Fertility Preservation in Adult Females Diagnosed with Hematologic Cancer

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Background and Significance

There is a high incidence of blood cancers and survivors of the cancers in adults of reproductive age. There are more than 1 million survivors of leukemia, Hodgkin and non-Hodgkin lymphomas. The typical treatments for these cancers, chemotherapy and total body irradiation, can reduce patients' reproductive capacity and cause infertility. (Lee, Kim, Kim, Hwang, & Kim, 2017)

Blood cancers have high recurrence rate. Though patients may not experience fertility-related effects from the first round of cancer treatment, they may develop recurrent cancer requiring additional chemotherapy. Additionally, for subsequent rounds of treatment, potent cytotoxic agents may be used or total body irradiation may be performed, both of which lead to acute ovarian failure. (Lee, Kim, Kim, Hwang, & Kim, 2017)

Cancer treatments affect fertility. Due to the acute nature of most leukemias and lymphomas, patients must urgently undergo cytotoxic therapy. They cannot afford to wait 10 days to prepare for fertility preservation. (Lee, Kim, Kim, Hwang, & Kim, 2017)

Chemotherapeutic agents have variable effects on fertility. While attacking actively dividing cells, chemotherapeutic agents destroy mature ovarian follicles by inducing apoptosis in granulosa cells. (Lee, Kim, Kim, Hwang, & Kim, 2017)

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Purpose

To inform Nurse Practitioners about the effects that treatments of hematologic cancers have on the reproductive capabilities of female patients. To explore the available treatment options for these patients.

Methodology

A literature search was done on Pubmed. Published literature from February 2013 to July 2018 was reviewed. Search terms used were: fertility preservation and cancer, cancer and fertility, fertility preservation, hematologic cancer and infertility. A filter for English language was applied. Articles discussing fertility preservation in men or children or which discussed non-hematologic cancers were excluded.

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Chemotherapeutic agents and radiation therapy are the most gonado-toxic therapies. (Lee, Kim, Kim, Hwang, & Kim, 2017) These agents exhibit dose-dependent germ cell toxicity. (Lee, Kim, Kim, Hwang, & Kim, 2017) The damage from these therapies increases with increased doses. (Lee, Kim, Kim, Hwang, & Kim, 2017). The risk of premature menarche being induced by these therapies increases with increased age. (Lee, Kim, Kim, Hwang, & Kim, 2017)

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Radiation is highly toxic to oocytes. Radiation is destructive to oocytes in both the dormant primordial follicle and the larger antral follicle. A dose as low as 2G to the ovaries will reduce the percentage of oocytes by 50%. (Lee, Kim, Kim, Hwang, & Kim, 2017)

There are different options for preserving fertility. The two standard options for women are embryo cryopreservation and oocyte cryopreservation. Both of these therapies entail controlled hormonal stimulation of the ovaries, followed by surgical removal of oocytes. In embryo cryopreservation, the oocytes must be incubated with sperm prior to banking. In oocyte cryopreservation, no sperm is required. (Loren, 2015)

Hormonal therapies are considered to be the most controversial options. (Loren, 2015) Combination oral contraceptives may be taken to minimize menstrual bleeding. If the primary process is malignant, the risk of venous thromboembolism increases. This makes estrogen-based contraceptives less desirable and often contraindicated. (Quinn & Louis-Jacques, 2016) In such instances, it is recommended that all hormonal contraceptive agents be avoided for the first 6 months after completion of cancer treatment. (Quinn & Louis-Jacques, 2016)

There are regional differences between the types of fertility preservation options available in different clinics. Most of the clinics offering the highest volume of fertility preservation and the most patient support were in the Northeast. The clinics that are more supportive of fertility preservation options were found to be more likely to have patients return to take advantage of the fertility treatments offered. (Winkelman & Mok-Lin, 2016)

Results

There are approximately 130,000 cases of blood cancers diagnosed each year. Acute myeloid leukemia (AML) and non-Hodgkin lymphoma (NHL) are primarily diagnosed in older adults. However, there is still a substantial amount of cases in patients under the age of 50. Approximately 20% of patients with AML and 17% of patients with NHL are under 50 years old. The cure rates of AML are between 50% and 60% and of NHL are 60%. (Loren, 2015) Hodgkin lymphoma and acute lymphoblastic leukemia (ALL) are primarily diagnosed in patients under 50 years old. 64% of patients with Hodgkin lymphoma and 75% of patients with ALL are under age 50. The cure rates of Hodgkin lymphoma are 80% and of ALL are 40-90%. (Loren, 2015)

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Implications for Nurse Practitioners

It is important for Nurse Practitioners to discuss barriers to fertility preservation with patients diagnosed with cancer. A survey of physician and patient attitudes and barriers to fertility preservation was done. Results revealed that most physicians skipped fertility counseling and referrals. The reasons for this were lack of time, referral facilities, and time to initiate treatment. (Karunakaran, Mahatra, & Lad, 2017)

Nurse Practitioners should initiate conversations with patients about fertility preservation. Addressing the threats to fertility is an important part of caring for a patient with cancer, as patient concerns about decreased fertility have been associated with depression and distress. (Loren, 2015).

Nurse practitioners should make sure concerns about fertility are properly addressed to enhance patient satisfaction and optimal opportunities to start families. The results of the study by Winkelman and Mok-Lin (2016) suggests that through patient education and support, clinics can increase utilization of fertility services after successful cancer treatment.

Graphs demonstrating predicted age of ovarian failure in patients receiving 3, 6, 9, and 12G radiation. Patients above age 11 are represented in green, and patients 11 and younger are represented in red. (Loren, 2015)

References


