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Psychological Counseling of Female Fertility Preservation Patients

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Abstract

Young cancer patients are increasingly interested in preserving their fertility prior to undergoing gonadotoxic therapies. Although the medical safety and treatment protocols for fertility preservation have been well documented, limited research has addressed the emotional issues which arise in fertility preservation patients. We briefly review the literature on the psychosocial issues in adult female fertility preservation treatment and describe our experiences within this patient population. Our findings suggest that several important issues to be addressed during the psychological counseling of adult female fertility preservation patients include: 1) pre-existing psychological distress in patients undergoing treatment, 2) choice of fertility preservation strategy in the face of an uncertain relationship future, 3) decision making regarding use of third party reproduction (e.g., sperm/egg donation, gestational surrogacy), 4) treatment expectations regarding pregnancy and miscarriage, 5) ethical issues related to treatment including the creation, cryopreservation, and disposition of embryos/oocytes, and 6) decision regret from patients who declined fertility preservation.

Keywords

Fertility Preservation; Psychological Counseling; Cancer; Psychosocial Oncology

INTRODUCTION

It is estimated that there are more than 14 million cancer survivors in the U.S. and that this number will continue to grow along with improvements in the detection and treatment of cancer (Demark-Wahnefried, Aziz, Rowland, & Pinto, 2005; DeSantis et al., 2014; Meyerowitz, Kurita, & D'Orazio, 2008). Over the last few decades, the rates of new cancer diagnoses have increased yet the rate of cancer mortality has decreased 1–2% per year (Kort, Eisenberg, Millheiser, & Westphal, 2014). Improvements in survival rates of young cancer patients in particular have resulted in an increased awareness of the importance of fertility preservation counseling (S. J. Lee et al., 2006).

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Prior to undergoing gonadotoxic radiation and chemotherapy, many female cancer patients can safely and effectively participate in gamete, embryo and/or reproductive tissue cryopreservation (Duffy & Allen, 2009; Ethics Committee of the American Society for Reproductive Medicine, 2005; Hulvat & Jeruss, 2009; S. J. Lee et al., 2006; Neal et al., 2007). Although there is a large body of research regarding the medical aspects of fertility preservation, the literature on the psychosocial aspects of fertility preservation treatment is limited.

The decision to undergo fertility preservation may be affected by a multitude of psychosocial factors. First, patients who are referred for fertility preservation are typically in the early stages of coping with their cancer diagnosis (Madrigano, Westphal, & Wapnir, 2007; Quinn et al., 2010). They are likely worried about their mortality, future recurrences, implications of genetic testing, body image concerns, sexuality, current and future relationships, as well as other illness-related sequelae (Al-Azri, Al-Awisi, & Al-Moundhri, 2009; Montazeri, 2008; Pasacreta, 2003; Roopnarinesingh, Harrison, & Keane, 2003; Rosen, Rodriguez-Wallberg, & Rosenzweig, 2009; Trask, Paterson, Fardig, & Smith, 2003; Trask et al., 2002). Given these concerns, it is not surprising that cancer patients are frequently found to have symptoms of depression and/or anxiety (Al-Azri et al., 2009; Brintzenhofe-Szoc, Levin, Li, Kissane, & Zabora, 2009; Carlson et al., 2004; Montazeri, 2008; Trask et al., 2002; Zabora, BrintzenhofeSzoc, Curbow, Hooker, & Piantadosi, 2001). Additionally, cancer patients may also experience anxiety regarding their decision to participate in fertility preservation which can be intensified by the time sensitivity of the decision (Hill et al., 2012; Madrigano et al., 2007; Quinn et al., 2010; Yee, Abrol, McDonald, Tonelli, & Liu, 2012). Further, patients pursuing fertility preservation must consider the cost of treatment because most insurance policies do not cover treatment (Campo-Engelstein, 2010; Hill et al., 2012; Yee et al., 2012) and cost may therefore present a barrier to treatment (Kim et al., 2012; Klock, Zhang, & Kazer, 2010; Letourneau, Smith, et al., 2012).

Women undergoing fertility preservation must also decide if they want to have all of their retrieved oocytes inseminated with their partner's sperm, risking their future fertility if their relationship should end and their partner not want the embryos used to create a pregnancy (see e.g., "Davis v. Davis," 1992; "Kass v. Kass," 1998; "Lay v. Dodson," 2010; "A. Z. v. B. Z.," 2000) or split their cycle and freeze both oocytes and embryos knowing that pregnancy rates are lower with frozen oocytes than they are with embryos (The Practice Committees of the American Society for Reproductive Medicine and the Society for Assisted Reproductive Technology, 2012). Single women also face the possibility of lower success rates with frozen oocytes and may therefore consider the use of donor sperm to inseminate their oocytes, thus potentially limiting a future partner's ability to procreate with the patient. Use of donor gametes also raises other psychological issues including those related to donor selection and disclosure to future offspring (Thorn, 2006).

Patients may also have religious or other ethical quandaries about the cryopreservation and/or future destruction of embryos as well as concerns about the use of testing to determine the health of embryos with pre-implantation genetic diagnosis (PGD) (Clancy, 2010; Quinn et al., 2010; Quinn et al., 2008). Further, after fertility preservation and cancer treatment are completed, patients and/or their significant others face psychological and

ethical issues similar to other infertility patients including coping with uncertain chances of pregnancy (Cousineau & Domar, 2007); risk of miscarriage (Covington, 2006; Klier, Geller, & Ritsher, 2002; Schwerdtfeger & Shreffler, 2009); relationship changes after embryo cryopreservation which may interfere with a patient's use of the embryos (Crockin, 2005; "Davis v. Davis," 1992; "Kass v. Kass," 1998; "Lay v. Dodson," 2010; "Reber v. Reiss," 2012; "A. Z. v. B. Z.," 2000); embryo, oocyte, and/or tissue disposition decisions (Klock et al., 2010; Styer, Cekleniak, Legedza, Mutter, & Hornstein, 2003); and posthumous reproduction (Braun & Baider, 2007; Crockin, 2005; ESHRE Task Force on Ethics and Law, 2006; Ethics Committee of the American Society for Reproductive Medicine, 2005).

When faced with the complex psychosocial issues related to fertility preservation, a subset of women opts not to pursue treatment. Previous research has shown that, between 30% and 50% of women decide not to pursue fertility preservation (Hershberger, Finnegan, Pierce, & Scoccia, 2013; Kim et al., 2012; Klock et al., 2010) and some women later regret this decision (Crawshaw, Glaser, Hale, & Sloper, 2009; Gardino, Jeruss, & Woodruff, 2010; Yee et al., 2012). However, women are less likely to regret this decision if they undergo pre-treatment counseling by both their oncologist and a fertility specialist (Letourneau, Ebbel, et al., 2012).

Our program has offered fertility preservation (embryo, oocyte, or ovarian tissue cryopreservation) to female cancer patients since 2005 (Klock et al., 2010). We have observed that a substantial number of women present with significant psychological distress. However, there is a paucity of research describing women's psychological status at the time of fertility preservation (Klock et al., 2010). Rather, most research on fertility preservation in cancer patients has focused on the medical outcomes, rates of enrollment or post-cancer treatment reactions (e.g., Kim et al., 2012; Letourneau, Ebbel, et al., 2012; Quinn et al., 2011; Tschudin & Bitzer, 2009; Yee et al., 2012).

Both the American Society for Reproductive Medicine (ASRM) and the American Society of Clinical Oncology (ASCO) recommend that fertility preservation patients be referred for psychological counseling prior to treatment but do not specify what should be addressed (Ethics Committee of American Society for Reproductive, 2013; Loren et al., 2013). The purpose of the current study is to describe our experiences with adult female cancer patients undergoing evaluation for fertility preservation treatment to: (1) describe the occurrence of symptoms of depression or anxiety in this group of women; (2) document the treatment-related psychological issues that arose during the course of fertility preservation; and (3) summarize issues to be addressed during the psychological counseling of adult female fertility preservation patients. This information could be used to improve the pretreatment counseling for female fertility preservation patients and guide future research.

METHODS

Participants

Between January 2005 and October 2011, 334 women with a cancer diagnosis contacted a patient navigator to discuss fertility preservation and had an initial consultation with a reproductive endocrinologist at our clinic. Fertility preservation was offered to pre-

menopausal women (ages 18–45) following approval by their oncologist. Patients underwent medical evaluation by a reproductive endocrinologist to discuss fertility preservation treatment options. Patients also had a pre-treatment semi-structured psychological interview by a licensed clinical psychologist wherein a psychosocial history was taken; psychosocial treatment education was provided, ethical issues related to embryo creation and cryopreservation were discussed, and realistic treatment expectations were discussed.

Of the 334 patients;¹ 168 (50%) declined treatment, three women reported completing fertility preservation via controlled ovarian hyperstimulation (COH) at another clinic, and 35 women were medically ineligible for fertility preservation due to elevated levels of FSH (i.e. > 20 mIU/mL), need to start their cancer treatment immediately, or were pregnant. Twelve additional women enrolled in an ovarian tissue cryopreservation protocol or underwent other treatment for fertility preservation that did not include COH and were excluded from further analyses. Of the remaining 116 eligible women who enrolled in treatment (i.e., completed a medical evaluation and psychological interview), two women completed COH at another clinic, and 9 women dropped out, leaving a final sample of 105 women who began a cycle of COH in this clinic and are the focus of this study.

Procedure

Medical records for the 105 patients who underwent COH were retrospectively reviewed. Demographic and medical history data including age, marital status, reproductive history, racial/ethnic status, mental health history, choice of fertility preservation treatment, gamete and/or embryo disposition, use of donor or partner sperm, and pregnancy data were collected. The study was approved by the Institutional Review Board at Northwestern University.

Data Analysis

Statistical analyses using SPSS (IBM, Armonk, New York) were performed employing parametric tests for normally distributed data and non-parametric tests for non-normally distributed data, unequal sample variances, categorical data, and/or comparisons with small sample sizes. Analyses are based on available data, sample sizes are provided, and $p < .05$ (two-tailed) was considered significant.

RESULTS

Participation in treatment

105 (105/334, 31%) eligible women began a cycle of fertility preservation via controlled ovarian hyperstimulation (COH) anticipating either oocyte or embryo cryopreservation from January 2005–October 2011. The mean age of this group ($n = 105$) was 31.6 years ($SD = 5.1$) while the mean age of women who declined treatment ($n = 177$) was 32.5 years ($SD = 6.6$) (ns). Of the 105 women who began COH, 54 were diagnosed with breast cancer, 27 had a hematological cancer, 11 had a gynecological cancer, and 13 were diagnosed with other

¹The mean age of the total sample ($n = 334$) was 32.1 years ($SD = 6.2$). 138 were diagnosed with breast cancer, 65 with a hematological cancer (i.e. leukemia or lymphoma), 39 with a gynecological cancer, and 57 were diagnosed with some other type of cancer (brain, colon, rectal, spindle cell sarcoma, tonsillar, or Wilm's tumor).

types of cancer. The majority of patients chose embryo cryopreservation (Table 1). The majority of women who underwent evaluation were Caucasian (79%), nulliparous (74%), and married or partnered (79%) (Table 2). There were no significant differences in the percentage of patients choosing embryo or oocyte cryopreservation related to specific diagnosis, ethnicity, parity or age. Four patient's cycles were cancelled. Of the 101 patients who completed a cycle of COH, there was one cycle which resulted in no frozen embryos or oocytes.

Relationship status

The majority of patients was married or partnered (82/105) and underwent COH for embryo cryopreservation (88%). In addition, three of the married patients² and 7 partnered patients participated in either oocyte cryopreservation only or split their cycle and had both oocytes and embryos cryopreserved in an effort to preserve their fertility should their relationship end. Further, two husbands contacted the clinic after the embryos were created to indicate that their relationship with the patient had ended and that they were rescinding their consent for the patient to use their embryos. In one instance the woman attempted to begin embryo transfer after her husband had withdrawn his consent.

Use of third party reproduction

Single women undergoing fertility preservation predominantly chose oocyte cryopreservation ($n = 15/23$ single women, 65%). However, 8 single patients and two married women,³ used donor sperm and 1 woman's partner signed a legal contract as a known sperm donor to allow the patient greater control over her future fertility should their relationship end. One woman required the use of a gestational carrier when she returned for frozen embryo transfer (FET).

Current mood symptoms

Approximately a third of the women ($n = 31/105$), self-reported current symptoms of depression and/or anxiety which caused them distress and/or was reported to impair their occupational or social functioning; 16 of these women were taking psychotropic medication (Table 3).

Pregnancy and live birth outcomes

In terms of post-treatment data, 100 women had embryos and/or oocytes cryopreserved. 13 (13%) women returned to use their embryos at the time of this study; 5 of the women with cryopreserved embryos underwent one FET cycle, 5 underwent two cycles, and 3 women underwent three transfer cycles. No patients who stored only oocytes have returned to attempt pregnancy. Two additional patients achieved live birth without additional fertility treatment. The average time between embryo creation and return for first FET was 17.4 months (range 4 – 34 months). There was a 54% ($n = 7$) pregnancy rate on the first transfer cycle but 71% ($n = 5$) miscarried. Overall, ten of the 24 transfer cycles (42%) resulted in a

²One married couple was uncertain of the future of their relationship, one couple froze oocytes for religious reasons, and one woman was in the process of divorce.

³One woman was in the process of divorce and one woman's husband had severe male factor infertility.

positive pregnancy test and four transfers (16%) resulted in live births (three twin and one singleton pregnancy) and there was one ongoing pregnancy with subsequent live birth after data collection had ended. Five women (38%) never achieved pregnancy and three additional women had a miscarriage without subsequent live birth. The live birth and miscarriage rates for women whose embryos were created when they were under 35 years old were 27% (4/15 transfer cycles) and 43% (3/7 pregnancies) respectively; 25% (1/4 transfers) and 50% (1/2 pregnancies) for women 35–37; and there was a 17% pregnancy rate (1/6 transfer cycles) and 100% miscarriage rate (1/1 pregnancies) in women 38 and older. During the same time period (2008–2011), our pregnancy rates for women <35 years old were 40.4–57.8% (www.sart.org). The average age of women at the time of COH who had a successful pregnancy was 29.3 years ($SD = 1.3$) compared to 34.4 years ($SD = 5.9$) for women who were not successful (ns). There was no relationship between time elapsed since COH and pregnancy attempt with live birth.

Embryo and oocyte disposition

With respect to embryo disposition, of the 86 patients choosing embryo cryopreservation, the majority of married or partnered patients ($n = 50/78$, 64%) gave their partner the option of choosing how to dispose of cryopreserved embryos in the event of the patient's death. Eleven married/partnered women (14%) elected to have their embryos donated to research and 6 married/partnered women (8%) wished to have their embryos donated to another couple. However, when given the scenario of both partners being deceased or other unforeseen circumstance (e.g., relationship termination), nearly half of couples ($n = 38$, 49%) elected to have their embryos donated to another couple and 36% ($n = 28$) opted to donate their embryos to research. Very few couples chose to have their embryos destroyed in the event of the patient's death ($n = 4$, 5%) or the couple's death or other unforeseen circumstance ($n = 5$, 6%). For single women, 4 chose to donate their embryos to research, 1 chose to have her embryos discarded, and choice was unavailable for 3 women.

Death

Three women have died since completing fertility preservation; one patient with brain cancer, one with leukemia, and one with spindle cell sarcoma. One woman's husband contacted the clinic to discuss family building options using the deceased patient's frozen oocytes. He was counseled about treatment options and emotional concomitants by the reproductive endocrinologist and a psychologist, and he was offered psychological counseling. The oocytes remain in storage. Two deceased partnered patients had their embryos transferred to a long term storage facility prior to their deaths, and their final embryo disposition is unknown.

DISCUSSION

Fertility preservation offers patients the possibility of reproduction after gonadotoxic treatment, but the decision to select such a strategy is a psychologically complex one, with ramifications long after the procedure is completed. In addition to coping with a cancer diagnosis and attendant treatment, fertility preservation patients must also cope with uncertain future fertility as well as stressors that may arise during the course of the fertility

preservation process. Fertility preservation is a relatively new option for woman and therefore there is limited research describing the psychological issues related to it. Therefore, we aimed to describe the psychosocial aspects of fertility preservation and, based on our review of the literature as well as our findings, we provide recommendations for pretreatment counseling.

Limitations

This study is limited by retrospectively describing the experience at a single fertility preservation center. Due to the retrospective nature of this study and the time constraints for the provision of psychological consultation (< 60 minutes) which hindered the administration of validated measures of mood and anxiety; it is unclear if diagnostic criteria for a mood or anxiety disorder were met for study participants. A longitudinal study which includes validated measures of mood and anxiety is currently underway to compare psychosocial adjustment among fertility preservation and routine IVF patients. Strengths of this study are its relatively large sample size from a unique patient population, diversity of cancer diagnoses among the participants, and our ability to make an initial assessment of long-term outcomes such as return for embryo use and pregnancy rates. Finally, we have identified multiple psychological issues present in fertility preservation patients that highlight the importance of pre-treatment psychological counseling for these patients.

IMPLICATIONS FOR CLINICAL PRACTICE

First, we recommend that mental health professionals assess patients' pre-existing and current psychological status. During psychological consultation in our clinic, changes in mood in the wake of a cancer diagnosis, coping, and sources of social support were assessed to identify women in need of additional services. Individual follow-up was provided by two staff psychologists. As noted in the patient's medical records, during the course of the psychological interview all women reported decreased mood and increased anxiety since diagnosis. This finding is not surprising given that patients diagnosed with cancer have previously been found to be anxious and depressed as well as concerned about their mortality, recurrence, hair loss and other body image concerns, etc. (Al-Azri et al., 2009; Klock et al., 2010; Montazeri, 2008; Trask et al., 2003; Trask et al., 2002). The short time between cancer diagnosis and fertility preservation (Madrigano et al., 2007), and upcoming chemotherapy and/or radiation treatment, likely does not allow for emotional recovery prior to fertility preservation. Thus, decisions regarding fertility preservation are likely made during a heavily emotion-laden context.

At evaluation approximately one third of our patients also reported symptoms of depression and anxiety that they described as interfering with daily functioning and which may have been consistent with a mood or anxiety disorder. Due to the retrospective nature of this study it was unclear if full Diagnostic and Statistical Manual IV (DSM-IV) (American Psychiatric Association, 2000) diagnostic criteria for a mood or anxiety disorder were met. The rates of anxiety and depressive symptoms found in this study were consistent with rates of anxiety (13%–32%) and depressive (8%–36%) symptomatology found in other studies of breast and other cancer patients (Carlson et al., 2004; Lawson et al., 2014; Peate et al., 2011; Ruddy et al., 2014; Zabora et al., 2001). It has been noted that the presence of anxiety may

be detrimental to the retention of medical information and may influence decision-making in the fertility preservation process (Peate et al., 2011) and depression may prevent patients from seeking medical advice about infertility (Herbert, Lucke, & Dobson, 2010). Thus, the presence of clinically significant anxiety or depression warrants psychological assessment and treatment in this group of women.

Second, we recommend that mental health professionals discuss the stability of patients' relationship with their current partner in the context of freezing both eggs and embryos where appropriate. In our study, only marital status significantly related to fertility preservation choice as embryo cryopreservation was the most common choice for married or partnered women. This observation is likely related to the fact that embryo cryopreservation is a mature technology, is associated with higher pregnancy rates than oocyte or tissue cryopreservation (though pregnancy rates with cryopreserved oocytes are improving (The Practice Committees of the American Society for Reproductive Medicine and the Society for Assisted Reproductive Technology, 2012), and married or partnered patients envisioned reproduction in the context of their current relationship.

The finding that most women in our sample were unmarried (single or partnered), that two couples began divorce proceedings after fertility preservation treatment, and that one couple was uncertain about the durability of their relationship at time of enrollment highlighted the importance of counseling women about decision making and coping regarding use of their partner's sperm or donor sperm. In the two instances of divorce, we noted that the husbands rescinded their permission to use the cryopreserved embryos. In one case the patient was not aware of the situation and returned to the clinic requesting an embryo transfer. This was not carried out and she was referred back to her former husband and his attorney for further discussion. In our clinic, both partners must sign a consent form for each FET. Disputes between partners regarding use of frozen embryos are left to the courts to resolve and legal precedent generally (see "Reber v. Reiss," 2012 for an exception) favors the partner who does not want the embryos used for FET (Crockin, 2005; "Davis v. Davis," 1992; "Kass v. Kass," 1998; "Lay v. Dodson," 2010; "A. Z. v. B. Z.," 2000). Patients who are unable to use their cryopreserved embryos due to relationship dissolution may experience psychological distress as those embryos may represent their only chance to have a child who is genetically related to them.

Fortunately, with the exception of cervical cancer patients, there appears to be no increased risk of relationship dissolution in patients diagnosed with cancer (Carlsen, Dalton, Frederiksen, Diderichsen, & Johansen, 2007; Glantz et al., 2009). However, female partners diagnosed with cancer, younger age, and shorter duration of partnership have been shown to be risk factors for divorce in cancer patients (Glantz et al., 2009). We believe it is important to highlight this issue to our relatively young female patients who may be unsure of the long term status of their relationship. We therefore counsel all couples about the possibility of cryopreserving both oocytes and embryos or the use donor sperm to inseminate a subgroup of the oocytes to increase the patient's future treatment options should their relationship with their current partner end unexpectedly.

Third, we recommend that mental health professionals discuss the psychosocial issues involved in the use of third party reproduction (e.g., donor sperm and/or future need for a gestational carrier) where appropriate. For both couples and single women, the decision to cryopreserved oocytes or utilize donor sperm may be a difficult one to make. Although the cryopreservation of oocytes is no longer deemed experimental and success rates are climbing, success rates for cryopreserved oocytes may be lower than those of embryos (The Practice Committees of the American Society for Reproductive Medicine and the Society for Assisted Reproductive Technology, 2012). Patients who use donor sperm should be counseled about multiple psychological issues including donor selection and privacy/disclosure to their future offspring and others (Thorn, 2006). Single patients may also fear being rejected by a future partner who is not willing to couple with someone with a history of serious medical illness, who is infertile (Schover, 1999; Zebrack, Casillas, Nohr, Adams, & Zeltzer, 2004), who needs fertility treatment to achieve pregnancy, or whose only hope for a genetically related child requires the use embryos created with donor sperm.

Patients who undergo oophorectomy and/or hysterectomy as part of their treatment or whose uterine cavity is damaged by cancer treatments may consider third party reproduction with an egg donor or gestational carrier. However, these types of treatment may be cost prohibitive and/or may not be deemed by the patient as acceptable options. In addition to the costs associated with fertility treatment, the costs associated with using an anonymous egg donor may exceed \$10,000 and the costs of a compensated gestational carrier arrangement may exceed \$100,000. Patients unable to reduce these costs with the use of a known (e.g., sister, cousin) unpaid egg donor or gestational carrier may be unable to afford treatment and therefore be forced to abandon their frozen embryos/oocytes. We therefore discuss the psychosocial and financial issues related to alternate family building in order to aid in setting realistic future treatment expectations.

Fourth, we recommend that mental health professionals discuss patients' treatment expectations. Only thirteen of the 101 women who completed a cycle of COH (13% of the sample) used their embryos to attempt pregnancy. One of these women used a gestational carrier to attempt a pregnancy. There have been five live births (three sets of twins and two singletons). Unfortunately, miscarriages were common and many women did not achieve pregnancy leading to feelings of grief, guilt, and anxiety from pregnancy loss or infertility.

Given the emotional toll of miscarriage(s), infertility, and parenting multiples; patients were counseled prior to undergoing fertility preservation about coping with losses, realistic treatment expectations, and alternate family building strategies. All patients were counseled to not consider fertility preservation as an "insurance policy" as that implies that future treatment will be successful when the outcome of future treatment is uncertain. As with non-cancer patients unable to achieve live birth with fertility treatment, cancer patients who were unable to complete a cycle of COH, who were unable to achieve live birth or miscarried, and those who faced current or future infertility are at risk of experiencing psychological distress (Canada & Schover, 2012; Corney & Swinglehurst, 2014; Cousineau & Domar, 2007; Daniluk & Tench, 2007; Lechner, Bolman, & van Dalen, 2007; Verhaak, Smeenk, van Minnen, Kremer, & Kraaijmaat, 2005).

Patients who are unable to achieve live birth and who are not interested or able to engage in third party reproduction may pursue adoption only to realize that their cancer history may limit their ability to adopt due to agency and birthmother's fears about the patient's future health and ability to parent (Rosen, 2005). Grieving the loss of one's genetic fertility or ability to engage in alternate family building while being thankful to be cured of their cancer is likely complex (Schover, 1999; Thewes, Meiser, Rickard, & Friedlander, 2003) and may result in long lasting psychological distress (Canada & Schover, 2012). As such, we counsel all patients regarding the possibility of future grief reactions over the loss of their genetic fertility and ways in which to cope with such grief.

Fifth, we recommend that mental health professionals discuss the ethical issues involved in the creation, cryopreservation, and disposition of excess genetic material. In our clinic, we discuss religious and moral concerns regarding the creation, cryopreservation, and/or destruction of oocytes and embryos with all patients as such procedures may violate their moral/religious beliefs (Hynie & Burns, 2005). The use of preimplantation genetic diagnosis (PGD) to reduce the chance of offspring with certain heritable disorders may pose similar moral concerns for patients (Clancy, 2010; Quinn et al., 2010; Quinn et al., 2008). Patients who are opposed to the procedures involved in fertility preservation via COH may be torn between their personal beliefs and the possibility of raising healthy genetic offspring. Further, PGD is not 100% accurate (Kalfoglou, Scott, & Hudson, 2005) and therefore patients who do or do not undergo the procedure may worry that they are risking their future offspring's health when they try to conceive (Quinn et al., 2010; Schover, 2005).

At the time of enrollment, all patients in our clinic are also asked to decide how to dispose of their genetic material in the event of their death. Patients will also have to make such decisions in the future should they be unable to use their oocytes or have excess oocytes/embryos. Limited research has reported on embryo disposition decisions of adult female fertility preservation patients. In the current study we found that the most frequent embryo disposition choice for couples was donation to another couple (48%), followed by donation to research (38%) and disposal (8%). Previous studies of IVF patients indicate lower percentages of donating to another couple ranging from 7% to 16% (Hammarberg & Tinney, 2006; Klock, Sheinin, & Kazer, 2001; Lyster et al., 2010) and donating to research 10% to 21% (Klock et al., 2001; Lyster et al., 2010). With regard to donation to research however, our findings were consistent with a study by Hammarberg & Tinney (Hammarberg & Tinney, 2006) which indicated 42% of their IVF patient sample intended to donate their embryos to research. However, our data may not reflect patients' ultimate disposition decisions as previous studies have demonstrated that a large percentage of patients may initially agree to donate their embryos but later decide otherwise (Klock et al., 2001; Newton et al., 2007).

All patient's and couples are also counseled about the possible emotional outcomes of disposition choices including the choice to allow a surviving partner to decide the fate of cryopreserved embryos or oocytes. Allowing the partner to use the embryos or oocytes may allow the surviving partner to fulfill their own or their deceased partner's reproductive dreams. However, partners and/or family members may also desire to use the embryos or oocytes in order to have a living connection (referred to as "souvenir children") (Braun &

Baider, 2007) to the deceased individual which may result in psychological distress for the resulting children and their family members (Braun & Baider, 2007; Landau, 1999). Use of the cryopreserved embryos and/or oocytes by surviving partners or family members also exposes these individuals to the risks and emotional sequelae of failure to achieve pregnancy, miscarriage, birth of multiples, and health problems with offspring. Additional distress may arise if the families of the surviving and deceased partner disagree about pursuing posthumous conception. Failure to conceive or produce a healthy child after grieving the loss of one's spouse or family member may add insult to injury.

In our sample, one male partner returned to use his deceased wife's oocytes to conceive a child with a gestational carrier. During the psychological consultation acute bereavement was identified. He was counseled to wait for at least one year (by which time the symptoms of Bereavement have typically waned) (Bonanno & Kaltman, 2001) and then return for additional follow-up if he still intended to use the oocytes. Supportive counseling was offered and focused on coping with his loss and exploring the social and emotional implications of using the oocytes for a possible pregnancy. The oocytes remain in storage.

Sixth, we recommend that mental health professionals discuss patient's decision making strategy and address possible future regret should the patients decline treatment. In the current study we had a relatively large sample of patients with diverse cancer diagnoses which enabled us to examine a more broad patient population than has been previously published. Over 7 years we received 334 referrals and 105/334 (31%) patients began fertility preservation with COH at this clinic. Approximately 10% of all women referred were ineligible for fertility preservation, most commonly because of medical contraindications or concerns about ovarian reserve. Less than half of eligible women (122/299; 41%) participated in COH at any clinic or underwent surgical or other fertility preservation treatment with the majority of women declining or dropping out of treatment (177/299; 59%).

We may have been able to achieve such a diverse sample as a result of the reduction of treatment costs in our clinic due to our reduced fees for treatment and due to a statewide fertility treatment insurance law which requires health insurance policies covered under the mandate to provide coverage for fertility treatment (Illinois Compiled Statutes). Further, we have been successful in getting fertility preservation treatment covered by insurance plans falling outside the treatment insurance law after the reproductive endocrinologist submits a letter of medical necessity for fertility preservation and as we have worked with multiple organizations/foundations (e.g., LIVESTRONG's Fertile Hope, Ferring Pharmaceutical's h.e.a.r.t. BEAT program) to obtain other financial supports in medication coverage (Klock et al., 2010).

In terms of patient enrollment, our results are similar to the findings of Peate et al. (Peate et al., 2011) that 31% of eligible cancer patients intended to undergo fertility preservation. Our results differ somewhat from those of Kim et al. (2012), Lee et al. (2011), and Letourneau et al. (2012) who reported higher rates (45%–80%) of participation from patients counseled by a fertility specialist. However, it is unclear if the higher participation rates in other studies reflect the number of women who enrolled in fertility preservation treatment and

subsequently began a cycle of COH (92% of women in our sample) or the number of eligible women counseled about fertility preservation who ultimately pursued treatment of any type (41% in our sample). Future research on fertility preservation would benefit from more detailed descriptions of participation rates.

Regardless of the comparability of enrollment rates, large numbers of women frequently decline participation in fertility preservation and concern exists that these patients may later regret their decisions (Crawshaw et al., 2009; Gardino et al., 2010). The issue of future regret can be addressed by discussing patients' reasons for declining treatment, ensuring they have realistic expectations about their future fertility, and discussing their thoughts and feelings about alternate family building (via use of an egg donor or adoption) and being child-free should they be unable to achieve pregnancy in the future. Caution should be used when counseling patients regarding the possibility of future regret lest patients be emotionally coerced into participating in treatment.

Overall, the decision to participate in fertility preservation is a psychologically complex one. Mental health professionals may only see fertility preservation patients for one consultation prior to treatment onset and it is therefore vital that salient psychosocial issues are addressed at that time. Patients who participate in treatment face multiple psychological issues including pre-existing anxiety and depression; the choice to use a donor or partner's sperm, or split a cycle and freeze oocytes and embryos to diversify fertility options in an uncertain future; potentially low pregnancy rates and high miscarriage rates; the possible emotional sequelae of embryo and oocyte disposition decisions; and the possibility of decision regret. These issues can be addressed via pretreatment psychological counseling. Thorough assessments of anxiety and depression are needed to allow for early identification of patients who may benefit from additional psychological counseling.

Finally, too few women of reproductive age with a cancer diagnosis are referred for fertility preservation and most of those women do not pursue consultation for fertility preservation with a reproductive endocrinologist (Corney & Swinglehurst, 2014; Kim et al., 2012; Letourneau, Ebbel, et al., 2012). Although not all women will be interested in fertility preservation, we believe all women of reproductive age whose future fertility may be compromised by medical treatment should have a discussion with their oncologist about their future fertility options.

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Table 1

Cancer patients' choices regarding fertility preservation by diagnosis.

Type of Cancer	N	Embryo Cryo	Oocyte Cryo	Embryo & Oocyte Cryo
Breast	(n = 54)	41 (76%)	7 (13%)	6 (11%)
Lymphoma/Leukemia	(n = 27)	22 (82%)	3 (11%)	2 (7%)
Gynecological	(n = 11)	6 (55%)	5 (45%)	0 (0%)
Other	(n = 13)	8 (62%)	4 (31%)	1 (7%)
Total	(n = 105)	77 (73%)	19 (18%)	9 (9%)

Table 2Demographic characteristics of ($n = 105$) participants who began a cycle of COH.

Variable	N (%)
<i>Ethnicity</i>	
Caucasian	83 (79%)
African American	3 (3%)
Asian	8 (8%)
Hispanic	7 (7%)
Other	2 (2%)
Unknown	2 (2%)
<i>Marital Status</i>	
Single	23 (22%)
Married	51 (49%)
Partnered	31 (30%)
<i>Gravidity</i>	
Never pregnant	78 (74%)
1 pregnancy	17 (16%)
2+ pregnancies	10 (10%)
<i>Parity</i>	
No children	96 (91%)
1 child	8 (8%)
2+ children	1 (1%)
<i>Elective abortions</i>	
None	96 (91%)
1 elective abortions	7 (7%)
2+ elective abortions	2 (2%)
<i>Miscarriage</i>	
None	96 (91%)
1 miscarriage	8 (8%)
2 miscarriages	1 (1%)

Table 3

Mental health history of participants who began a cycle of COH.

Variable	N (%)
<i>Depression</i>	
No	70 (67)
Current symptoms	16 (15)
History	2 (2)
No Information	17 (16)
<i>Anxiety Disorder</i>	
No	65 (62)
Current symptoms	18 (17)
History	1 (1)
No Information	21 (20)
<i>Antidepressant use</i>	
No	66 (63)
Current	16 (15)
History	2 (2)
No Information	21 (20)