ONCOLOGY

Cancer and pregnancy: an overview for obstetricians and gynecologists

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A relatively rare occurrence, pregnancy-associated cancer affects approximately 1 in 1000 pregnancies. Optimizing treatment of the cancer and minimizing harm to the fetus are often dependent on the extent of disease, treatment options required, and the impact on the pregnancy as well as the gestational age of pregnancy. When malignancy is diagnosed, the obstetrician-gynecologist plays a key role in the diagnosis, initial evaluation, and coordination of patient care. Furthermore, the obstetrician-gynecologist may be asked to assist in fertility planning for young women with a new diagnosis of cancer and may be responsible for addressing questions about family-planning needs and the safety of future pregnancy. Therefore, the purpose of this article was to provide the obstetrician-gynecologist with a relevant overview of the current literature regarding concurrent pregnancy and cancer diagnoses, management options, including maternal and neonatal outcomes, as well as the future needs of young women diagnosed with cancer who desire fertility preservation.

Key words: cancer in pregnancy, chemotherapy, fertility preservation, radiation therapy

Of the estimated 805,500 women who will receive a cancer diagnosis in 2013, approximately 20-30% will occur in women younger than 45 years of age.[1,2] This disease may affect both women in the reproductive years as well as the pediatric or adolescent period, having an impact on future fertility and pregnancies. Despite the prevalence in this population, a cancer diagnosis is rarely in coexistence with pregnancy. However, the incidence of malignancy and pregnancy has increased from 1:2000 in 1964 to 1:1000 deliveries in 2000.[3-5] The rate of increase is attributed to not only higher rates of cancer in general but also to a delay in childbearing to the third and fourth decades of life.[6]

Pregnancy complicated by malignancy creates a unique clinical scenario for several reasons. First, diagnosis of malignancy may be confounded by the following: (1) symptoms of malignancy overlap with symptoms of pregnancy, such as nausea/vomiting, breast changes, and abdominal pain; (2) compromised physical examination secondary to the breast changes and gravid uterus; (3) hesitation to obtain testing and limitations and restrictions of imaging; and (4) decreased utility of tumor markers and laboratory values.[7] Second, antineoplastic treatments often lack data from large prospective trials to support safety. Clinicians must rely on information obtained from retrospective studies based on small samples and limited therapies to guide the decision-making process.[8] Third of all, the diagnosis and treatment of malignancy during pregnancy necessitates a balance of risks and benefits for both maternal and fetal well-being.

The cornerstone of care for a women diagnosed with malignancy during pregnancy requires a multidisciplinary approach, which may include but is not limited to the obstetrician-gynecologist, maternal-fetal medicine specialists, oncologists, neonatologists, pharmacists, social workers, and psychosocial support services. The obstetrician-gynecologist is often the front line for investigating symptoms, establishing a diagnosis, and making the appropriate referrals. Additionally, the obstetrician-gynecologist should be aware of the impact of malignancies and their treatments on future fertility and pregnancies. This includes options for women desiring fertility preservation, contraception planning, routine health maintenance, and continued coordination of care with treating providers.[9,10] Lastly, patients may look to their obstetrician-gynecologist for information on outcomes and additional supportive measures. The purpose of this article was to provide an overview of the current literature regarding concurrent pregnancy and cancer diagnoses, a brief review of management options, and maternal and neonatal outcomes.

Evaluation and diagnosis

As part of the initial visit, every newly pregnant woman should undergo a thorough history, a complete review of systems, comprehensive physical examination, including a breast examination and a Papanicolaou test, if indicated per the American Society for Colposcopy and Cervical Pathology guidelines, which may help detect the presence of an occult cancer.[11-13] When a suspicion of malignancy arises, clinicians may be hesitant to order testing because of concern for harm to the fetus. Because delays in diagnosis can affect prognosis and limit options for therapy, concerning and/or persistent symptoms or examination findings should be promptly

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TABLE 1
Fetal radiation dose exposure of common imaging methods

Imaging	Estimated fetal dose (rads)
Plain radiograph	
Chest	<0.01
Abdominal (2 views)	0.02
Extremities	0.001
Mammogram	0.020
Computed tomography	
Head	<0.05
Chest	<0.10
Abdomen/pelvis	2.60
Background radiation (control)	0.10

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investigated. Although blood work may be part of the evaluation, tumor markers, particularly for ovarian tumors, should be interpreted with caution because elevations may be expected in pregnancy.[14,15] Furthermore, tissue biopsies and fine-needle aspirations can be accomplished with minimal to no risk on the developing pregnancy.[16]

Often evaluation of malignancy or assessment for metastatic disease will require imaging. When diagnostic imaging is required in pregnancy, preferable modalities are ultrasound and magnetic resonance imaging, which are associated with minimal to no increased risk.[17,18] This is in comparison with imaging such as computed tomography scans or plain radiograph films, which use ionizing radiation, a known teratogen.[19,20] Although this exposure has been associated with adverse outcomes such as miscarriage, malformation, mental retardation, or carcinogenesis, the effect on the developing pregnancy is dependent on the dose of radiation, anatomic location of interest, and gestational age.[17,21,22]

Based on current data, most imaging studies with ionizing radiation exposure have a fetal dose less than 5 rads and are not typically associated with adverse outcome, especially once organogenesis is completed.[17,21,22] Exposure of radiation doses greater than 10-20 rads has been associated with malformations and decreased intelligence quotient levels.[17] Patients should be aware of an increased incidence of childhood malignancy, particularly leukemia, with in utero radiation exposure as low as 1 rad from 2-3 per 1000 to 3-4 per 1000 pregnancies.[17,22] Therefore, when there are no alternatives and the use of these tests warrant the use of these tests, efforts to decrease fetal dose, such as the shielding of the maternal pelvis, should be undertaken.[17-22] Table 1 provides an overview of the most commonly utilized tests and associated radiation dose.

Cancers in pregnancy

Although malignancy during pregnancy can arise from any site, the most common diagnoses are breast cancer, cervical cancer, lymphoma, ovarian cancer, and melanoma.[4,14,16,23-25] Because the obstetrician-gynecologist is often on the front line in making the diagnosis, awareness of symptoms and findings of malignancy as well as management of the initial work-up is required. In the following text, we have described the evaluation for breast cancer and the most common gynecological malignancies and cervical and ovarian cancer. A more comprehensive list is provided in Table 2.

Breast cancer

Similarly to nonpregnant women, breast cancer often presents as a palpable mass, skin changes, or bloody nipple discharge; however, symptoms and examination may be confounded by physiological changes associated with pregnancy.[16,26] Because delay in diagnosis may result in poorer prognosis, when clinically suspicious/persistent mass or symptoms are present, further investigation is warranted.[16,27] This evaluation may include an ultrasound, mammogram, and/or a core needle biopsy, all of which can be safely utilized in pregnancy.

Treatment depends on the extent of the disease and the gestational age. In the first trimester, options include termination of pregnancy or surgery followed by adjuvant chemotherapy in the second trimester. This latter option is also recommended when diagnosis is made in the second to early third trimester. When diagnosis is made in the late third trimester, consideration of aforementioned treatment or delay into the postpartum period can be selected. Of note, radiation and/or hormonal therapy are deferred to the postpartum period.[27] Coordination of care with surgical and medical oncology, the maternal-fetal medicine specialist, and the obstetrician-gynecologist will help determine management options at all steps.

Cervical dysplasia and cancer

Cervical cytological abnormalities are found in up to 5% of all pregnancies.[13,14] Low-grade lesions often regress or remain unchanged throughout pregnancy. Women who are found to have atypical cells of undetermined significance or low-grade lesions on cytology can be offered repeat evaluation after pregnancy or, if older than age 30 years, may undergo human papillomavirus (HPV) testing.[13] If HPV testing is performed and is positive for high-risk types, colposcopy should be performed.[13] High-grade lesions should be evaluated with colposcopy and biopsies only because endocervical curettage is contraindicated. Colposcopy should be performed every trimester with additional biopsies if progression to malignancy is suspected. Although these lesions rarely progress, postpartum follow-up is mandatory because approximately 50% of high-grade lesions will persist.[14]

Diagnosis of invasive cervical cancer ranges between 1-10 per 10,000 pregnancies and almost three-fourths of cases are diagnosed in the early stages.[14] If microinvasive or invasive disease is suspected, management with conization or trachelectomy may be indicated, and referral to a gynecological oncologist is recommended.[28] When a diagnosis of invasive cancer is confirmed, management recommendations are dependent on the stage of disease. Delay of treatment until fetal maturity may be

appropriate when evaluation confirms early-stage disease with negative lymph node status (which can be assessed with lymphadenectomy). In locally advanced disease, the primary option for management is chemoradiation with termination of pregnancy; however, options such as neoadjuvant chemotherapy in pregnancy have been used and are continuing to be studied.[14]

Ovarian tumors and cancer

With the use of routine ultrasound imaging in pregnancy, finding adnexal masses is not uncommon, with an estimated 1 in 600 to 1500 pregnancies requiring surgery.[14] Fortunately, although most are benign, distinguishing those that may be malignant, which comprises 1-3% of adnexal masses, is often challenging.[14] Because spontaneous resolution occurs in approximately 70% of adnexal masses, serial ultrasounds can determine whether further intervention is needed for masses that persist.[29] In addition to acute symptoms such as pain, hemorrhagic rupture, or torsion, masses that are large in size (greater than 8 cm), complex in nature, those that persist after 16 weeks of gestation, or are associated with the presence of extraovarian disease may also warrant surgical intervention.[30]

The use of tumor markers associated with common ovarian malignancies, which may indicate surgical intervention, may be affected by pregnancy. The markers whose reliability may be altered in pregnancy include human chorionic gonadotropin, alpha-fetoprotein, and CA-125 values, whereas the markers that are not affected include carcionembryonic antigen, CA 19-9, and lactate dehydrogenase levels.[31] More recently the biomarker human epididymis protein 4 (HE4), which has been shown to be useful in the detection and management of ovarian cancer, was found to have lower values in pregnant women compared with their premenopausal counterparts.[32] Further studies on the impact of pregnancy on HE4 and other biomarkers for ovarian tumors, including OVA1, are warranted.

In pregnancy, the most common ovarian malignancies are diagnosed in early stages and are comprised of germ cell, sex cord-stromal, borderline tumors, and less commonly, invasive epithelial ovarian cancer.[15] When surgery is performed, either laparoscopy or laparotomy, care to avoid rupture is imperative and surgical staging (with preservation of the contralateral ovary and uterus) is advised when possible. The use of standard chemotherapy, namely platinum and taxanes, may be utilized with minimal fetal consequences in the second and third trimester and treatment should be individualized.[33]

TABLE 2
Overview of cancer types, symptoms, and evaluation in pregnancy

Cancer type	Incidence	Symptoms	Initial evaluation
Breast cancer[4,15]	1:3000-10,000	Palpable, painless mass Bloody nipple discharge Skin changes (retraction/redness)	Ultrasound Core needle biopsy
Cervical cancer[4,13]	1-2:2000-10,000	Abnormal cervical cytology Friable, exophytic mass	Colposcopy/biopsy conization
Melanoma[21]	1-2.6:1000	New or growing pigmented skin lesion	Tumor excision/biopsy
Ovarian cancer[13]	1:10,000	Mass found incidentally on ultrasound Abdominal pain or bloating	Ultrasound Surgery
Lymphoma[4]	1:1000-6000	Painless lymphadenopathy Systemic symptoms such as fever or chills	Chest radiograph Bone marrow biopsy Abdominal ultrasound
Thyroid cancer[4,22]	0.2-1.4:10,000	Palpable thyroid nodule	Fine-needle aspiration
Colorectal cancer[4,23]	1:13,000	Bloody stool Abdominal pain Diarrhea	Colonoscopy

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Treatment

After diagnosis of malignancy has been established, a review of outcomes and expectations with the patient and her family along with coordination of care with oncologists should occur as soon as possible. The necessary treatment must balance oncological outcomes with the effect on the pregnancy, and decisions regarding the management of pregnancy include termination, iatrogenic prematurity, or intentional delay in treatment of the maternal malignancy. When making this decision, one must account for the wishes of the patient/family, stage of cancer diagnosis, gestational age, and effects of the specific therapeutic option because any of these may have an impact on the management. An overview of the most commonly utilized therapeutic options is provided below.

Surgery

The role of surgery may be either diagnostic or therapeutic in the management of malignancy during pregnancy. The primary adverse effect of surgery is prematurity secondary to preterm labor and may be attributed to either the surgical procedure or the exposure to anesthesia.[34,35] In the first trimester, administration of anesthesia has not been associated with an increased risk of congenital malformation; however, because of several reports of increased rates of miscarriage in the first trimester, surgery is often deferred to the second trimester when possible.[34-36] Regardless of the type of surgery, fetal well-being should be monitored with Doppler or ultrasound preceding and following general anesthesia during the first trimester.[37] Surgery that is performed after 24 weeks of gestation should include continuous fetal monitoring

along with consultation of an obstetrician.[37] Patients should be aware of the need for emergent delivery secondary to nonreassuring fetal well-being on monitoring, and consented for cesarean section prior to surgery.

When abdominal surgery is required, the laparoscopic approach is the preferred approach when feasible during pregnancy, and the surgeon may have to adjust techniques to accommodate physiological changes of pregnancy.[38] Consideration for the safest technique for entry is dependent on the size of the gravid uterus.[38]

Chemotherapy

The impact of chemotherapy exposure during pregnancy is based on both gestational age and the specific agent being administered. For the former, chemotherapy given from conception to approximately 10 days represents the all-or-nothing period. From this period to 8 weeks (organogenesis), chemotherapy is associated with teratogenesis and major congenital malformations. After this period, the effects of chemotherapy are inversely related to gestational age, with rates of congenital malformations 16%, 8%, and 6% in the first, second, and third trimester, respectively.[8] Additionally, combination therapy was associated with only a slight increase in adverse outcomes (25%) when compared with single-agent therapy (17%).[39] Therefore, introduction of chemotherapy should be delayed to later gestational period if possible. It is important to recognize that adverse outcomes occurring in the second and third trimesters include minor anomalies, fetal hematological suppression, growth restriction, prematurity, and rarely fetal/neonatal death.[40]

Although a full review is beyond the scope of this paper, the impact of chemotherapy exposure is also dependent on the agent given. In brief, alkylating agents (eg, cyclophosphamide) and antimetabolites (eg, methotrexate) were found to have the greatest risk for adverse pregnancy outcomes, particularly first-trimester malformations.[4,40] Platinum adducts (carboplatin), taxanes (paclitaxel), and antibiotic agents (doxorubicin) have the lowest associated risks.[8,33,40] All patients who require chemotherapy during pregnancy should undergo thorough counseling with the treating oncologist, neonatologist, and obstetrician.

Radiation therapy

The successful use of radiation therapy in pregnancy, particularly in breast cancer and lymphoma, has been reported with the use of proper shielding techniques required to reduce fetal exposure to less than 10 rads, minimizing adverse fetal outcomes.[17,41] Rates exceeding 20 rads are associated with teratogenesis or pregnancy loss.[4,42] Therefore, most guidelines for the management of cancer in pregnancy advocate for alternative treatments, such as neoadjuvant chemotherapy, and delay of radiation treatment until the postpartum period if possible.[42]

Delivery considerations and neonatal outcomes

Once cancer therapy has been selected and deemed to be compatible with continuing the pregnancy, assessment for fetal well-being with antenatal testing and serial growth ultrasounds are indicated. Consultation with maternal-fetal medicine specialist is also advised. Prior to delivery, patients should consult with both obstetrical anesthesia services and the neonatology team. This will allow for the preparation of potential premature delivery, fetal exposure counseling and management, and/or maternal medical comorbidities.

In addition to the aforementioned treatments, neonatal outcomes are mainly dependent on the gestational age at the time of delivery. Although there are higher rates of small-for-gestational age neonates exposed to chemotherapy after the first trimester, rates of congenital malformations are comparable with those who are not exposed.[40,43,44] Currently, a majority of providers taking care of women with malignancy in pregnancy prefer preterm delivery, despite associated consequences such as respiratory distress, necrotizing enterocolitis, and intraventicular hemorrhage.[45] Induction of labor or primary cesarean section was performed in approximately 72% of cases, and maternal malignancy was documented as the indication in 76.7% vs 16.2% for obstetrical indications.[43] Rates of iatrogenic prematurity were shown to result in significantly high rates of neonatal intensive care and neonatal death, advocating for a need to delay delivery to term.[43,44]

A primary goal of cancer treatment during pregnancy should be to limit iatrogenic prematurity. Unfortunately, this may not always be feasible, and, if anticipated, antenatal steroids can be safely administered and confirmation of fetal lung maturity is recommended.[18,45,46]

After delivery, histological evaluation of the placenta should be performed to identify metastatic disease.[16] For women who require chemotherapy or hormonal therapy following delivery, breastfeeding is contraindicated.[47,48] Often recommendations advise allowing for a 2 year disease-free period after treatment prior to attempting another pregnancy.[27,48] Treatment should be individualized and women should be educated on the risks of recurrence with future pregnancies and the need for continued surveillance.

Additional considerations

Fertility preservation

Of the estimated 12 million cancer survivors in the United States, more than 250,000 are women under the age of 40 years.[49] As advancements in cancer treatments continue to improve survival, increased focused has been given to additional improvements to be made in the realm of quality of life for survivors.[50] For cancer survivors or those newly diagnosed with cancer, the obstetrician-gynecologist often plays an integral role in the diagnosis, providing routine gynecological care, and discussion regarding fertility and obstetrical options and outcomes. The American Society of Clinical Oncology recommends that physicians address fertility options/outcomes in patients, including referral to reproductive specialists.[51] Because of the permanent effects of therapy, the topic of fertility preservation should be touched upon as soon as

TABLE 3
Fertility preservation options for breast and gynecological malignancies

Cancer site	Estimated cases in reproductive-aged women[61]	Fertility-preserving options	Contraindications/concerns	Fertility/obstetrical outcomes	Oncologic outcomes (fertility preserving methods compared to standard)	Notes
Breast cancer	~23,000-34,000 cases	Ovulation Induction with aromatase inhibitors and tamoxifen Oocyte/embryo cryopreservation	Ovarian metastases (3-30%)[26] Hormone receptor status may have impact on fertility treatments	Embryo cryopreservation: comparable with age-matched controls in regard to length of stimulation, number of embryos obtained, and fertilization rates[62,63]	Similar relapse-free survival rates between women who conceive and those who chose not to conceive Similar recurrence rates, progression-free survival in short term.[64,65]	Consider BRCA testing for women who may be at increased risk for ovarian cancer and additional counseling
Cervical cancer	~6000 cases	Radical trachelectomy Ovarian conservation Ovarian transposition Oocyte/embryo cryopreservation	Ovarian metastases (0.5-5%)[66,67]	Trachelectomy: First-trimester loss: 18-20%[68] Second-trimester loss: 3-8.6%[68] Third-trimester delivery: 62-73%[68] Preterm delivery <37 wks: 18-28% Term delivery: 40-55%[69,70] Ovarian transposition:50% preservation menstruation[51] Pregnancy rate variable	Recurrence rate: 4.5-4.8%[69,70] Death from disease: 1.6-2.5%[69,70] 5 year PFS: 96%[70]	• Retrospective analyses on trachelectomy have reported on safety and efficacy, but long-term follow-ups are needed for details on obstetrical and oncological outcomes • Ovulation induction for oocyte/embryo cyropreservation is not recommended if cervix is friable, because of bleeding concern and seeding abdomen with malignant cells
Endometrial cancer	~10,000 cases	Hormonal therapy Progestins: Medroxyprogesterone Megestrol acetate Levonorgestrel intrauterine system	Persistent or progressive disease occurs in ~25% of patients[71] Contraindication: high-risk histologies or with myometrial invasion	Pregnancy rates[71] Hyperplasia: 41% Endometrial cancer: 34.8% Number live births (n = 117)[71] Hyperplasia: 28 Endometrial cancer: 89	Response to hormonal therapy: 77% CR: 48.2% Median time to CR: 6 months (1-18 months) Recurrence: 35.4%[71]	Continue endometrial sampling to confirm response Counsel patient on contributing lifestyle factors
Ovarian cancer	~3300 cases	Conservative staging with preservation of the uterus and contralateral ovary Ovarian cystectomy (borderline tumors)	Contraindication: high-grade histologies and advanced disease	Spontaneous abortion rate: 10% Ectopic rate: 0.8% Term births: 88% Preterm birth: 0.4% No congenital anomalies[69]	Recurrence rate: ~12% Death rate: ~5%[72]	Appropriate counseling on the risks of disease recurrence must take place

CR, complete response; *PFS*, progression-free survival.

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TABLE 4
General considerations when cancer is diagnosed in pregnancy

- Multidisciplinary, clinical management is fundamental to optimize outcomes
- Ultrasound evaluation to exclude preexisting malformations prior to interventions.
- Serial growth scans should be performed.
- When possible, delay surgery until the second trimester.
- Surgical procedures performed after 24 weeks' gestation should include intraoperative fetal monitoring
- Chemotherapy treatments should be followed by fetal well-being checks
- Chemotherapy should not be administered after 35 weeks of gestational age or within 3 weeks of anticipated delivery.
- Efforts to defer radiation therapy until after pregnancy should be taken.
- Delivery should be based on obstetrical indications with efforts made to deliver at term.
- If preterm delivery is indicated, when possible, fetal maturity should be confirmed.
- The placenta should be examined for metastatic disease.
- Breast-feeding is contraindicated with chemotherapy/hormonal therapy.

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possible, preferably before treatment is administered.

Regardless of disease site, rates of compromised fertility following cancer treatment vary and depend on multiple factors. For instance, potential gonadotoxicity is dependent on both the chemotherapy agent and dose, and the prevalence of infertility was directly related to age, ranging from 15-30% at 25 years and 25-50% at 35 years.[52] For young women who have had radiation exposure to the ovaries, follow-up data from the Childhood Cancer Survivor Study demonstrated an increased risk of miscarriage in future pregnancies compared with those who were not exposed.[53] Because ovarian shielding has been shown to reduce this risk, patients should be counseled appropriately.[53-55] Lastly, surgery may result in anatomic changes or removal of essential reproductive organs, reducing or eliminating future fertility.[10] When the preservation of fertility is desired and is likely to have had an impact by cancer treatment, consultation with an infertility specialist will allow for a comprehensive review of options.

The fertility-preserving techniques used are dependent on the age of the patient and may include oocyte/embryo banking, ovarian tissue cryopreservation, ovarian suppression with gonadotropin releasing hormone agonists, fertility-preserving surgery, and ovarian transposition.[10,56] Table 3 provides options and outcomes for commonly diagnosed cancers. It is important to note that the use of a gonadotropin releasing hormone agonist during chemotherapy has been inconclusive to date and should not be recommended for fertility preservation in itself.[56]

The use of assisted reproductive technology, such as in vitro fertilization, may be an option when pregnancy is desired. However, if the use of hormone stimulation is contraindicated or the uterus has been removed/radiated, options for family building may include surrogacy as well as adoption.[10] Although short-term data are promising with regard to fertility, obstetrical, and oncological outcomes, oncofertility is still in its infancy and longer-term studies need to be performed to improve our knowledge on recurrence and survival outcomes.

In younger women, who may be remote from child-bearing years and have undergone fertility-preserving cancer therapies, the obstetrician-gynecologist must be aware of the impact of these treatments on future pregnancies. For example, treatments for early-stage cervical cancer, such as cervical conization, places patients at risk for difficulty with conception secondary to cervical stenosis and increases the risk for second-trimester loss and preterm delivery.[57] Radical trachelectomy with placement of a cervical cerclage has an impact on the delivery method (cesarean section) along with the aforementioned risks.[58] Although risks such as postpartum hemorrhage, preterm delivery, and the need for operative delivery have been reported at higher rates than the general population, in general, in cancer survivors attempting to conceive, pregnancy rates are favorable.[28,59]

Contraception planning

Although fertility preservation is often addressed, it is important to recognize the impact of an unintended pregnancy on women during or following cancer treatment. In a survey assessing reproductive-age women during cancer treatment, more than half of the participants reported that they believed they could not become pregnant following cancer treatment.[60] Additionally, 45% of study participants reported that they were not using any form of contraception and that, if pregnancy occurred, approximately half of this group would elect for termination during cancer treatment.[60] These findings reiterate the results of a long-term survivorship study from childhood cancer, in which cancer survivors were more likely to terminate a pregnancy when compared with noncancer controls.[53]

Primary prevention of unplanned pregnancy has the potential to decrease these types of difficult ethically and morally challenging decisions, and the obstetrician-gynecologist has a principal role in contraception planning during both primary treatment and postdisease surveillance. In 2012, clinical guidelines specifically for contraception planning in the setting of cancer were developed and advocate that any patient who is sexually active (with reproductive capability) should be considered at risk for pregnancy.[9] Women should be counseled that irregular menses or amenorrhea may not be reliable signs of infertility.[9,10]

Contraception selection in this patient population is dependent on the following factors: type of malignancy, disease status (active vs remission), and other medical comorbidities. For hormone-dependent malignancies, such as breast cancer, combined systemic hormone contraception may adversely affect prognosis or increase the risk of recurrence and should be avoided.

Women with active disease or completing treatment within 6 months should also avoid estrogen-containing contraception because of an increased risk of venous thromboembolism.[9] If an absolute contraindication to estrogen therapy exists, options include placement of an intrauterine device, implants, barrier, or behavioral methods.

Contraception methods can also be tailored to specific side effects of cancer treatment. For example, women with a history of breast cancer on tamoxifen therapy, which may actually enhance fertility, may benefit from a levonorgestrel intrauterine system that will counter endometrial stimulation.[9,27]

Summary

The diagnosis and treatment of malignancy during pregnancy is a relatively rare occurrence but represents a complicated clinical scenario. During this situation, the obstetrician-gynecologist plays a critical role in detection and diagnosis of malignancy. Thus, being familiar with concerning symptoms and findings that warrant further evaluation may prevent a delay in diagnosis and allow for the most effective interventions. Providing patients with information on and addressing concerns with regard to testing will help comfort the patient and her family. When cancer during pregnancy is diagnosed, cooperative and multidisciplinary management is the cornerstone of treatment to optimize patient care. Working with the neonatology and oncology team to determine a treatment plan as well as the ideal time for delivery will help improve outcomes for both the woman and baby. Table 4 provides a comprehensive list of topics that addresses the needs of women with cancer in pregnancy.

As the number of cancer survivors grows, the population of women in the reproductive ages with a cancer history will also increase. When women with a history of cancer are not actively attempting pregnancy, contraceptive counseling as well as options for fertility preservation should be addressed by the obstetrician-gynecologist. Thus, the obstetrician-gynecologist plays a multifaceted role for women with cancer, or a history of cancer, during pregnancy and the reproductive years. ■

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