Breast Cancer:
So Much More Than Just a Perioperative Experience

By Cynthia McLennan, RN, BScN, CPN(C)

Perioperative nurses have been exposed to breast cancer and the various treatment modalities throughout their professional lives, and many have navigated the complex cancer care spectrum in their personal lives as well. Within their specialty they are well positioned to positively influence the outcome of individuals and their families who must travel the maze of the cancer care delivery system.

Cancer, in general, is an abnormal growth of cells caused by changes in the cell genes which are either inherited from parents or which are developed. Breast cancer is simply an abnormal growth of cells in the breast, which unlike other normal cells, continue to grow until they crowd out the normal cells. Breast cancer cells may disassociate from the tumour and travel via the blood vessels or lymph fluid to other bones and organs.

Incidence of Breast Cancer

Breast cancer is not a sudden occurrence, but a process which has been developing for a period of time, thus, it is not a medical emergency. It takes approximately a billion cells to form a breast cancer one centimeter in size so, on average, most cancers have existed around eight years before they can be detected on mammogram and ten years before they may be palpated (Kneece 1995).

With 570,000 new cases of breast cancer in the world each year it remains the most common malignancy in women and comprises 18% of all female cancers (Sainsbury 1995). In Canada, the incidence of breast cancer is projected to hit 108 women per 100,000 in 1999, up from about 98 cases per 100,000 a decade ago (NCIC 1997). It is said that the chance of a woman developing breast cancer in her lifetime is one in eight, up from one in twenty in the 1960's. This refers to the lifetime risk of a woman developing breast cancer should she live to 85 years of age. In Canada there will be approximately 18,000 new cases of female breast cancer diagnosed in 1999 and approximately 5,000 women will die from this disease. The incidence of female breast cancer is increasing slightly at about 1% per year, however, this statistic may simply reflect the increased early diagnosis of breast cancers through screening programs. It is estimated that there will be a thirty percent increase in cancer incidence in general by the year 2010 (NCIC 1997).

Breast cancers are derived from the epithelial cells that line the terminal duct lobular unit of the breast. Non-invasive carcinomas, or carcinomas in-situ, remain within the membranes of the lobular unit or breast ducts. Invasive carcinomas disseminate from the breast lobules and ducts into the surrounding normal tissue. The majority of breast cancers are adenocarcinomas, arising from glandular tissue. There are over 30 histologic types of breast cancer with the most common, about 50%, being infiltrating ductal carcinomas. Another third of all breast cancers are combinations of infiltrating ductal cancers, and infiltrating lobular carcinomas. Ductal carcinoma in-situ (DCIS) represents approximately 12% of all breast cancers (Sainsbury 1995).

Abstract

This paper's focus is the various types of breast cancer, the predisposing factors for the disease, treatment options, treatment modalities, conventional and unconventional therapies, surgical reconstruction, genetics and hormone replacement.

The treatment of breast cancer is regarded as a team effort requiring the dedication and expertise of all of the members of the care team to ensure a favorable patient outcome. Within this team the author recommends an expanded new role for the periopertive nurse, that of the *nurse navigator.*

Author

Cynthia McLennan, RN, BScN,CPN(C) is Nurse Manager, OR/PACU/CSS/Day Care/Oncology, Renfrew Victoria Hospital, Renfrew, Ontario. This is an abridged version of her presentation to the 16th National ORNAC Conference in Halifax, June, 1999.

Breast Cancer Classification

Historically, breast cancer has been classified as either ductal or lobular, however further research has proven that this clearly defined delineation between cancer types is no longer appropriate. Thus, breast cancer tumours are graded depending upon the degree of cellular differentiation of the tumour. Tumours are routinely graded according to three specific characteristics: glandular formation; nuclear pleomorphism, the ability of the cell nucleus to change; and, frequency of mitosis, or cell proliferation. Each characteristic receives a score between one and three and the combined score of all three measured characteristics reflects the final score on the Bloom and Richardson scale. The combination of the three characteristics translates into three groups: grade I (scores 3-5), grade 11 (scores 6-7), and grade 111 (scores 8-9). This measurement is a strong predictor of disease recurrence and survival rates. The Bloom Richardson tumour grading is not the only indicator of value in predicting local recurrence and prognosis. The involvement of the vascular and lymph vessels is considered to be a marker for more aggressive disease and the presence of extensive in-situ breast cancer (Sainsbury 1995).

There are currently two staging classifications in current use that are used to diagnose the extent of breast cancer disease. The tumour node metastasis (TMN) system depends upon clinical assessment of the lymph node status and the International Union Against Cancer (UICC) system which incorporates the TMN system. To improve the TMN system a separate pathological classification has been added, allowing tumour size and node status which have been determined by the pathologist to be taken into consideration. Breast cancer stage at the time of presentation is directly related to prognosis (Sainsbury 1995).

Predisposing Factors

Presently, there is no single contributing critical factor scientifically linked to the cause of breast cancer, however, genetics, personal history and diet are all influencing factors. In fact, the majority of breast cancers, nearly two-thirds, occur in women who do not have any identifiable risk factors (Buckman 1995). Western Lifestyle Studies have shown conclusively that women living in countries with a Western lifestyle have a higher incidence of developing the disease by up to a factor of five.

Other factors cited as causes of breast cancer:

• **Age** - The annual risk of a woman developing breast cancer doubles between 40 and 50 years of age and then doubles again by the age of seventy.

• **Genetics** - Family history is thought to be an influencing factor in the development of breast cancer for some women. Up to ten percent of breast cancer in Western countries is of a genetic predisposition. The inheritance of breast cancer susceptibility may be transmitted through either sex and some of the family members transmitting the abnormal gene may never get cancer themselves. About one third of the familial cases of breast cancer are thought to be due to the mutation in the BRCA1 gene on the long arm of chromosome 17. Another gene, BRCA2, has been identifled on the long arm of chromosome 13 and, additionally, incidental cases arise from mutations on the p53 gene on the short arm of chromosome 17 (Sainsbury 1995). Thirty percent of breast cancer patients have the defective gene HER2 which is responsible for protein production that normally signals the cells to grow and multiply.

• **Family History** - A strong family history of any cancer in the family, especially breast, ovarian, colon, prostate and other cancers attributable the same inherited mutation increases the risk for breast cancer (Sainsbury 1995). Women who develop bilateral breast cancer, those who develop a combination breast cancer and another epithelial cancer, such as ovarian cancer, and women who get the disease at an early age are most likely to be carrying the genetic material predisposing them to breast cancer. Women with first degree relatives, such as mother, daughter or sister, who have developed breast cancer before menopause have a six fold risk at developing breast cancer. Women with first degree relatives who developed bilateral breast cancer have a ten fold risk in their lifetime (Dollinger, et al 1994).

• **Pregnancy and Breast Cancer** - The age at which the woman has her first full term pregnancy may also influence her susceptibility to breast cancer. Nulliparity, never having been pregnant, and late age of the woman at the first birth, usually over the age of thirty, increase the risk of developing breast cancer. The highest risk group occurs in women who have their first child over the age of thirty-five years (Sainsbury 1995). Interestingly, women who become

pregnant for the first time have a one-time increased incidence of developing breast cancer which is thought to possibly originate from the rapid proliferation of breast tissue that occurs throughout the first pregnancy resulting from high hormone levels. This increased incidence in breast cancer is not demonstrated in subsequent pregnancies (Rosner & Colitz 1996).

• **Menstrual Cycle** - Breast cancer incidence is greater in women who start menstruating early in life and who have a later menopause, usually after the age of fifty-five. It is thought that the increased exposure to estrogen as a result of the early start to menstruation and the later menopause may influence this finding. It is interesting to note that women who have had a bilateral removal of the ovaries, before the age of 35 have a forty percent less chance of developing breast cancer than a women who has a natural menopause (Colditz 1995).

• **Benign Breast Lesions** - Women who have had previous benign breast lesions without atypical hyperplasia, unusual, unchecked growth, of the cells have only a slightly increased risk for the development of breast cancer. However, any woman who has had a diagnosis of atypical hyperplasia in any breast specimen has four times the risk of developing breast cancer in her lifetime. Women with atypical hyperplasia and have had a first degree relative with breast cancer, have nine times the risk of developing this disease (Buckman 1995).

• **Radiation Exposure** - The exposure to radiation, especially in women under the age of 20 years increases both the immediate and long term risk of developing breast cancer. However, the effects of mammography, as a form of radiation, is actually associated with a net decrease in the mortality rate from breast cancer among women over the age of 50 (Sainsbury 1995). The increased incidence of breast cancer in nurses and, more specifically, dental hygienists may have been indirectly related to past x-ray exposures (Morton 1995).

• **Diet** - Lifestyle is often associated with breast cancer risk. Women who are obese have a twofold risk in the incidence of breast cancer in the postmenopausal era. Premenopausal women who are obese may actually have a lower incidence of breast cancer (Burlington 1995). There is no concrete scientific evidence to prove a direct link between the incidence of breast cancer and the consumption of dietary fat, however, breast cancer rates are much higher in countries where women consume more processed foods and consume more meats in their diet (Baron-Borgen 1997). Some studies suggest that the incidence of breast cancer may be reduced by almost 50% if adult women reduce dietary fat consumption dramatically (Giovannucci et al 1993).

• **Oral Contraceptives** - There does appear to be an increased risk in the incidence of premenopausal breast cancer for women who used oral contraceptives for four years or more before their first term pregnancy. It is not possible to determine if these women have an increase chance of developing breast cancer in the post menopausal state as the women have yet to reach this age in which to be studied. This situation is very similar to the circumstances earlier in this century where women were given diethylstilbesterol, DES, to prevent miscarriage and incidentally were found to have increased breast cancer occurrence later in life(Sainsbury 1995).

• **Hormone Replacement Therapy** - Hormone replacement therapy for women in the general public, and breast cancer survivors specifically, is a hotly debated topic. Women in North America usually begin to experience menopausal symptoms in the forth decade of life, however, menopause can start earlier in women treated with breast cancer as a side effect of chemotherapy, or, as a result of removing their ovaries. This is called treatment-induced menopause and may be more severe, due to the rapid onset of symptoms, than a natural menopause (OBCIEP 1997).

The health risks associated with menopause such as heart disease and osteoporosis, the loss of bone mass, have been strongly linked to lower levels of estrogen especially treatment-induced loss of estrogen (OBCIEP 1997).

• **Breast Density** - Research has shown that women who assume a low fat diet can significantly reduce breast density, thereby reducing their incidence of breast cancer. Women with dense breasts appear to have a five times increase in the risk factor for breast cancer so if dietary refinements were to be adopted there is a strong possibility that breast cancer prevention may occur (Snyder, Seilsch & Reville 1998). Additionally, women with dense breasts experience more false negative mammograms as mammographic efficacy has been directly related to breast density. Thus, it has been stated that women with dense breasts have an increased incidence of developing breast cancer in their lifetime, perhaps in part, as a result of poorer screening methodology (Baines et al 1997).

Tamoxifen

Just as it is impossible to choose your sex, family members or to cease the aging process, it has been likewise impossible to prevent breast cancer with any certainty. Research has indicated that it may be possible to actually prevent breast cancer by manipulating the hormonal milieu of women at risk. Chemoprevention with a selective estrogen receptor modulator (SERM), such as the medication Tamoxifen, and when used as an adjuvant treatment for breast cancer, has shown promise in reducing breast cancers by blocking the hormone receptor sites on the cells (Kneece 1995 & Major 1998). Studies have conclusively shown Tamoxifen to reduce the incidence of breast cancer in women of increased risk by as much as forty-five percent (Logan 1998).

Tamoxifen is a type of hormone therapy used to treat breast cancer and, more recently, as a preventative treatment modality. It blocks the estrogen receptor sites on cells, thereby preventing the growth of the cancer cell. To attain optimal efficacy Tamoxifen works best in women who's cancer needs estrogen to grow. This estrogen-receptor positive breast cancer is identifled at the time of biopsy.

Breast Cancer Diagnosis and Treatment

Prior to the initiation of any treatment for breast cancer it is essential that a confirmed pathological diagnosis be obtained. There are four primary methodologies for obtaining an accurate tissue diagnosis: **(i)** a fine needle aspiration is used on a solid lesion and is performed most often in an outpatient setting; **(ii)** a stereotactic core needle biopsy is used with solid, non-palpable lesions most often detected mammographically in a diagnostic imaging centre; **(iii)** a coreneedle biopsy is utilized most often with solid accessible tumours and performed in an outpatient setting; and, **(iv)** a surgical biopsy used to access a solid palpable mass which is most often biopsied in a day surgery setting. Once a confirmed diagnosis of type and stage of carcinoma is determined in addition to the hormone receptor status of the tumour, treatment options may be explored (Engelking 1995).

Treatment for breast cancer is commonly referred to as either local or systemic and the decision to proceed with either treatment is dependent upon many factors. From the perspective of the individual who has the breast disease personal issues may determine which treatment approach is undertaken. Specifically, how important is it to save the breast; is the tumour of a size and position that lends itself to breast conserving surgery; is it possible to access radiotherapy if a local tissue excision is performed; is a second opinion available; and, is breast reconstruction available if desired? Personal beliefs and access to treatment options may strongly influence the choice of treatment regime that individuals accepts. (Morra 1994).

Local Treatments for Breast Cancer

Local treatment options for breast cancer include primarily surgery and radiotherapy to include brachytherapy, the placement of radiation directly into the lesion. Surgery may be of a breast conserving or a breast ablation nature. Clinical trials in Europe, the United States and Canada have proven that radical surgery offers the women no survival benefit over the simple lumpectomy. It is interesting to note that women who had lumpectomies without post-operative radiation therapy had an increase in the rate of local recurrence that had to be treated again, however, these recurrences did not impact upon their long-term survival (Batt 1994). Clinical and pathological factors that influence the selection of breast conserving or breast ablation surgery include: incomplete initial excision, young age of the woman, the presence of an extensive in-situ component, lymphatic or vascular invasion, and the histological grade of the tumour (Sainsbury 1995).

The decision to proceed with either breast conserving or breast ablation surgery is, to a certain extent, dependant upon the individual circumstances of the woman and her family. Women choosing breast conserving surgery are almost always referred to a regional cancer centre for radiation treatment. This treatment modality can only be delivered in a regional cancer centre, thus, the woman must travel there every day for the duration of the treatments, or, she may elect to live at a cancer treatment lodge for the weekdays during her treatment. For many women being away from their family, support system, and place of work renders this option untenable, thus, the option of mastectomy is the only reasonable, prudent course of action. The Institute for Clinical and Evaluative Sciences (ICES) published a report that examined the mastectomy rates for hospitals and surgeons in Ontario. This report caused an uproar as it was viewed as punitive to both the hospitals and surgeons who recommended breast ablation surgery. In reality, many women chose mastectomy as the most reasonable course of action after considering their individual circumstances (ICES 1996).

Breast Conserving Surgery

Breast conservation surgery may consist of a local excision of the tumour leaving a one centimetre margin of normal tissue, commonly known as a lumpectomy or segmental resection of the breast, or, a more extensive excision of breast tissue may occur and is most commonly known as a quadrantectomy. The amount of tissue excised is indirectly proportional

to the cosmetic effect of the surgery. Thus, the more breast tissue that is excised, the poorer the cosmetic result, therefore, it is most common to have lesions of less than four centimetres excised as breast conserving surgery (Taylor et al 1995).

Lesions of the breast most suited to breast conserving surgery include those with a single clinical and mammographic lesion, tumour size of less than four centimetres, and a local presence only with clear axillary nodes and no evidence of metastases. Women with large breasts and who show evidence of a lesion greater than four centimetres in size may, individually, qualify for breast conserving surgery (Gage et al 1995). The overall survival rate for women who have had breast conserving surgery is no different than in women who had breast ablation procedures. Women accessing breast conserving surgery should have routine physician follow-up visits bi-annually (Salvadori et al 1995).

Breast Ablation Surgery

Breast ablation surgery, more commonly recognized as mastectomy, occurs in about one third of all breast cancer surgery and involves the removal of the nipple, the axillary tail of the breast, all remaining breast tissue while leaving the chest wall muscles, the pectoralis major, rectus abdominus and serratus anterior intact. Complications associated with mastectomy include: the formation of a seroma, a collection of fluid under the skin flaps; infection, often due to the large surface area exposed; and, skin flap necrosis if the blood supply is compromised. While serosa formation occurs in one third to one half of all women who have had mastectomy, tissue necrosis and infection are very rare (Morra 1994).

Axillary Lymph Node Dissection

Current literature indicates that the necessity of axillary node dissection as a diagnostic and treatment modality for breast cancer is debatable. As such, a number of studies have the histologic characteristics of the sentinel lymph node predicting the histologic characteristics of the remaining lymph nodes in the axilla. The American College of Surgeons has called for an evaluation of the sentinel node biopsy replacing the axillary dissection in patients with carcinoma of the breast (Wells 1998).

Axillary lymph nodes are the most common sites of metastasis in breast carcinoma. Metastatic involvement of the axilla is known to progress sequentially beginning with the first lymph node, with skip metastasis found in only two percent of cases. Sentinel node biopsy and lymphatic mapping is becoming a surgical option in the treatment of breast cancer for many women (Dent 1998). The day prior to surgery, and in conjunction with nuclear medicine departments, women are injected with a radioactive colloid and the lymph drainage of the breast lump is identified. They are re-injected on the day of surgery and the surgeon injects Lymphazurin 1% dye prior to initiation of the operative procedure. A gamma probe is used in the operating room to identify the most suspect areas and surgical dissection centres in this area. Research is indicating that women identified with a negative sentinel lymph node may be spared axillary dissection and the related morbidity associated with this procedure (Welykoholowa 1998).

Lymphedema

Lymphedema, swelling of the arm, is a physical problem that may occur after the treatment for breast cancer. Early literature derived from assessment of the Halstead radical mastectomy indicated that up to 62.5% of all women undergoing this procedure reported incidences of lymphedema. More recent studies from less invasive surgery suggests that the incidence of this complication may be as low as two percent, however, it is important to note that any procedure involving axillary dissection, including lumpectomy or partial mastectomy, carries the risk of lymphedema as it disrupts normal lymphatic drainage pathways. The flow of lymph is disrupted until new pathways can be regenerated. Radiation augments the difficulties experienced by the women with axillary surgery as radiation slows the regeneration of new lymphatic pathways. Treatment for lymphedema includes elevation of the arm, exercise, compression garments, manual lymphatic drainage, and compression pumps (Engelking 1995).

Radiation Therapy

Radiation therapy, a local treatment for breast cancer, has evolved with the advent of linear accelerator radiotherapy machines, thus, the incidence of immediate skin reactions and subsequent skin telangactasia, redness or dilatation of the blood vessels, has been reduced. Additionally, the incidence of cardiac damage and radiation pneumonitis, inflammation of the lung, has been reduced to less than two percent. Axillary damage, injury to the area under the operative arm, was much more prevalent before the advent of more recent radiotherapy treatment modalities and there is much less skin damage resulting in surgical repair than in years past (Sainsbury 1995).

Brachytherapy

Initial brachytherapy, used in the treatment of larger tumours of the breast treated with breast conserving surgery, or utilized if the surgical margins of excision are unknown, is gaining popularity as a viable treatment modality. Perioperative placement of implants conducted at the time of the lumpectomy have saved the women the inconvenience of undergoing another anaesthetic (Formenti 1995). The application of iridium 192 directly through hollow tubes or needles, at or near the tumour bed, plus the addition of external beam radiation to the axilla have indicated very positive results (ORCC 1997).

Systemic Breast Cancer Treatment

Chemotherapy, the treatment of cancer with medications, is a systemic breast cancer treatment modality that is now given to many women after surgery in an effort to minimize the growth of microscopic deposits of tumour cells that may progress into a recurrent tumour (Dollinger et al 1994). Women who are at risk for metastases are commonly given CMF (cyclophosphamide, methotrexate, and, fluorouracil) or, CAF (cyclophosphamide, adriamycin, and, fluorouracil). Side effects of chemotherapy may include, but are not limited to: fatigue, weight gain, nausea and vomiting, menopause induction, alopecia (hair thinning or loss), oral mucositis, increased risk of infection, diarrhea, and certain drug specific side effects such as bruising and blood clotting disorders. From a perioperative perspective it is imperative that preoperative blood work values be assessed for electrolyte, complete blood count, and clotting values before any surgery is performed. The immunocompromised individuals undergoing the surgery may require reverse isolation procedures so that they have minimal exposure to potential pathogens (Burlington 1998).

Although hair loss is the most common concern of patients prior to the initiation of chemotherapy, over 80% report fatigue and lethargy as the most troublesome side effect once chemotherapy has been administered. Alopecia may be reduced with scalp cooling techniques and although disconcerting for the individual, it is a transient side effect associated with specifIc chemotherapeutic agents. Nausea and vomiting are a common and unpleasant chemotherapy side effect but the advent of the new anti-nausea medications have made miraculous reductions in these side effects possible. A perioperative application of these new medications has, despite the price of over thirty dollars an injection, made it possible to eliminate the nausea and/or vomiting of post-operative patients thereby improving their wellbeing and quite possibly reducing their overall hospital lengths of stay (Cunningham 1997).

While it is possible to offer chemotherapy treatment prior to surgical excision when direct observation of the efficacy of the treatment is observable, it is extremely difficult to differentiate between invasive or in situ carcinomas due to the lack of a confirmed tissue diagnosis. Therefore, the majority of the chemotherapy, used as adjuvant therapy, is administered after the surgery has been performed. The goal of chemotherapy administration is to cure, control or palliate breast cancer patients. Some general principles apply to the administration of chemotherapy, specifically: a combination of drugs is more effective than a single drug; a single course of treatment is less effective than a prolonged course of treatment; and, the benefits of chemotherapy are greatest in women under 50 years, while a smaller but still significant benefit is seen in older women (Major et al 1998).

Metastatic Breast Cancer

Over half of the women with operable breast cancer who receive local surgery with or without radiotherapy will die from metastatic disease, indicating that for many women the cancer has already spread by the time of presentation. Metastatic risk factors include: axillary lymph node involvement, an adverse histological grade, and a large tumour size. The only way to improve the chance of survival for many women is to give effective systemic treatment (Hoskins 1997). Metastatic breast cancers have highly variable courses of action. Individuals with hormone sensitive cancers may live for several years without any intervention other than hormonal manipulations. Conversely, individuals with breast cancer that is not hormone sensitive may have a much shorter disease free interval and a shorter survival. The average period of survival after the diagnosis of metastatic breast disease is 18 to 24 months (Sainsbury 1995).

Metastatic breast disease may be treated alone or in a combination of treatment modalities such as hormonal manipulation, chemotherapy or surgery. Hormonal manipulation is effective in over 30% of patients however second line hormonal manipulation produces significantly less results. Chemotherapy for metastatic breast cancers must be administered while rec-

ognizing that the side effects may limit the amounts prescribed. The overall response rate to chemotherapy for metastatic breast cancer is usually 40 to 60%, however, with each subsequent course of treatment the success ratio falls by 50%. It is also interesting to note that when one chemotherapy regimen has been administered it cannot be repeated, thus, new medication must be administered (Sainsbury 1995).

Problems associated with metastatic breast disease include bone disease, specifically, bone pain. Pathological fractures due to bony metastasis will require internal fixation followed by radiation to improve the quality of life of these individuals (McLean 1996).

Bone Marrow Transplantation

Another treatment modality for breast cancer, specifically high-risk metastatic node-positive cancer, is autologous stem cell (bone marrow) transplantation combined with high-dose chemotherapy. Indeed, the most frequent indication for autologous stem cell transplantation is breast cancer which initially presents in patients with high numbers of positive lymph nodes or locally advanced breast cancer. Over the last 10 years, treatment related mortality has decreased from 22% to 6% and the overall survival in women receiving high dose therapy supported by stem cell transplantation is 30% at three years.

Breast Reconstruction

The loss of a breast to cancer often has a devastating effect on many women and their families. The option of breast reconstruction, while never restoring the breast to its original state, is often a viable alternative after mastectomy. Breast reconstruction may be performed immediately following mastectomy or delayed, however, any reconstruction may be contraindicated if there is metastasis to the lung, liver or bone. The administration of chemotherapy or application of radiation is not a contraindication to reconstruction, however, administration of these treatment modalities may be delayed so that the surgical sites can heal under optimal conditions (Meeker & Rothrock 1995).

Breast reconstruction may be achieved in three ways: available tissue and an implant, tissue expanders, and flaps. The use of available tissue is the easiest, but many women post mastectomy lack the necessary tissue, thus necessitating more invasive surgery.

Tissue Expanders

For breast reconstruction using tissue expanders a basic plastic instrument set is used and the round breast-shape expander is supplied in a sterile package in numerous sizes. Care of this device is the same as for any other implantable device. The client is positioned supine with the arms extended on arm boards and the prepping and draping is carried out in a routine manner such that both breasts are exposed.

A submuscular pocket is created for the expander and an additional tunnel and pocket is created at an adjacent site from the main sac for the placement of the injection dome and connecting tube.

The tissue expander is leak tested prior to insertion; then inserted; the reservoir positioned subcutaneously and connected; the wound closed; and, the expander filled with sterile saline solution until blanching of the skin is achieved. Record the amount of saline inserted on the operative record as well as the details regarding the expander. Additional inflation of the tissue expander usually begins two to three weeks post placement and thereafter occurs approximately every seven days. The time from initial insertion to complete fill depends upon the desired maximum stretch. After the desired expansion has been achieved the temporary expander is exchanged for a permanent prosthesis.

Latissimus DorsiMyocutaneous Flap

Breast reconstruction using a latissimus dorsi myocutaneous flap is a singlestage reconstruction of the breast following a mastectomy. Usually significant tissue deficiency has occurred following a radical or modified radical mastectomy to necessitate this procedure. The latissimus dorsi muscle is a wide muscle extending over the mid thoracic portion of the back and inserting into the humerus. The blood supply comes from the thoracodorsal artery and perforators from the upper lumbar arteries and the intercostal vessels. The rich blood supply allows the surgeon flexibility in orienting and positioning the flap to the pattern of the deficit on the anterior chest wall. This type of flap may be used with an internal breast prosthesis, with or without adjustment to the contralateral breast.

The surgeon will draw the island of the flap on the back of the patient prior to surgical dissection. The patient is positioned in the lateral position with the arm on the operative side extended and elevated above the patient. The patient is stabilized, prepped and draped, exposing the affected breast and muscle. A basic plastic set is used, plus long Metzenbaum scissors, long DeBakey forceps, Deaver retractors, Freeman areolar markers, lighted breast retractors or a headlight, and possibly a second electrosurgical unit.

Often two surgical teams operate simultaneously, one freeing the muscle flap and the other preparing the recipient site. Initially the island of skin is incised transversley across the back with care being made such that the scar will be covered by a bra or bathing suit. The muscle is then freed from the overlying skin by undermining so that all of part of the muscle may be mobilized. The skin island and the muscle are then tunnelled through the axilla to the chest wall. The original insertion site of the muscle on the humerus and accompanying blood vessels are left undisturbed. This latissimus dorsi muscle fills the space left by the missing pectoralis muscle. The island of skin is oriented to the recipient site and both are sutured into place. If desired, a saline-filled implant is placed under the muscle before suturing to reconstruct the breast mound. The wound is drained by closed wound suction catheters and the nipple-areola complex may also be reconstructed at this time by sharing the nipple on the unaffected side or by using groin or auricular tissue. This may be done at the time of reconstruction or at a later date.

Trans-Rectus Abdominus Flap

The trans-rectus abdominus (TRAM) flap is a single-stage reconstruction of a post-mastectomy breast with the transverse rectus abdominis muscle. This flap is an alternative to the latissimus dorsi flap and takes the excess tissue from the lower abdomen to reconstruct the breast while rarely using an implant as further augmentation.

The surgeon will mark the client pre-operatively with the patient in an upright position. A basic plastic instrument set is used and the patient is placed in the supine position with the arms extended on armboards. The operating room table is often flexed and additional padding of the lower extremities may be required. The chest and abdomen are prepped and draped simultaneously. The skin from the mastectomy scar is revised. The transverse rectus abdominus muscle is dissected and tunneled subcutaneously to the midline and the flap is brought to the chest wall and fixed medially with the thinnest portion of the flap being positioned superior and medial and the thickest portion of the flap is inferior and lateral. Due to the amount of tissue available implants are often unnecessary. There are variations on the TRAM flap to include the pedicle approach, free approach or supercharged flap (Meeker & Rothrock 1995).

The advantages to reconstruction include: restoration of feminine body image; no prosthesis or special bras need to be purchased or worn; any clothing can be worn; can go braless; no overt daily reminder of breast surgery; and, it is psychologically beneficial. Disadvantages to reconstruction include: a longer recovery time from surgery; greater post-operative discomfort; some insurance programs will not cover all of the costs; and, increased incidence of infection or surgical complications due to the complexity of the surgery (DiMartino 1996).

There are benefits to immediate reconstruction which include: only one surgical experience and anaesthetic; lower cost than two surgeries; reduced recovery time compared to two surgeries; body image doesn't suffer as much as with mastectomy alone; and, there may be better psychological adaptation. Disadvantages to immediate reconstruction include: more physical discomfort and a longer recovery time when emotions are at their peak; and, increased potential for infection or surgical complications which could delay cancer treatment (Kneece 1995).

Advantages of delayed breast reconstruction include: time to study reconstruction methods and see other opinions; time to carefully select a reconstructive surgeon; more time to psychologically prepare for the surgery; no delay in cancer treatments. Women who delay reconstructive breast surgery experience some of the inconveniences of having to wear a prosthesis, thus they are often more pleased with the reconstructive results.

Mammography

Mammography is a simple, safe radiologic x-ray examination of the breast recommended every two years by the Canadian Cancer Society (CCS) for all women over age of 50. Mammography may detect breast cancers before they can be palpated by a woman or physician, thus increasing the chances of a cure.

Research shows that the ideal time to have a mammogram is during the first two weeks of the menstrual cycle. Having a mammogram during the last two weeks of the cycle doubles the chances of missing a cancerous tumour as studies have shown that menstruating women who have used hormones may have an increased risk of false-negative results when mammograms are performed during days 15 to 28 of the menstrual cycle (Baines et al 1997). Obviously, the efficacy of screening mammograms would increase if there was a reduction in the false negative reports. The CCS recommends that women have their breasts examined by a certified breast examiner yearly and perform monthly breast self examination. For women between the ages of 40 and 49 years the CCS recommends that mammograms be discussed with the family physician and performed accordingly.

While mammography is recommended for all

women over the age of 50 it is strongly recommended that both screening and diagnostic mammography be performed at dedicated facilities offering two view mammography.

Breast Self-Examination

Mammography alone is not sufficient surveillance to be used in the detection of breast abnormalities. Regular breast examinations performed in a consistent, thorough manner by certified breast examiners and by the woman herself are essential for the early detection of breast abnormalities. Many lumps are discovered by the woman themselves - 30% in one study, 80% in another, thus routine breast self examination may locate fast-growing, interval cancers that develop between scheduled screenings. As many women forego regular check-ups, breast self examination (BSE) is a valuable detection aid. This examination must be learned from a trained health professional as improper technique facilitates a sense of false security. Premenopausal women should perform BSE preferably a few days after a period ends and post menopausal women should perform BSE on the first day of each month. Breast self examination facilitates the woman getting to be more familiar with her breasts, thereby increasing the opportunity to recognize any abnormality. It is important to recognize that eight out of ten breast abnormalities are benign and that early detection potentially saves lives (Engel 1991).

The CCS recommends using either the grid or rotary method for breast self examination. Utilizing the grid method small circles are made back and forth across the breast, covering the entire breast area to include the tail of the breast and axilla. The rotary method is accomplished by making small circles starting at the outside edge of the breast and making small circles all the way around the breast. Keep moving in toward the nipple and be sure to check the entire breast and axilla (CCS 1997).

Unconventional Therapies

Today in the market and in the literature, there is an abundance of information and misinformation available to the consumer regarding unconventional therapies for breast cancer.

Some of the more common unconventional therapies currently alleged to reduce the incidence of, or to potentially cure breast cancer includes: • 714-X, an immune system booster ; • green tea, an anticarcinogenic comprised of the potent antioxident epigallocatechin gallate (Kaegi et al 1998); • essiac, a combination of burdock root, Indian rhubarb, sheep sorrel and slippery elm bark herbs; • therapeutic touch; • soy milk - presumed to decrease the side effects of menopause and to possibly avoid hormone replacement therapy; and, • vitamins and q10 consumption may alter the body's breakdown of estrogen, thereby possibly reducing the chances of getting breast cancer.

Breast massage as a form of complimentary therapy is relatively new to Canada although widely used in Europe for years. Breast surgery often results in lymphatic congestion, hard, painful or fibrous breasts and scarring or numbness in the breast or surrounding tissues. Breast massage promotes lymphatic drainage, reduction in pain and swelling and helps lessen scars. Massage therapists in most provinces are regulated health professionals and breast massage is within their scope of practice.

Breast Cancer Risk Factors

Induced Abortion. Articles abound supporting both sides of the breast cancer risk and induced abortion issue, however, there is literature to support the statement that a 30% risk increase exists for the development of breast cancer in women who undergo induced abortion.

Constricting Garments. While not scientifically proven, researchers link the impaired lymphatic flow related to constricting garments directly to breast cancer incidence and found that women who wore their bras for 24 hours per day had a three out of four chance of developing breast cancer. Women who wore their bras 12 hours per day, but not to bed, had a one out of seven risk and women who wore their bras less than 12 hours per day developed a one out of 152 risk. Exercise and massage of the breasts increased lymphatic flow, and were thereby linked to reduced incidence of breast cancers (Reed 1996).

Plastics and Estrogen. Plastic storage and drinking containers are being studied to see how they potentially mimic the effects of estrogen in the body. The chemical, pnonylphenol, is strongly linked to this theory and is found in polyvinylchloride pipe that carries water. The chemical bisphenol-A, commonly used in the manufacture of drink bottles, including water, is also involved. Caution is urged when storing and heating food in plastic containers.

Environment. Environmental concerns pertaining to the development of breast cancer are very troubling since a host of chemicals used in plastics, detergents and pesticides act as pseudo-estrogens, thereby promoting breast cancer by accelerating the disease and enhancing other factors that cause it.

Occupational Hazards. There is data to support the theory that breast cancer may be directly related to occupation. Teachers, religious workers, administrators and nurses all have an increased risk of developing breast cancer while female construction workers have a remarkably decreased risk.

Nurses have an increased mortality from all cancers combined, especially cancers of the breast and ovary, representing an unexpected increase of between 15 and 20%, in addition to leukemia and pancreatic cancers (King et al 1994). Nurses in Iceland have a higher breast cancer incidence rate than the general Icelandic population and a Finnish study indicated the incidence of breast cancer in registered nurses was twice that of the general population, thus, the possiblity exists that the nursing occupation may be an indirect risk factor for breast cancer (Gunnorsdottir & Rafnsson 1995).

Alcohol Consumption. Death from breast cancer was elevated among women consuming more than one drink of alcohol a day (Colditz, Manson & Hankinson 1997). Consumption of alcohol, even in small amounts, may lead to DNA damage and may influence the development of breast cancer by altering the hormonal milieu as alcohol causes a 28% elevation in estradiol levels and a 21% increase in estrone levels during the ovulatory cycle of the menstrual cycle (Giovannucci, et al 1993).

Perioperative Issues

While nobody would expect a nurse with perioperative experience to be conversant with all aspects of breast cancer detection, treatment, support and palliation, it is imperative that they have a broad overview of the various aspects of the disease and the follow-up programs available in their community. The shorter hospital lengths of stay and the resulting increase in Surgical Day Care breast procedures means that the women and their families are interfacing with the formal health care system for significantly less time than ever before. The opportunity to answer concerns related to the perioperative experience, or to address the personal aspect of breast cancer is minimal.

To improve the cancer care delivery system for the woman and her family it will be necessary for the perioperative team to become familiar with:

- diagnostic and treatment interventions;
- hospital programs offering support to the individual;
- community groups and agencies offering assistance to individuals and their families who must deal with breast cancer; and,
- ideally, have a designated person act in the capacity of system navigator.

Pre-operative Preparation

Perioperative nurses, through their involvement with pre-admission clinics are well positioned to provide education and support to the woman who must deal with a recent diagnosis of breast cancer. Just as we would address any operative concerns pertaining to the direct surgical experience, a unique opportunity exists to help this individual with any social or psychological concerns that they might have at the time of the pre-operative visit. The perioperative nurse may refer the woman to any hospital based support group or social workers, or, facilitate a referral to community groups and agencies that can provide the support that the woman and her family needs. Individuals or agencies that may be available to counsel the woman may include: breast cancer support groups, hospital and community social workers, breast cancer survivors, psychologists, oncology nurses or physicians. Often more than one avenue of support is necessary, therefore, it is important that the perioperative nurse have access to the information so that the referral may be both appropriate and made in a timely fashion.

In many instances the perioperative nurse is the first health care professional that the newly-diagnosed breast cancer patient meets after the surgeon has communicated the diagnosis. As such, information access is very important to the woman and access to a current library is essential for the most recent developments in breast cancer treatment. While it is virtually impossible for every community to have immediate access the most current breast cancer information available, it is possible to link with libraries in cancer treatment centres or to access information electronically on the World Wide Web. It is suggested that caution be exercised when accessing information on the Web as not all sites are recommended sources of evidence-based cancer treatment information. Web sites such as the Canadian Cancer Society, National Cancer Institute of Canada, and provincial cancer treatment centre locations are highly recommended.

Discharge Planning

Ideally, prior to admission to the hospital as either an inpatient or as a day surgery candidate, the woman and her family should receive instructions pertaining to discharge. Many hospitals incorporate discharge planning into the admission process to ensure that the individual and the family make appropriate

arrangements prior to admission so that continuity of care is maintained. Utilization of the Home Care programs in the community are of a great benefit to the woman undergoing breast cancer surgery as they will provide assessment services, psychological counseling and symptom control in the home after hospital discharge. This continuity has been of proven benefit to both the care team and the individual after surgery. Additionally, many Public Health programs will provide in home visits to deal with psychological issues that the woman may wish to address either prior to, or immediately after, her surgery.

Financial Issues

In addition to the physical and emotional assaults that the woman must face as a result of her breast cancer diagnosis, many women must also address financial issues. In today's society many women are responsible for contributing to the financial welfare of the family unit and, as such, a diagnosis of breast cancer with the resultant loss of work due to surgery, radiation and/or chemotherapy, may strain the family's ability to cope financially. Many women work part-time and do not have disability insurance as an allotment of a benefit package so a diagnosis of breast cancer further compounds their distress as they will now face additional hardship. For individuals and families who are facing financial hardship there are community social services and other agencies available that will provide support during their time of treatment. For example, the Canadian Cancer Society will provide babysitting services and transportation to individuals who must travel for cancer treatments and appointments, however, many women and their families do not even know that this service is available, let alone the mechanism available to access it. Thus, the role of the perioperative nurse or the nurse navigator, acting in the capacity of facilitator, becomes a crucial part of the cancer care delivery system.

Nurse Navigator

Hospitals providing breast cancer surgery should have a system in place whereby both the users and providers of breast cancer care can access the formal cancer care system for information. Information that may be necessary to access so that care may be facilitated could be either general, such as current treatment options, or specific, such as designated oncology appointment times. In this capacity the nurse navigator position would be most advantageous. The nurse navigator should be a professional with extensive experience dealing with individuals who must cope with cancer in general, and breast cancer specifically. They should have a general knowledge of the perioperative and oncology treatment delivery systems as well as a thorough knowledge of hospital and community resources that may be accessed to meet the needs of the individual and family. Additionally, and perhaps most importantly, the nurse navigator should have the time, responsibility and the authority to guide the woman and her family through the often complex maze of choices that are available. It is important to remember that the concerns of the individual, not the concerns of the nurse or other members of the health care team, are paramount. All too often health care providers will dictate to the individual instead of listening and respecting the individual's concerns and issues.

Surgery and the Breast Cancer Patient

While it is not a recommended practice, many individuals diagnosed with breast cancer and undergoing radiation or chemotherapy must undergo concurrent additional surgery. As such, there are many intraoperative considerations that the perioperative nurse must consider and communicate to the team so that the desired surgical outcome may be achieved. It is essential to remember that when chemotherapy is being administered to an individual that the blood counts and possible risks of systemic complications are lowest at the immediate time of chemotherapy administration. While nausea and vomiting are most prevelant at the time of chemotherapy administration potentially life threatening blood disorders usually manifest themselves anywhere from ten to twenty-one days post chemotherapy administration. Specifically, with regards to chemotherapy, anyone undergoing an operative procedure should have in addition to a routine pre-operative workup: a complete blood count including absolute neutrophil count to assess susceptibility to infection and a platelet count to establish blood clotting factors. Thus, accurate blood results are essential to assess the physiological status of the individual prior to any surgical intervention.

Just as chemotherapy may potentially complicate the administration of anesthetics, the application of radiation therapy may cause further revision to the perioperative care plan. Radiation therapy causes local skin irritation that may sensitize the skin to the point of severe fragility. Excessive care must be taken during surgical positioning to ensure that shear forces on the irritated skin are not applied as the skin may slough as a result of the pressure. Skin prep should be minimal, scrubbing of irradiated areas should be avoided, and, skin preps containing alcohol should not be used due to the caustic effects on the skin. It is suggested that the prep solution be gently removed as soon after the procedure as possible to reduce any potentially irritant effects to the irradiated area. Tape should never be placed on irradiated skin due to the fragility of the area and dressings should be modified to minimize trauma to the compromised skin.

Individuals undergoing any breast surgery, be it either lumpectomy with axillary node dissection or mastectomy, should at all times be cognizant of the fact that the lymph pathways are affected, thus, the ability of the limb to combat infection is compromised. Therefore, from a perioperative perspective the team members should be aware that after any breast surgery the arm will have a tendency to swell. Usually the swelling is mild and does not pose a problem, however, any infection introduced to the arm or hand may lead to dramatic swelling. In an effort to reduce the incidence of infection into the limb it is suggested that the arm be well padded and elevated at all time, whenever lying down or sitting for any length of time. Additional precautions should be taken by the team members to avoid injury or to break the skin in the hand or arm as this presents an ideal situation for inflammation or infection to occur. Blood pressures and any other monitoring should not take place on the affected arm as this may compromise the integrity of the limb. The active participation of all members of the care team towards maintaining the integrity of the skin and circulation in the arm affected as a result of surgery or radiotherapy will ensure that the care delivered to the woman is of the highest quality.

Post-Operative Follow-up

Many surgical programs provide outcome measurement for the delivery of perioperative care delivery utilizing a post discharge telephone follow-up call as a tool. At this time the nurse contacting the patient is able to assess both the recovery status of the individual as well as the efficacy of the care that was delivered in the hospital to include the pre-operative assessment clinic. This telephone call may be made by any nurse in the pre-operative assessment clinic, the operating room or the post-operative anaesthetic care unit depending upon the policy of the individual institution. This follow-up telephone call allows the nurse the opportunity to assess the status of the client and to answer any concerns that may be present as a result of the operative experience. The nurse should be prepared to comment appropriately regarding the perioperative experience in addition to: wound care, analgesia, exercise, diet, work issues and, perhaps most specifically, access to cancer care services. At this time it is imperative that the perioperative nurse be familiar with community resources pertaining to breast cancer services and this should include support group information. This nurse need not be an expert in cancer issues, however, a general knowledge of available cancer services and resource individuals will be most appreciated by the cancer patient and their family members.

Conclusion

The treatment of breast cancer is a team effort requiring the dedication and expertise of all of the members of the care team to ensure a favorable outcome. While the cancer care team cannot always guarantee a successful outcome of the treatment, they can ensure that every attempt has been made to offer the most comprehensive, coordinated and timely access to supportive care and cancer treatment. As a member of the team, perioperative nurses play a crucial role in the delivery of treatment modalities and the dissemination of cancer information to the women and their families. By utilizing their wealth of knowledge, skills and expertise, they are well positioned within the cancer care spectrum to positively influence the outcome of individuals and their families who must navigate the system. A concise knowledge of breast cancer types, history, incidence, predisposing factors, therapies and mammography will assist the perioperative nurse throughout her personal and professional life. Additionally, with a thorough understanding of breast cancer as a disease process, and the diverse treatment options that are currently available, the perioperative nurse has the opportunity to educate as well as participate in the care and treatment of women who must deal with all aspects of the breast cancer. Individually, and as a specialty, we should reconsider our position within the cancer care system because once all aspects of this disease are assessed, breast cancer really is so very much more than just a perioperative experience. ■

References

The author provided 66 references with the manuscript, along with several graphs and charts. Due the limitations of this journal's size references will be provided only on request. Please submit a postage-paid, fully addressed envelope to the publisher and references will be forwarded immediately.