Published in final edited form as:

Pain Manag Nurs. 2018 August ; 19(4): 348–353. doi:10.1016/j.pmn.2017.12.002.

The Relationship of Age and Postoperative Pain in Women Following Surgery for Breast Cancer

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Abstract

Background—In the past, elderly women with breast cancer were not offered surgery because of beliefs that they would experience serious complications from comorbidities and increased chronological age. Today the decision to offer surgery is based on a woman's fitness rather than her age.

Objective—The purpose of this study is to compare the experience of postoperative nausea and vomiting (PONV), anxiety and reported pain levels in women who represent four different age groups following breast cancer surgery.

Methods—Postoperative pain was measured in the post-anesthesia care unit (PACU) using an 11-point Verbal Pain Scale, PONV was measured categorically and if present severity of nausea was assessed. Anxiety was measured preoperatively by the short form Profile of Mood States (POMS-SF).

Findings—97 women, aged 37–78 participated in this study. Overall, 35% of all women experienced PONV, however, only two women (18%) in the highest age range (70–79) experienced PONV, yet they reported significantly more pain than women in the other age groups. Understanding the difference in postoperative symptoms experienced by older woman following surgery for breast cancer will support the development of age specific strategies.

Background

In the past, women over the age of 70 with breast cancer were unlikely to be offered a surgical option for treatment because it was believed that they were at greater risk for postoperative complications than younger women. Factors that influenced this decision included the presence of comorbidities and increased chronological age (Markopoulos & van de Water, 2012; Tesarova, 2013). Although many of these women were concerned about their cancer diagnosis and wanted to undergo breast cancer surgery, surgeons were hesitant and often denied requests to otherwise healthy older women (Markopoulos & van de Water, 2012; Tesarova, 2013). Older women were also less likely to receive adjuvant chemotherapy following breast cancer surgery, or if they received chemotherapy, the dose was significantly lower than that given to younger patients (Markopoulos & van de Water, 2012; VanderWalde

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The authors have no financial disclosures to report

& Hurria, 2012). Instead of surgery or chemotherapy, women over 70 years of age were offered other forms of treatment, for example Primary Endocrine Therapy (PET) or hormone therapy alone. (Dimitrakopoulos et al., 2015; Sowerbutts et al., 2015). Current evidence demonstrates that women are more likely to survive breast cancer with a multi-therapy approach, including surgery, chemotherapy and radiation therapy, compared to hormone therapy alone (Tesarova, 2013; van de Water et al., 2012). Current evidence also suggests that many older women who undergo surgery are healthy and physically fit and that physical status should be the predictor of surgical referral (VanderWalde & Hurria, 2012). According to the Centers for Disease Control and Prevention (CDC), in order for an adult over the age of 65 to be considered 'fit' or 'physically active,' he or she must complete at least 150 minutes of moderately-intense aerobic activity (like brisk walking) per week and muscle-strengthening activities of all the major muscle groups at least 2 days per week (CDC, 2015). Other exercise options for this age group include 75 minutes of vigorous-intense aerobic activity (like running) per week in conjunction with the muscle-strengthening activities 2 days per week (CDC, 2015). In recent years, older women have been considered for breast cancer surgery based on their fitness and ability to stay active post-surgery (Loughney et al., 2016). A systematic review by Jones and Alfano (2013) suggests that patients with solid tumors who are more physically fit and able to maintain their fitness postoperatively will have a better prognosis than patients who are not fit. A recent study by Mays et al. (2017) found that women over 70 years of age are not at an increased risk for adverse effects following surgery compared to women less than 70 years with more co-morbidities. Oncology surgeons have noticed these trends and are more likely to offer surgical options for fit patients because of this. Today, women who are over eighty are now scheduled for mastectomies, something that was unheard of 10 years ago.

Patient anxiety and fear of surgery are complex and impeding problems for breast cancer patients (Mejdahl et al., 2015). Anxiety and preoperative distress have been associated with increased perception of pain following breast cancer surgery, and can often affect quality of life and patient happiness (Mejdahl et al., 2015). Anxiety could stem from various fears, including fear of anesthesia, surgical findings, or even recovery (Aviado-Langer, 2014). Preoperative anxiety may warrant increased doses of medications during anesthesia, postoperative pain medications in higher doses, and longer hospital stays (Aviado-Langer, 2014).

In addition to treatment decisions, older adults with cancer are significantly undertreated in regard to level of pain management (Pimentel et al., 2015). In a cohort study of 29,825 patients with five different cancers (lung, colorectal, female breast, prostate and head and neck), 60% of younger adults (< 60 years old) were prescribed at least 1 pain medication during end of life, while only 30% of older adults (> 75 years old) received 1 pain medication when requested (Higginson & Gao, 2012). Many physicians are hesitant to prescribe opioids and other analgesics to older adults, due to the risk of polypharmacy interactions and adverse effects (Nawai et al., 2017), which contributes to the undertreatment of pain and other symptoms. A retrospective study in 2013 reviewed data from the 2011 National Health and Aging Trends Study to determine the prevalence of pain in a representative sample of older adults in the United States (Patel et al., 2013). Fifty-three percent (53%) of older adults in this group experienced "bothersome pain," which was

equivalent to 18.7 million older adults (Patel et al., 2013). These findings demonstrate a possible disparity between older age and adequate pain management.

In addition to pain, postoperative nausea and vomiting (PONV) following surgery is a frequent and often burdensome symptom experienced by women, especially patients with breast cancer. Well established risk factors for PONV include female sex, a positive smoking history, history of PONV and use of opioids for pain. Being a woman is the strongest independent predictor of PONV, even stronger than having a previous history of PONV. It is not understood why there is an increased risk in women but this increased risk persists throughout life, even following menopause (Apfel et al., 2012). The incidence of PONV following surgery can be as high as 30%, even with the implementation of antiemetic clinical guidelines (Odom-Forren et al., 2015; S. Wesmiller et al., 2016).

In 2017, it is estimated that 318,590 women will be newly diagnosed with invasive and/or non-invasive breast cancer in the United States (Breastcancer.org, 2017). As the number of women diagnosed with breast cancer increases and the age range of surgical candidates grows, it is imperative for us to understand the symptoms experienced by women of all ages. The purpose of this study was to compare the experience of anxiety, level of postoperative pain, and PONV in women of four different age groups following surgery for breast cancer.

Methods

Design

This project, a secondary data analysis from a study which was approved by the University of Pittsburgh Institutional Review Board, employed a cross-sectional design to compare PONV, anxiety and pain after surgery in women with breast cancer. Women were included in the parent study if they were diagnosed with early staged breast cancer (stage I, II, and IIIA) and had scheduled surgery for removal of the cancer under anesthesia (general or combined general and regional anesthesia). Inclusion criteria included telephone access and American Society of Anesthesiologist (ASA) status of I, II, or III. Women were excluded if they were scheduled for breast reconstructive surgery (due to length of surgery) or had a past medical history of neurological trauma (stroke, head injury, spinal cord injury, or intracerebral hemorrhage), which may have influenced their experience of PONV.

Participants were recruited and baseline data were collected in the preoperative center of a large women's teaching hospital; that includes a Comprehensive Breast Care Program. To determine study eligibility, investigators and members of the study team communicated with the surgical team each morning to review the operating room (OR) schedule. Informed consent was obtained from women who agreed to participate in the study.

Study Variables and Data Collection

PREOPERATIVE DATA COLLECTION—Preoperative data collection in the preoperative care center included information regarding individual characteristics such as age, race, smoking history, history of PONV, and motion sickness. Preoperative anxiety was measured using the Tension-Anxiety subscale of the short form of the Profile of Mood States (POMS-SF) (Lerman & Schwartz, 1993). The POMS-SF subscale includes six items, which are rated

on a Likert-type scale ranging from 0 (not anxious at all) to 4 (extremely anxious). The score of the POMS-SF is the sum of all responses for the six items. The POMS-SF has validity and reliability in women with breast cancer (Lerman & Schwartz, 1993). Montgomery and colleagues (2010) reported notable internal consistency (Cronbach alpha = 0.91) (Montgomery, Schnur, Erblich, Diefenbach, & Bovbjerg, 2010).

POSTOPERATIVE DATA COLLECTION—The outcome variables for this study were 1) pain control; level of pain and amount of opioids (measured in morphine equivalents) needed to achieve pain control, and 2) PONV. In the post-anesthesia care unit (PACU), pain and pain control were measured on an 11-point (0–10) Verbal Pain scale. Zero represents no pain, while 10 represents worst pain imaginable. Opioids were measured in morphine equivalents.

Vomiting was measured nominally (yes/no) and continuously to measure the number of emetic episodes. Nausea was measured on a verbal numeric 11-point (0–10) Numeric Nausea Scale, which is similar to the Verbal Pain scale in that 0 represents no nausea and 10 represents worst nausea imaginable. Type and time of surgery, anesthetic agents, and all medications administered in the operating room were also recorded by investigators.

Data Analysis

Data were analyzed using IBM SPSS Statistics 23.0 (IBM Corporation, Armonk, NY). The four age groups determined for this study were 37–49, 50–59, 60–69, and 70+ years old. The percentages of women who reported pain, PONV, and anxiety were estimated and reported with 95% CIs. A univariate binary logistic regression was used to determine risk factors for pain and use of opioids to compute crude (unadjusted) odds ratios with 95% CIs. The level of statistical significance for two-sided hypothesis testing was set at 0.05.

Results

The 97 women in this study all were diagnosed with early stage breast cancer were clustered by age; 15 were between the ages of 37–49, 31 were between the ages of 50–59, 40 were between the ages of 60–69, and 11 were 70 years of age or older. Eighty-eight women (92%) were Caucasian, 84 (88%) were nonsmokers, and 48 (50%) had a previous history of PONV. Twenty-two (22%) had full mastectomies, all other women had modified partial or segmental mastectomies.

Pre and Postoperative Symptoms

As shown in Table 1, we found no significant difference in anxiety between age groups, with the overall mean anxiety score of 10.1 ± 5.2 . When compared to the other age groups, women in the 70+ group experienced higher pain levels (5.09 ± 2.77). They also received more pain medication than any other group, with an amount of 9.47 ± 7.87 morphine equivalents.

As shown in Table 2, 4 (27%) women in the 37–49 age group, 11 (36%) women in the 50–59 age group, 12 (30%) women in the 60–69 age group, and 2 (18%) women in the 70+ age group experienced PONV. Overall, 35% of women in this study experienced PONV.

Discussion

The purpose of this study was to compare the experience of anxiety, reported pain levels, and PONV in women of four different age groups following breast cancer surgery. An objective of the study was to determine if older women were more or less likely to be in pain, and if their pain was effectively relieved. Data demonstrated that older women (greater than 70 years of age) reported higher levels of pain and were administered more postoperative pain medications than each of the other three age groups. These findings are not consistent with the findings of Higginson & Gao (2012) and Pimentel et al. (2015). The older women in this study were given more pain medication than any other group, unlike older women in previous studies who received significantly less pain medication than younger women (Higginson & Gao, 2012; Pimentel et al., 2015).

Consistent with most research (Gan et al., 2014; Wesmiller et al., 2017), 35% of women in this study experienced PONV following breast cancer surgery. We found that older women experienced less PONV compared to the other three groups, even though they received a higher amount of opioids to control pain.

Limitations

The limitation of this study was the relatively small sample size of 97 women. The cohort of patients in the 70 and older age group numbered only 11 patients. Consequently, it is difficult to generalize these findings to the entire population. We have recently modified our IRB application to be able to study women through 90 years of age. Thus, we continue to recruit women of all ages, with emphasis on the experience of older women, to increase understanding of this segment of the breast cancer population.

Conclusion & Clinical Implication

Older women in the age group of 70 years and older experienced less PONV yet reported higher pain scores after surgery for breast cancer. Common misconceptions held by nurses include the belief that elders do not tolerate opioids well and that the perception of pain is decreased with age. Study findings indicate that the PACU nurses caring for these patients were not affected by these misconceptions since the older woman received more pain medication than other age groups, revealing that opioids were not restricted because of age. Presence of the study nurse observer may have influenced patient care in regard to pain medication administration. Since data collection occurred in only one PACU, perhaps nurses in this PACU are especially well educated in providing effective pain management for elders. The use of pain rating scales can be confusing and requires effective patient education. It is possible that the elders in this cohort had not been educated effectively and were not using the 0 to 10 pain rating scale correctly. Communication with elders may be hindered by hearing loss, poor vision, and the hectic environment of the PACU. Assuring that the patient has eyeglasses and hearing aids in place and that they are separated from distracting activity can enhance communication with nursing staff. Elders are sometimes excluded from study populations. It is important to continue to study this population and to study the effects of aging on the pain experience. Assuring that PACU and oncology nurses

are cognizant of the unique needs of elders with breast cancer will influence symptom management strategies and improve patient care.

Acknowledgments

This study was supported by:

The Oncology Nurses Society Foundation and T32 NR011972A Training of Nurse Scientists in Cancer Survivor Research

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Table 1

Anxiety, pain level and opioid use in all four age groups.

Variables	X±SD	Group 1 (37–49 yrs) X±SD	Group 2 (50–59 yrs) X±SD	Group 3 (60–69 yrs) X±SD	Group 4 (70+ years) X±SD
Pre-op Anxiety	10 ±5.2	10.60±4.22	9.61±5.897	10.53±5.87	10.82±5.77
Post-op Pain		3.93±3.240	3.61±3.106	3.85±3.106	5.09±2.73
Opioid Use in morphine equivalents		5.94±5.561	4.96±5.96	5.86±5.70	9.47±7.871

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Table 2

Comparison of incidence of PONV by Age Group

Variable	Group 1 (37–49)	Group 2 (50–59)	Group 3 (60–69)	Group 4 (70+)	Overall PONV Experienced
PONV (%)	27%	36%	30%	18%	35%