report discussed the importance of discussing fertility preservation options with young women with diagnosed with breast cancer and the challenges faced in the decision making of the patient.

The importance of a team of experts to involve closely with the patient to help in decision making will definitely help in the overall well being of the patient, to avoid regrets, post cancer treatment and recovery.

Keywords: *Breast Cancer; Fertility; Patient*

Introduction

Breast cancer is the most common malignant tumor in women of reproductive age and is characterized by a high survival rate owing to improved cancer treatments available.

Recent advances in diagnostic and therapeutic strategies have significantly improved breast cancer prognosis, and more than 80% of women under the age of 40 years are now successfully treated [1]. Young breast cancer survivors face the prospect of a diminished fertility as a consequence of the gonadotoxic chemotherapy [2].

There are some studies done which have suggested that fertility preservation in young women diagnosed with breast cancer are not addressed early and not address enough [3].

Partridge., *et al.* [4] in their study of patients with early breast cancer, reported that 57% of the patients were concerned about their future fertility upon learning of their cancer diagnosis, and 29% of the patients said their personal concerns affected their decision making. In addition, 51% of all patients felt that their concerns about fertility were inadequately addressed, indicating that there was insufficient communication between health professionals and the patients. Young women who are interested in fertility preservation should be referred to a fertility specialist as soon as possible, as recommended by several international guidelines [5-7].

An early and timely referral to a fertility specialist can reduce conflicts in decisions about fertility preservation for the patient [8].

Difficulties in deciding about fertility preservation

Although fertility preservation is becoming more popular with young patients diagnosed with breast cancer, there is still a good percentage of patients refusing fertility preservation as decision-making becomes very difficult and wrought with uncertainty. The main factor is the psychological impact of being diagnosed with cancer, the doubts they have about successful pregnancy and child

rearing in post cancer treatment stages due to lack of data on the precise risk of infertility from treatment and unmet information needs contribute to patients' uncertainty and most importantly, most patients don't prefer to wait longer to start treatment. Be it neoadjuvant chemotherapy or surgery, patients once diagnosed with cancer, prefer to start treatment at the earliest.

Even for patients who are informed of fertility risks prior to treatment and have the option to consider fertility preservation, decision-making is difficult and wrought with uncertainty. Decisions are often considered more difficult for females than for males as the procedures are more invasive, costly, and often require delaying treatment [22].

Financial considerations are often a significant factor influencing decision-making [23].

One more factor is availability of specialized reproductive centers in close proximity and this may also be limited by geographic location [23].

Pregnancy after cancer treatment?

Multiple factors contribute to the risk of infertility after cancer treatment, including gonadal function prior to treatment, gonadal toxicity of chemotherapy, and the effects of surgery and radiation on reproductive structures. Radiation of the gonads and chemotherapy with alkylating agents pose the highest risk of infertility. Platinum analogues, anthracyclines, and taxanes pose an intermediate risk [24,25]. It is indeed challenging to quantify the precise risk of specific chemotherapeutic agents, as most are used in combination with other agents.

Fertility preservation options

Embryo cryopreservation is the most well-established method of fertility preservation. Embryo cryopreservation follows the procedure used in infertile patients for *in vitro* fertilization. The ovaries are stimulated with gonadotropic hormones to acquire multiple oocytes, and then gonadotropin-releasing hormone (GnRH) agonists or antagonists are administered to inhibit early ovulation [8].

Oocyte cryopreservation is another option for fertility preservation [9], especially in a young post pubertal woman without a committed male partner.

Even if the protocol for ovarian stimulation and oocyte retrieval in oocyte cryopreservation is similar to that of embryo cryopreservation, concerns have been articulated regarding lower implantation and pregnancy rates than those obtained with fresh or frozen embryos. However, recent studies have reported that embryo transfer cycles using frozen-thawed oocytes had comparable success rates to those using unfrozen oocytes [10-12].

A supraphysiologic level of estradiol during fertility preservation, including controlled ovarian stimulation (COS), might stimulate the proliferation of breast cancer cells. Therefore, a modification of conventional COS protocol has been developed to prevent this potential harm. Administration of letrozole as an aromatase inhibitor before and after ovarian stimulation seems to be a feasible option [13-18]. The co-administration of letrozole is effective in reducing the peak estradiol level without a decrease in oocyte yield [3,18]. Although definitive large-scale trials regarding the safety of COS in women with breast cancer do not yet exist, the largest prospective study [15] reported that recurrence after COS was comparable to controls and that the survival rate was not compromised.

Tissue cryopreservation of the ovarian cortex seems to be an efficient way of preserving ovarian function [3]. Ovarian tissue cryopreservation, ovarian tissue is resected prior to chemotherapy, cryopreserved, and retransplanted upon treatment completion.

This method is still under research and considered experimental although some studies have reported more than 60 live births have been reported from ovaries cryopreserved with slow freezing or vitrification [19] though ovarian tissue cryopreservation.

Important thing to be kept in mind with this method is metastasis of breast cancer to the ovary is not an extraordinary event in the course of breast cancer [20,21] patients should be informed about this probability. For patients at increased risk of ovarian cancer due to comorbid diseases closely associated with genetic mutations such as BRCA1 and BRCA2, removal of the transplanted ovarian tissue and oocyte donation can be considered upon completion of successful pregnancy and delivery.

Case Report

A 32-year-old nulliparous married lady presented with history of lump in the right breast for 2 months.

The lump was painless and has been gradually increasing in size. She did not have any other constitutional symptoms. She did not have any other medical comorbid conditions.

She had no personal or family history of breast or ovarian cancer. There was no history of alcohol consumption or smoking.

Clinical examination showed 3x3 cm lump in the superolateral quadrant with right axillary nodes.

Trucut biopsy of the lump was suggestive of invasive ductal carcinoma.ER- positive/PR positive/Her2Neu positive.

MRI confirmed the above features.

PET CT scan did not show any metastatic disease.

She was referred to a fertility center in view of her young age and she was nulliparous. She was counselled and explained about the fertility preservation options by the experts. As the patient and family did not want any delay in the treatment of the cancer, they opted out of fertility preservation and decided to go ahead with the planned treatment.

The entire course of treatment was explained to her and family in detail. The possibility of requirement of oophorectomy at a later date was also explained. The adverse effects of chemotherapy and lower/no chances of pregnancy post treatment were explained.

She underwent Breast conservation surgery of the right breast, along with axillary clearance. The final histopathological staging was Following surgery, she is being treated with adjuvant chemotherapy (Adriamycin and cyclophosphamide (AC) regimen).

Discussion and Conclusion

Fertility preservation is a priority for young women with breast cancer. The expert group of oncologist discussed on the options available to preserve fertility in breast cancer patients undergoing chemotherapy or hormonal therapy or radiotherapy. The decisions of whether to resort to fertility preservation and which method to be use depends on a number of factors, including the patient's age, the type of adjuvant treatment, the time available before chemotherapy, and the length of delay to childbearing post chemotherapy. The embryo cryopreservation is a good fertility preservation option for women with partners or sperm donors is present, who can contribute sperm for egg fertilization. Women that do not have a partner and do not wish to use donor sperm, Oocyte cryopreservation becomes the treatment of choice.

Adequate timely counselling by a team of experts is very essential to make the decision making easier for the patient and her family. The team must include the treating oncosurgeon, medical oncologist, reproductive medicine/infertility specialist and a psychologist. After complete understanding of the fertility preservation options, as well as the risk of infertility post cancer treatment with data, the patient can take the decision, to avoid post treatment regret, as she will be mentally prepared to face it. This extra effort will definitely help in the overall well being of the patient, post recovery from the cancer.

Financial Disclosure

None to declare.

Conflict of Interest

Nil.

Author Contributions

All authors have equally contributed in this manuscript.

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