

CLINICAL CHALLENGES

Susan Moore, RN, MSN, ANP, AOCN®
Associate Editor

Caring for Pregnant Patients With Breast Cancer

Sue Rimes, RN, BSN, Jacalyn Gano, RN, MSW, OCN®, Karin Hahn, MD, Mildred Ramirez, MD, and Andrea Milbourne, MD

Case Study

Ms. G is a 37-year-old nulligravid female from a small town in rural Texas. She noticed unusual tenderness in her left breast and palpated a mass on self-examination. She underwent a breast biopsy and was diagnosed with invasive ductal carcinoma of the left breast. She was referred to a cancer center for treatment recommendations.

When Ms. G presented to the cancer center, she was scheduled for a staging workup. She underwent a bilateral mammogram that showed an irregular mass measuring 3.3 cm x 2.7 cm in the left breast with associated ipsilateral axillary lymphadenopathy. An ultrasound-guided core biopsy of the breast and fine needle aspiration (FNA) of the axillary lymph node and supraclavicular lymph node were performed. The core biopsy confirmed invasive ductal carcinoma. Pathology revealed the disease to be estrogen receptor-negative, progesterone receptor-20% positive, and HER2/neu negative. FNA of the axillary lymph node was negative for metastatic disease. The patient was staged as T2, N0, M0.

Treatment options, neoadjuvant (preoperative) chemotherapy followed by left total mastectomy versus left total mastectomy followed by adjuvant chemotherapy, were discussed at length. Ms. G elected to undergo surgery first to reveal the extent of the disease. She then would receive adjuvant

chemotherapy. She was referred to internal medicine for preoperative risk assessment.

Her visit to the internal medicine physician was scheduled for one week later. Prior to her appointment, she experienced some irregular menstrual bleeding and nausea. After using an over-the-counter pregnancy test, Ms. G discovered that she was pregnant, which was confirmed by a serum pregnancy test. Her oncologist was notified of the pregnancy, and the nurse liaison in the department of gynecologic oncology was contacted. Because the cancer center does not have obstetric services, a formal collaboration with the division of maternal fetal medicine (MFM) at a health science center had been established to treat patients with cancer on an as-needed basis. A nurse liaison is charged with assisting high-risk patients in obtaining a consultation with the division of MFM to facilitate appropriate obstetric care.

After receiving a referral from the nurse liaison, Ms. G and her husband met with an MFM physician, who discussed the effects of pregnancy on breast cancer, the effect of breast cancer during pregnancy, and the risks and complications of surgery and fluorouracil, doxorubicin, and cyclophosphamide (FAC) chemotherapy. The patient also had an ultrasound that documented the fetal gestational age at 10 weeks. The MFM physician recommended (a) an ultrasound every three to four weeks to monitor interval fetal growth, (b) a targeted ultrasound

for anatomic survey at approximately 20 weeks of gestation, (c) antenatal testing with biophysical profiles when indicated, and (d) suggestions for an obstetrician if Ms. G was unable to deliver in Houston. After the consultation, the MFM obstetrician conferred with the medical oncologist regarding the patient's plan of care and how best to manage her pregnancy while she underwent chemotherapy.

Ms. G had a left total mastectomy within a month of her initial visit. She was approximately 13 weeks pregnant. Pathology revealed an invasive ductal carcinoma, stage T2 N0 M0. Following surgery, the patient was seen by a medical oncologist who specializes in treating pregnant patients with breast cancer. Ms. G's treatment was delayed until the beginning of her second trimester. A subclavian catheter was inserted at gestation week 16, and she began receiving FAC chemotherapy. She continued to receive chemotherapy every three weeks for a total of six cycles. Chemotherapy was discontinued five weeks prior to the scheduled delivery of the fetus to allow Ms. G's blood counts to recover to the normal range.

Sue Rimes, RN, BSN, is a clinical nurse liaison in the Gynecologic Oncology Department, Jacalyn Gano, RN, MSW, OCN®, is the manager of clinical protocol administration in the Gynecologic Oncology Department, and Karin Hahn, MD, is an assistant professor in Breast Medical Oncology and the Department of Epidemiology, all at the University of Texas M.D. Anderson Cancer Center in Houston; Mildred Ramirez, MD, is an associate professor in the Division of Maternal Fetal Medicine at the University of Texas Health Science Center at Houston; and Andrea Milbourne, MD, is an associate professor in the Gynecologic Oncology Department at the University of Texas M.D. Anderson Cancer Center.

Do You Have an Interesting Clinical Experience to Share?

Clinical Challenges provides readers with a forum to discuss creative clinical solutions to challenging patient care problems. Case studies or problem descriptions may be submitted with or without discussion or solutions. References, tables, figures, and illustrations can be included. Materials or inquiries should be directed to *Oncology Nursing Forum* Associate Editor Lori A. Williams, RN, DSN, OCN®, AOCN®, at lori.williams@prodigy.net or Susan Moore, RN, MSN, ANP, AOCN®, at smoore46@yahoo.com.

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Labor was induced at 39 weeks, and a healthy baby girl was delivered, weighing 7 lbs., 4 oz. No complications occurred for the mother or neonate.

Clinical Problem Solving

What types of diagnostic and staging tests can be performed on pregnant patients?

Cancer during pregnancy presents a significant clinical challenge, balancing the anticipated outcomes of safe and effective cancer diagnosis and treatment with a healthy newborn. Many diagnostic tests are available to pregnant patients. Radiologic diagnostic tests that deliver less than 5 cGy to the fetus do not increase the risk of growth retardation and spontaneous abortion and are not believed to cause birth defects, even during the first trimester (Challoner & Incerpi, 2003). The radiation dose used for a mammogram is 0.0004 Gy; therefore, mammograms are not contraindicated during pregnancy (Bock, Hadji, Ramaswamy, Schmidt, & Duda, 2006). Yang, Dryden, Gwyn, Whitman, and Theriault (2006) reported that imaging indications for biopsy, which include the presence of complex cysts, solid masses, indeterminate calcifications, and persistent inflammatory changes, remain the same for pregnant woman as for nonpregnant women. Similarly, an ultrasound scan, which differentiates between cystic and solid lesions, and chest x-rays (when the abdomen is shielded), also are safe to use during pregnancy. Challoner and Incerpi noted that a lead shield should be placed on the abdomen to reduce the radiation to the fetus.

Certain tests should be ordered with caution. Magnetic resonance imaging (MRI) with contrast is not recommended because of concerns about the safe use of gadolinium and the difficulty in positioning a gravid patient in a prone position (Eedarapalli & Jain, 2006). However, if an MRI is necessary to rule out bone metastasis, a noncontrast MRI of the thoracic and lumbar spine can be performed. Routine computed tomography scans and bone scans are not recommended during pregnancy because of the amount of radiation exposure to the fetus. Intraoperative lymphatic mapping using isosulfan blue dye has not been approved for use in pregnant patients and is contraindicated because anaphylaxis can occur with its use (Loibl et al., 2006).

An FNA or a core biopsy may be performed as part of the initial evaluation. An experienced pathologist should interpret the specimen because of the hyperproliferative changes in breast tissue that occur especially during pregnancy. However, FNA does not permit diagnosis of invasive disease unless it is of a regional lymph node. Core needle biopsy is an effective means of diagnosing breast cancer (Eedarapalli & Jain, 2006; Loibl et al., 2006).

How should patients be counseled regarding the option of pregnancy termination?

Based on limited data, the survival of patients with breast cancer has not been improved by terminating pregnancy. Survival of pregnant patients and nonpregnant patients with breast cancer has been reported as equal when patient age and disease stage are taken into account. Several studies have shown that a large percentage of pregnant women with breast cancer had tumors that tested estrogen and progesterone receptor-negative, which seems to contradict the argument to terminate pregnancy because of concerns about hormonal effects (Hahn et al., 2006; Middleton, Amin, Gwyn, Theriault, & Sahin, 2003). Termination of pregnancy might be considered if a patient has advanced-stage disease that requires prompt and aggressive cancer treatment (Dow, 2000; Pavlidis, 2002). Termination also may be considered if medically indicated by the health of the mother or for known or suspected fetal teratogenesis.

What are the risks for pregnant patients undergoing surgery?

The ultimate goal is to provide safe surgical treatment and anesthesia to the mother while minimizing the risk of fetal demise or preterm labor (Ni Mhuireachtaigh & O'Gorman, 2006). The risk of a spontaneous abortion is highest before the 12th week of gestation, regardless of any surgical intervention (Loibl et al., 2006). Teratogenic effects of drugs administered in the perioperative period, including anesthetic agents, could be hazardous to the fetus. Fetal organogenesis occurs during the first trimester (Kuczkowski, 2004; Shaver & Shaver, 2005). According to Kuczkowski (2006), all but emergency surgery should be postponed until later in pregnancy to avoid potential teratogenicity and intrauterine fetal death. However, when a patient has cancer, surgery should be performed when indicated, but elective procedures should be avoided during the first trimester (Kuczkowski, 2006). Patients should be informed that premature labor is more likely to occur during the third trimester (Kuczkowski, 2004).

Good communication among the surgeon, oncologist, anesthesiologist, obstetrician, and patient is very important. At the cancer center, a consultation with MFM is highly recommended before surgery to reassure the patient that a specialist is involved in the care of her baby, in collaboration with her surgeon and oncologist. The recommendations of the specialist, along with the gestational age and status of the fetus, are sent to the oncology nurse liaison. The information is entered into the mother's medical record so that it is accessible to all healthcare providers.

In the case of Ms. G, a consultation visit with the MFM physician was scheduled prior to a mastectomy to discuss the risks of sur-

gery to the fetus. After seeing the patient and assessing the fetal status and gestational age, the following recommendations were made.

- Assess the fetal heart rate pre- and postoperatively but not intraoperatively if the fetus has not reached viability.
- Anesthesia and analgesia can be used as in the nonpregnant state as long as precautions are taken. Pregnant patients are at high risk for aspiration with general anesthesia and are more prone to oxygen desaturation. In addition, aspirin and nonsteroidal analgesics are contraindicated during pregnancy.
- A preoperative chest x-ray may be taken with an abdominal shield, if needed.
- Interval fetal growth ultrasounds should be performed every three weeks to monitor the growth of the fetus.

What are the effects of anesthesia on a fetus?

Any type of medication or analgesia should be used with caution during the first trimester. Often, all but truly emergency surgery should be postponed until later in the pregnancy to avoid potential teratogenicity (Kuczkowski, 2004). However, when treating patients with cancer, scheduling options are limited because the disease must be treated. The second trimester is the ideal time to perform necessary surgery. If surgery is necessary after the 24th week of pregnancy, it should be performed in a hospital with obstetric and neonatal services. If a patient were to go into preterm labor with a viable fetus, the facility must be equipped with obstetricians, neonatologists, a neonatal intensive care unit, and nurses specializing in the care of premature infants.

The primary anesthetic considerations for surgery during pregnancy should include knowledge of the anatomic and physiologic changes of pregnancy (e.g., maintenance of adequate uteroplacental blood flow and blood pressure, oxygenation), selecting anesthetic drugs and techniques that have a safe track record, choosing regional anesthesia when possible, fetal surveillance, and understanding that no anesthetic agent has been proven to be teratogenic in humans. The type of anesthesia and its potential effects on the fetus should be discussed with the patient before surgery. The mother must be positioned correctly during surgery to avoid aortocaval compression, especially in advanced gestation. Fetal surveillance and monitoring should be performed according to the recommendations of the MFM specialist (Kuczkowski, 2004, 2006).

What is the role of oncology nurses in ensuring optimum care for a pregnant patient and the fetus?

Oncology nurses serve as liaisons and primary contacts for patients, oncologists, and obstetricians. Nurses play a pivotal role in arranging appointments, promoting

communication, and facilitating the flow of pertinent medical information between services, thus ensuring continuity of care. Most importantly, nurses become contacts and resources. Patients can call with questions or concerns and be directed to appropriate sources, whether they are oncologists, obstetricians, or other supportive services. Oncology nurses offer resources that physically, emotionally, mentally, and spiritually support their patients.

At the cancer center, an oncology nurse played a pivotal role in designing a patient education booklet for pregnant patients with cancer that is offered to all pregnant patients. Booklets are available in English and Spanish and include basic information regarding testing, treatment, side effects of treatment, emotional issues, and additional resources. Nurses can answer questions regarding its content.

In the case of Ms. G, a consultation visit was scheduled with the MFM obstetrician before the start of treatment. Follow-up appointments also were scheduled before each cycle of chemotherapy and as needed. The oncology nurse liaison faxed the oncologist's treatment plan, which included the type of surgery and chemotherapy, to the MFM physician prior to the patient's visit. With that information, the specialist could discuss the risks and complications specific to the interventions with the patient. After seeing the patient and assessing the fetal status and gestational age, the specialist's progress notes and recommendations were faxed to the nurse liaison, who entered the information into the patient's medical record, making it accessible to the oncologist, surgeon, and anesthesiologist. The oncologist and the MFM physician communicated with one another before each cycle of chemotherapy.

Nurse liaisons reduce physician-to-physician time in communication, which is very important when more than one facility is caring for a patient who is pregnant. Knowing who to call is critical. In addition, nurse liaisons are another contact for patients who have questions or concerns or need symptom management. Nurses are familiar with the most common problems that patients may experience and are able to triage those problems to the appropriate physician. Lastly, the nurse liaison is able to coordinate postpartum care appropriately and without delays.

What are the concerns for pregnant patients receiving chemotherapy?

The treatment of pregnant patients with breast cancer should conform as closely as possible to standardized protocols for nonpregnant patients. Each pregnant patient requires individualized therapeutic decisions formulated after considering the gestational age at first presentation, the stage of the disease, and the preferences of the patient and her family. The treatment of breast cancer must be planned carefully, giving consider-

ation to the potential risks to the developing fetus (Loibl et al., 2006). As a result, patients are referred to a MFM specialist to get input regarding risks to the fetus.

Chemotherapy during pregnancy definitely requires a multidisciplinary approach. Patients should visit a MFM physician before chemotherapy to monitor the growth and well-being of the fetus and the mother. The specialist's recommendations, progress notes, and ultrasound reports become part of the patient's medical record, providing essential information such as fetal status and gestational age. Establishing gestational age is critical because chemotherapy is contraindicated during the first trimester of pregnancy. Organogenesis and limb formation generally occur during the first 10 weeks of pregnancy (Gemignani & Petrek, 2000).

The action of chemotherapy agents is to inhibit cell division, which causes great concern for pregnant women. Likewise, the physiologic changes of the blood volume during pregnancy, the glomerular filtration rate, and other parameters may affect drug metabolism during pregnancy. Methotrexate is a folic acid antagonist and usually is avoided during pregnancy. Taxanes have not been studied and, therefore, should not be given (Gemignani & Petrek, 2000).

In 1992, a standardized treatment protocol was developed at the cancer center for pregnant patients with breast cancer who require chemotherapy. Cyclophosphamide (500 mg/m² IV in a single dose on day 1), doxorubicin (50 mg/m² by continuous IV over 72 hours on days 1–4), and two bolus doses of fluorouracil (500 mg/m² IV on days 1 and 4) comprise the standard chemotherapy regimen for patients. Anthracycline-based chemotherapy (FAC) can be administered every 21–28 days during the second and third trimesters of pregnancy through week 35 with minimal risk to the developing fetus (Berry et al., 1999; Hahn et al., 2006; Loibl et al., 2006; Yang et al., 2006).

How should pregnant patients be followed while undergoing chemotherapy?

Pregnant patients require extra physical, emotional, and psychological support. The potential for nausea, vomiting, anemia, pain, and fatigue exists because the symptoms commonly are associated with pregnancy and chemotherapy. Healthcare providers should follow two imperatives when treating the symptoms of pregnant women with cancer: Make pregnant patients as comfortable as possible and do no harm to the fetus (MacDougall, LeGrand, & Walsh, 2000). Patients are encouraged to care for themselves by resting as much as possible, maintaining proper nutrition and adequate fluid intake, and taking prenatal vitamins. Supportive care may be necessary.

Treatment should resolve reversible causes first. Serotonin antagonists, ondansetron and granisetron, are used to treat hyperemesis

gravidarum. Metabolic disturbances should be evaluated and corrected (MacDougall et al., 2000). Nausea and vomiting can be treated with ondansetron (Berry et al., 1999). Based on reported data, ondansetron is reasonably safe to use when given during the second and third trimesters (Mahon, 2001).

Anemia can be associated with chemotherapy, such as the FAC regimen. Recombinant human erythropoietin (epoetin alfa) is indicated for chemotherapy-induced anemia. Although data are limited (six human pregnancies have been reported in the literature), erythropoietin does not seem to produce any major risk to the fetus (Cardonick & Iacobucci, 2004; Mahon, 2001). Patients' blood pressure also must be monitored.

When patients are in pain, healthcare providers should determine whether the pain is from the cancer, the effects of cancer treatment, the pregnancy, or some other unrelated etiology. With abdominal pain, pregnancy-associated symptoms, such as preterm labor, severe preeclampsia, appendicitis, round ligament pain, amnionitis, abruptio placenta, labor, or bowel obstruction, must be ruled out because they could be secondary to the tumor or a prior surgery. For treatment of cancer pain, the World Health Organization's ladder of analgesia for pain relief should be followed (MacDougall et al., 2000). Acetaminophen and nonsteroidal anti-inflammatory medications are given reluctantly during chemotherapy because they mask fever. Nonsteroidal anti-inflammatory medications are contraindicated during pregnancy.

Emotional support is important for pregnant patients with cancer. A cancer diagnosis is traumatic, stressful, and overwhelming. Those emotions are compounded when pregnancy is confirmed. Mothers have difficulty planning for a new baby when they are worried about the future of their own health. The literature is lacking in regard to information about the psychosocial effects of cancer during pregnancy. The diagnosis of cancer interferes with the process of adjusting emotionally and cognitively to pregnancy. Pregnancy is a time when a woman balances taking care of herself and nurturing a new life growing inside of her, but cancer can be a life-threatening illness. The diagnosis brings fear of premature death and worry about whether the pregnancy can continue and the effects of cancer treatment on the fetus (Schover, 2000).

Patients should be encouraged to talk about their feelings with someone they trust. When a woman is diagnosed with cancer during pregnancy, she and her family should be offered psychological consultation and support (Schover, 2000). Although counseling is a personal choice, patients may appreciate knowing that professional support is available.

Online resources from the American Cancer Society (www.cancer.org), Cancer Information Service (<http://cis.nci.nih.gov>),

Fertile Hope (www.fertilehope.org), and the Pregnant With Cancer Network (www.pregnantwithcancer.org) are available. The Pregnant With Cancer Network offers a peer-support program that matches women diagnosed with cancer during pregnancy with women who have gone through the same experience. Women may find talking to someone who has been in a similar situation helpful.

What special concerns exist regarding the delivery?

Because of maternal and neonatal reasons, a period of recovery is recommended between the last dose of chemotherapy and delivery. The mother's blood count needs to recover as much as possible to the normal range before delivery. In planning, allow at least three weeks between the last dose of chemotherapy and the delivery, so as to minimize the risk of fetal and maternal neutropenia and possible infection. The patient must have a sufficient platelet count to prevent bleeding complications (Loibl et al., 2006). The recovery period will avoid complications that can occur in patients with low platelet and leukocyte counts associated with chemotherapy (Cardonick & Iacobucci, 2004; Dow, 2000). Chemotherapy is not recommended after 35 weeks of gestation because spontaneous delivery could occur before the bone marrow recovers (Cardonick & Iacobucci). In addition, fetal organs may be immature and, as a result, have difficulty excreting chemotherapy agents in a timely fashion. By delaying delivery for three weeks after chemotherapy, fetal drug excretion occurs via the placenta, which is especially important in preterm infants. Suspected preterm labor should be treated aggressively (Cardonick & Iacobucci).

Placental metastases are rare in breast cancer. However, the placenta should be examined histopathologically for metastases

following delivery. According to Loibl et al. (2006), no cases of breast cancer metastases to a fetus have been documented.

Breastfeeding is contraindicated during chemotherapy. Concentrations of chemotherapeutic agents in breast milk are variable and related to the dose and timing of chemotherapy. Neonatal neutropenia has been reported in an infant breastfed during maternal treatment with cyclophosphamide. However, no information is available about most agents (Cardonick & Iacobucci, 2004).

Author Contact: Sue Rimes, RN, BSN, can be reached at sarimes@mdanderson.org, with copy to editor at ONFEditor@ons.org.

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Clinical Highlights: Pregnant Patients With Breast Cancer

Diagnostic Workup

Caring for pregnant patients poses unique clinical challenges for the health-care team. Physical examination and mammogram may be more difficult during pregnancy as a result of hypertrophy and engorgement of the breasts that occur with hormonal changes during pregnancy. Masses discovered during pregnancy and lactation often are attributed to physiologic changes and may be discounted by the patient and/or physician. Patients and physicians can be reluctant to pursue definitive diagnostic procedures. The diagnostic workup, including mammography,

fine needle aspiration, core biopsy, and open breast biopsy, is identical in pregnant and nonpregnant patients (Berry et al., 1999).

With the exception of computed tomography bone scans, most diagnostic tests can be performed. Once staging is complete, a treatment plan is offered to the patient, which should be discussed with the patient's maternal fetal medicine specialist as well. Surgery can be performed at any time during pregnancy, and chemotherapy can be performed safely during the second and third trimesters. Radiation therapy during pregnancy is contraindicated because of risks to the fetus. The gestational age and fetal status must be documented before treatment begins. Patients must be informed of

the risks and complications and therapeutic rationale of treatment of the disease and the potential effects on the fetus. With the exception of radiation therapy, treatment of pregnant patients with cancer should be as close as possible to the standard protocol for nonpregnant patients with breast cancer (Loibl et al., 2006; Yang, Dryden, Gwyn, Whitman, & Theriault, 2006).

Collaborative Care

Interdisciplinary care is of the utmost importance when treating pregnant patients with cancer. An example of collaborative

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care occurs during surgery. A general gynecologist should assess the fetal heart rate and fetal status pre- and postoperatively. A normal fetal heart rate is 120–160 beats per minute, but it can decrease after surgery as a result of the effects of anesthetic agents that the mother received during surgery. However, surgical and oncology nurses must be aware that a decrease in the fetal heart rate also might indicate fetal hypoxia or a decrease in temperature (Kuczkowski, 2004).

Physiology

Throughout pregnancy, a woman's body goes through many physiologic changes resulting from gestational hormones and a growing gravid uterus. The changes must be understood and maintained to achieve the best outcome for the mother and baby (Shaver & Shaver, 2005). Torgersen and Curran (2006) noted that hemodynamic changes occur in blood volume, cardiac output, systemic blood pressure, pulmonary vascular resistance, heart rate, and blood flow distribution. Maternal blood volume increases 40%–50% above nonpregnant levels. The increase begins around 6–10 weeks of gestation and continues until weeks 32–34 (Shaver & Shaver; Torgersen & Curran). The protective mechanism supports the uterus, fetus, placenta, and maternal tissues with adequate perfusion and oxygenation. Oxygen consumption increases secondary to an elevated metabolic rate and fetal demands.

Coagulation properties change during pregnancy and put pregnant patients at increased risk for thrombosis of all types, including pulmonary embolus and deep vein thrombosis. This is particularly significant for pregnant women who have cancer because a diagnosis of cancer also increases the risk for thrombosis. If significant hypovolemia occurs, pregnant patients are more likely to develop disseminated intravascular coagulation (Torgersen & Curran, 2006). Perianesthesia nurses might not recognize when a pregnant woman is being hemodynamically challenged or decompensating (Torgersen, 2005).

Anatomic and physiologic changes in the cardiovascular system occur as the body tries to meet the demands of the mother and the fetus. The heart changes its position, appearance, and function during pregnancy. Anatomically, the diaphragm is pushed upward along with

other abdominal organs, which moves the heart upward, forward, and to the left side. The maternal heart rate increases and peaks in the third trimester (Torgersen & Curran, 2006). Pregnancy hormones affect maternal blood pressure, which begins to fall during the first trimester and gradually returns to the nonpregnant level by the end of the pregnancy. Blood pressure also can be affected by the health status and age of the mother, maternal position, and maternal parity. As parity increases, systolic and diastolic blood pressure decreases.

Physiologic and anatomic changes deserve special attention in the perioperative period. Pregnant patients need to be positioned carefully during surgery. Because the uterus supports the weight of the fetus, placenta, and amniotic fluid, it could compress the inferior vena cava if the patient is in a supine position for an extended period of time, preventing blood from flowing back to the heart and causing pooling of blood in the lower extremities and pelvis (Torgersen & Curran, 2006). The patient can be positioned using a left uterine displacement device such as a wedge. The effectiveness of displacement can be assessed by palpating the quality of the right femoral pulse, monitoring the blood pressure in the right leg, and placing a pulse oximeter on the right foot (Kuczkowski, 2004). The risk for uterine displacement is greater after 32 weeks of gestation and if the mother is positioned on her back for longer than an hour. The fluid distribution will correct itself after changing the mother's position to a lateral or semi-Fowler's position with her legs elevated (Kuczkowski). Changes in positioning should be done slowly. Positioning a patient in a left lateral position will decrease the compression and relieve symptoms of decreased venous return, cardiac output, and blood pressure, which could cause the patient to feel faint or nauseous (Shaver & Shaver, 2005).

During pregnancy, the respiratory system undergoes a number of changes. Maternal oxygen requirements are increased because of acceleration of the mother's metabolic rate and fetal needs (Torgersen & Curran, 2006). The mother breathes deeper, which increases her tidal volume; however, her respiratory rate is increased only slightly (Shaver & Shaver, 2005). Ni Mhuireachtaigh and O'Gorman (2006) reported that the gravid uterus exerts a restrictive effect on respiratory mechanics, with a reduction in functional residual capacity of 20% when the fetus is at full term. Airway management

in pregnancy is complicated further by anatomic changes; as a result, patients are at significant risk for failed intubation and airway trauma.

Gastric motility and gastroesophageal sphincter tone may decrease and gastric acidity may increase as a result of elevated maternal progesterone. The enlarging uterus progressively displaces the stomach and intestines, which can slow emptying (Ni Mhuireachtaigh & O'Gorman, 2006; Shaver & Shaver, 2005). This is important to consider perioperatively, because nausea and vomiting are possible side effects from anesthesia, thus increasing the risk of aspiration.

When treating pregnant patients with breast cancer, oncology nurses can facilitate good communication among all caregivers and ensure that pertinent information is communicated and documented. The goal is to ensure safe and effective cancer treatment with minimal risk to the fetus.

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