ORIGINAL ARTICLE

Preoperative coping mechanisms have no predictive value for postoperative pain in breast cancer

Maria Luiza Alves,[1] Joaquim Edson Vieira,[2] Lígia Andrade Silva Telles Mathias,[3] Judymara Lauzi Gozzani[3]

[1]School of Medicine, Universidade de Pernambuco (UFPE), Recife, PE, Brazil. [2]School of Medicine, Universidade de São Paulo (USP), São Paulo, SP, Brazil. [3]Department of Anesthesiology, Hospital Central da Irmandade de Misericórdia da Santa Casa de São Paulo, São Paulo, SP, Brazil.

Objective: This study evaluated the relationship between psychological coping mechanisms and symptoms of anxiety and depression in the preoperative and postoperative periods in relation to the intensity of postoperative pain among patients undergoing breast cancer surgery.

Methods: Female patients who were scheduled to receive immediate surgical treatment for breast cancer were invited to participate, and answered the following questionnaires: The Hospital Anxiety and Depression Scale (HADS), the Self Report Questionnaire (SRQ-20), the Coping Strategies Questionnaire (CSQ), and the visual analogue scale (VAS).

Results: Of the 139 patients, 122 (87.8%) had an aggressive procedure. Eighty-five patients (61.2%) had a history of preoperative pain while 54 (38.7%) had not. There was no difference in VAS scores between patients subjected to aggressive or non-aggressive surgery. Only the CSQ subscale catastrophizing showed correlation with VAS at 24 hours and with HADS/D postoperatively. The HADS scores indicated both anxiety and depression, but did not distinguish patients subjected to aggressive or non-aggressive surgery.

Conclusions: The majority of patients did not exhibit depression and anxiety. Coping mechanisms and pain in the preoperative period did not have a strong predictive value for additional postoperative pain, but those with a higher anxiety score had greater pain.

Keywords: Anxiety; pain, postoperative; preoperative care; breast neoplasms; pain measurement

Introduction

Breast cancer raises concerns about femininity, motherhood, and sexuality, changing the psychosocial universe of affected women. Patients commonly experience feelings of loss in addition to adverse symptoms that go beyond the label of painful and deadly disease. Pain may restrict their functional abilities, and uncertainties about the future associated with removal of the breast may significantly affect the patient's emotional life.

Besides acute pain, patients undergoing surgery for breast cancer may develop post-mastectomy pain syndrome (PMPS), which is described as chronic neuropathic pain with intercostobrachial nerve injury.[1-3] Chronic pain may occur after amputation procedures, inguinal hernia repair, and after breast, gallbladder, and lung surgeries, and is primarily related to the intensity of acute postoperative pain.[4] This last condition should be seen as predictable and managed by the anesthesiologist. Also in this regard, informing medical professionals and the general public to reduce unnecessary surgeries may be of value to minimize this condition.[5,6]

Patients with breast cancer can find diagnosis and treatment very stressful.[7] Strategies used to evaluate stress include psychiatric screening instruments, preferably those that are easy to implement at low cost. Ease of use and low cost are of great relevance for clinical practice and epidemiological studies.[8] A previous investigation suggested that invasive surgery followed immediately by radiation therapy and meaningful acute postoperative pain were independent predictors of chronic pain, while preoperative emotional functioning variables did not contribute to this condition.[9]

Anxiety and depression are the most common psychiatric disorders associated with disease.[10,11] Anticipation of pain, separation from family, loss of independence, fear of becoming incapacitated, and fear of surgery and death are factors that often trigger symptoms of anxiety and depression in this period.[12]

Pain catastrophizing is a poor psychological adaptation to pain that leads to a worsening of any pain experience, functional disability, and greater difficulty disengaging from such an experience.[13] Few studies have addressed coping mechanisms and pain catastrophizing during the preoperative and postoperative period among patients undergoing breast cancer surgery. A previous work showed the Pain Catastrophizing Scale as a significant predictor of acute postsurgical pain measured in the postanesthetic care unit, but it did not predict postoperative analgesic

use.[14] The present study evaluated the relationship between psychological coping mechanisms and symptoms of anxiety and depression in the preoperative and postoperative periods in relation to the intensity of postoperative pain.

Methods

After ethical approval by the Research Ethics Committees of both the University of Pernambuco and Hospital Pernambuco, patients with breast cancer were invited to participate in the study. They were evaluated by a team of physicians and psychology experts as part of routine care in the Gynecology clinics. Patients received complete information about the study procedures and those who agreed to participate signed an informed consent form. The hypothesis tested was whether preoperative scores would correlate with higher postoperative pain scores. The primary outcome was the correlation of visual analogue scale (VAS) scores with coping and anxiety scores.

Female patients, American Society of Anesthesiologists (ASA) class I or II, aged between 18 and 80 years, and scheduled to receive immediate surgical treatment for breast cancer were invited to participate from September 2007 to May 2009. Their surgical treatment was considered aggressive if they required axillary lymph node dissection, or non-aggressive if there was no lymph node dissection. The study excluded patients who refused to participate, those younger than 18 years or older than 80 years of age, those presenting with severe visual or hearing impairment, those who had no command of the Portuguese language, on the basis of a discretionary evaluation by the principal investigator (MLA) who interviewed the patients, and those who showed any evidence of cognitive disturbance, on the basis of a discretionary evaluation by psychologists. The instruments used for this investigation consisted of three questionnaires and the VAS for measurement of pain. The analgesia schedule as well as rescue analgesia were at anesthesiologist discretion.

The Hospital Anxiety and Depression Scale (HADS) questionnaire has 14 items, seven focused on the assessment of anxiety (HADS/A) and seven for depression (HADS/D). Each of its items can be scored from zero to three, giving a maximum score of 21 points for each subscale. A score equal to or higher than eight indicates anxiety or depression, according to the measured subscale.[15] A validated Portuguese version of the instrument was used in this study.[16]

The Self Report Questionnaire (SRQ-20)[17,18] has been used to screen patients suspected of mental disorders. It consists of 20 questions with "yes" or "no" answers. The scores range from 0 (no probability) to 20 (extremely likely). Patients who scored higher than eight were considered SRQ-positive for risk of mood disorders and those with scores above 12 were excluded from the study due to a higher risk of psychiatric disorders. A validated Portuguese version was used.[18]

The Coping Strategies Questionnaire (CSQ)[19] has shown that patients use certain strategies more, including cognitive coping and suppression, helplessness and diverting attention, or praying. The Portuguese version used for this study is composed of eight items: diverting attention (G1), reinterpreting pain sensation (G2), coping self-statements (G3), ignoring pain sensation (G4), praying and hoping (G5), catastrophizing (G6), increasing activity level (G7), and increasing pain behaviors (G8).

During the preoperative period, patients completed the HADS, CSQ and SRQ-20, as well as a demographic questionnaire, and indicated which level on the VAS represented pain experienced during the preoperative evaluation. All patients received general anesthesia and the surgical procedure performed was recorded, to be classified as aggressive (lymph node dissection) or non-aggressive, as were the timing and use of analgesics during surgery. Patients were visited 6, 12, 18, and 24 hours postoperatively for evaluation of pain using the VAS and for administration of analgesia. On the 7th postoperative day, patients were asked to complete the HADS questionnaire again.

The sample size was chosen on the basis of a previous study.[16] A chi-square test was used to compare patients grouped according to type of surgery and whether they experienced pain before or after surgery. The chi-square method was also used to compare whether patients received rescue analgesia, as well as pain relief at 24 hours postoperatively related to the type of surgery. HADS and VAS scores were tested for normality with the Kolmogorov-Smirnov test. The Friedman test was used to compare VAS scores at 6, 12, 18 and 24-hour measurements. The Kruskal-Wallis test was used to compare VAS scores according to the HADS ($\geqslant 8$) and CSQ according to VAS (> 3) and HADS ($\geqslant 8$), and to compare time for the first claim for pain relief related to type of surgery. The Mann-Whitney test compared VAS results for aggressive and non-aggressive types of surgery, presence of preoperative pain, and HADS/A and HADS/D scores. A difference was considered statistically significant when $p < 0.05$. The odds ratio (OR) that a patient with a SRQ-20 as well as HADS higher or lower than eight would have a VAS higher than 3 in the postoperative period, or pain before surgery, was calculated.[9] SPSS version 10.0 was used.

Results

One hundred and sixty female patients provided written informed consent. The final sample consisted of 139 patients. Nine patients did not complete the questionnaires and 12 had SRQ-20 scores that indicated that they were at risk for mental disorders. Participant age ranged from 27 to 76 years, with a mean (SD) of 51.7 (11.8) years. Regarding the surgical procedure, 122 patients (87.8%) had axillary lymph node dissection and were classified as having undergone an aggressive procedure. None of the patients was receiving treatment for chronic pain, although 85 (61.2%) had a history of some type of pain, while 54 (38.7%) denied any pain.

All patients enrolled in this study received metamizole 30 mg/kg before the end of surgery. Eighty-eight patients

received rescue analgesia (72.1%) within the aggressive surgery group, while 16 (94.1%) received it within the non-aggressive surgery group. Time to rescue analgesia did not reach a normal distribution (Kolmogorov-Smirnov, p = 0.041) and no difference was found considering aggressive surgery (14 [7.0-24.0] hours) vs. non-aggressive surgery (16.5 [9.0-20.0] hours, p = 0.28). There was no more rescue analgesia for aggressive than for non-aggressive surgery (chi-square, Yates correction = 2.73, p = 0.09). Also, these patients did not differ for analgesia at 24 hours postoperatively (25 vs. 24%, p = 0.89).

VAS scores during the postoperative period decreased from 6 to 24 hours postoperatively (p < 0.0001 for all four groups), and the data did not reach normality. Patients with anxiety (HADS/A ⩾ 8) had significantly higher VAS scores throughout the postoperative period after the first measurement at 6 hours (Kruskal-Wallis). There was no difference in VAS related to depression (HADS/D ⩾ 8). There was no difference in VAS between patients subjected to procedures considered aggressive or non-aggressive, or between patients who experienced pain in the preoperative period and those who did not (Table 1).

No items related to coping mechanisms from the CSQ questionnaire showed any correlation with VAS at any time points of analysis (6, 12, 18, and 24 hours), except a negative correlation for the item "reinterpreting pain

sensation" at 6 hours. The same item reached a higher score at 6 hours when considering those patients with a VAS > 3 (p = 0.04, Kruskal-Wallis). Catastrophizing correlated with HADS/D scores obtained in the postoperative period (p = 0.017, Spearman), and was associated with a HADS/D higher than 8 (p = 0.035, Kruskal-Wallis) as well as with those patients still in pain (VAS > 3) at 24 hours of observation (p = 0.019, Kruskal-Wallis). CSQ scores in relation to HADS are shown in Table 2.

The HADS score did not reach normality (p = 0.005 for preoperative anxiety; p = 0.003 for postoperative anxiety; p = 0.016 for preoperative depression; p = 0.003 for postoperative depression). Both the preoperative and postoperative HADS suggested this sample could be considered to harbor feelings of either anxiety or depression. However, when considering a cutoff higher than 8, the majority of patients were not in an anxious (HADS/A ⩽ 8, n=102) or depressive state (HADS/D ⩽ 8, n=121) either pre- or postoperatively (Tables 3 and 4).

Patients considered at risk of mood disorders (SRQ-20 > 8) did not show any tendency to express a higher VAS postoperatively (VAS > 3) (OR = 0.73, 95% confidence interval [95%CI] 0.22-2.41). Patients harboring feelings of either anxiety or depression (HADS ⩾ 8) in the preoperative period also did not have higher VAS

Table 1 Postoperative VAS scores over time

	6-hour VAS	12-hour VAS	18-hour VAS	24-hour VAS
Total (n=139)*	1.5 (0-10)	0.0 (0-10)	0.0 (0-9)	0.0 (0-6)
Kolmogorov-Smirnov (p-value)	2.61 (< 0.001)	3.15 (< 0.001)	4.24 (< 0.001)	5.53 (< 0.001)
Aggressive surgery (n=122)	1.25 (0-10)	0.0 (0-10)	0.0 (0-9)	0.0 (0-6)
Non-aggressive surgery (n=17)	2.5 (0-8)	1 (0-5)	0 (0-4)	0 (0-2)
Kruskal-Wallis	0.404	0.714	0.597	0.308
Preoperative pain (n=85)	1.5 (0-10)	0.5 (0-10)	0.0 (0-9)	0.0 (0-6)
No preoperative pain (n=54)	1.75 (0-10)	0.0 (0-9)	0.0 (0-6)	0.0 (0-4)
Kruskal-Wallis	0.730	0.304	0.145	0.165
HADS/A < 8 (n=102)	1.0 (0-10)	0.0 (0-10)	0.0 (0-6.5)	0.0 (0-6)
HADS/A > 8 (n=37)	2.5 (0-10)	2.0 (0-10)	2.0 (0-9)	0.0 (0-5)
Kruskal-Wallis	0.068	0.017	0.003	0.033
HADS/D < 8 (n=121)	1.5 (0-10)	0 (0-10)	0 (0-9)	0 (0-6)
HADS/D > 8 (n=18)	1.0 (0-10)	1.5 (0-10)	0.5 (0-7)	0 (0-5)
Kruskal-Wallis	0.809	0.089	0.148	0.301

HADS/A = Hospital Anxiety and Depression Scale - Anxiety; HADS/D = Hospital Anxiety and Depression Scale - Low Mood; VAS = visual analogue scale.
Data expressed as median (range).
* Friedman test, p < 0.001.

Table 2 CSQ scores in relation to HADS classification

	Total score	HADS/A ⩾ 8	HADS/A ⩽ 8	HADS/D ⩾ 8	HADS/D ⩽ 8
CSQ1 - Diverting Attention	14.0 (0-36)	16.5 (0-36)	14.0 (0-36)	13.0 (0-36)	15.0 (0-36)
CSQ2 - Reinterpreting Pain Sensation	7.0 (0-36)	9.5 (0-30)	6.0 (0-36)	9.0 (0-28)	7.0 (0-36)
CSQ3 - Coping Self-statements	22.0 (0-36)	22.0 (1-36)	22.0 (0-36)	23.0 (0-36)	21.5 (0-36)
CSQ4 - Ignoring Pain Sensation	14.0 (0-36)	18.0 (2-33)	13.0 (0-36)	15.0 (0-30)	14.0 (0-36)
CSQ5 - Praying and Hoping	29.0 (0-36)	30.0 (6-36)	29.0 (0-36)	30.0 (1-36)	28.5 (0-36)
CSQ6 - Catastrophizing	6.0 (0-31)	9.0 (0-31)	6.0 (0-23)	11.0 (0-31)	6.0 (0-23)
CSQ7 - Increasing Activity Level	14.0 (0-34)	15.5 (0-30)	14.0 (0-34)	10.0 (0-30)	15.5 (0-34)
CSQ8 - Increasing Pain Behaviors	6.0 (0-12)	7.5 (0-12)	6.0 (0-12)	6.0 (0-12)	6.0 (0-12)

CSQ = Coping Strategies Questionnaire; HADS/A = Hospital Anxiety and Depression Scale - Anxiety; HADS/D = Hospital Anxiety and Depression Scale - Low Mood.
Data expressed as median (range).

Table 3 HADS subscales for pre- and postoperative periods

	Preoperative HADS/A	Postoperative HADS/A	Preoperative HADS/D	Postoperative HADS/D
Total (n=139)	5.0 (0-16)	5.0 (0-20)	5.0 (0-11)	4.0 (0-17)
Aggressive surgery (n=122)	5.0 (0-16)	5.0 (0-20)	4.5 (0-11)	4.0 (0-17)
Non-aggressive surgery (n=17)	7.0 (0-13)	5.0 (2-13)	5.0 (0-11)	4.0 (0-12)
Kruskal-Wallis	0.651	0.656	0.533	0.821
Preoperative pain (n=85)	5.0 (0-16)	5.0 (0-16)	5.0 (0-11)	4.0 (0-13)
No preoperative pain (n=54)	5.5 (0-14)	5.5 (0-20)	4.0 (0-11)	3.5 (0-17)
Kruskal-Wallis	0.474	0.272	0.127	0.554

HADS/A = Hospital Anxiety and Depression Scale - Anxiety; HADS/D = Hospital Anxiety and Depression Scale - Low Mood.
Data expressed as median (range).

Table 4 Scores of HADS according to anxiety of low mood classification

	Preoperative HADS	Postoperative HADS
Total	10.0 (0-27)	9.0 (0-37)
HADS/A $\leqslant$ 8 (n=102)	8.0 (0-18)	7.5 (0-37)
HADS/A $\geqslant$ 8 (n=37)	18 (12-27)	14.0 (3-28)
Mann-Whitney	0.000	0.000
HADS/D $\leqslant$ 8 (n=121)	9.0 (0-23)	8.0 (0-37)
HADS/D $\geqslant$ 8 (n=18)	18.0 (10-27)	17.0 (8-25)
Mann-Whitney	0.000	0.000

HADS/A = Hospital Anxiety and Depression Scale - Anxiety; HADS/D = Hospital Anxiety and Depression Scale - Low Mood.
Data expressed as median (range).

postoperatively at any time (OR = 1.20, 95%CI 0.56-2.56). Likewise, those patients who reported that they were in pain in the preoperative period did not show any trend toward a higher VAS in the postoperative period (OR = 1.47, 95%CI 0.68-3.18).

Discussion

Coping mechanisms among patients with breast cancer and preoperative pain assessed during the preoperative period did not show any predictive value for additional postoperative pain, but those with a higher isolated anxiety score reported higher pain scores postoperatively. The catastrophizing subscale score correlated with low mood as well as with pain measured 24 hours in the postoperative period.

SRQ-20 screening for mental disorders is considered simple and easy to administer.[20] It is interesting to note that, in this study, some patients scored high enough to be considered at risk for mood disorders.[17,18] Breast cancer patients require particular attention from healthcare providers, including the administration of a variety of diagnostic and/or screening tools. However, there are few data to support the hypothesis that treatment of depression in patients with breast cancer may positively affect morbidity and mortality.[21] Indeed, a previous investigation suggested study of interventions that promote the use of comprehensive coping strategies to decrease pain, anxiety, and depression among patients with breast cancer, considering they experience pain, psychological distress, and alterations in coping and perceived health status.[22] The present study may add to these data, given that there was no correlation between CSQ subscale scores and postoperative measures of stable or worsening pain during the first 24 hours of observation, although one item, catastrophizing, could be correlated with low mood and pain.

Even though patients that could be considered at risk for mood disorders according to SRQ-20 or HADS results were not at risk of expressing higher pain score, anxiety was associated with greater pain in this study. These findings may be in accordance with a recent review that points out that psychosocial factors probably play a role in some situations of persistent postoperative pain, where preoperative pain, severe immediate postoperative pain, and nerve damage are often good predictors.[23] In addition, a recent meta-analysis presented evidence, albeit small, that depression was associated with mortality.[24]

The HADS scale score of eight was used in this investigation as a limit for the normal range, although doubts remain as to whether there are safe values to be used as cutoff scores.[25] In patients with breast cancer, it is our opinion that anxiety and depression should be assessed in the preoperative period regardless of the patient's present clinical disease or surgical disorder, in agreement with the literature.[22] Breast cancer survivors report a higher prevalence of mild to moderate depression and a lower quality of life. Treatment of depression in breast cancer patients improves their quality of life and may increase longevity, despite not preventing disease progression.[24,26]

Interventions that improve strategies for coping with pain are associated with lower fatigue and lower psychological distress among women with breast cancer.[27] Depression and anxiety during breast cancer follow-up had a negative effect on coping mechanisms to deal with this condition, as well as on quality of life.[28] Even though the results of this investigation did not suggest that SRQ-20 or the CSQ scores or previous pain may predict immediate postoperative pain, a careful attention to these indicators in the preoperative period may help sustain an optimized approach.

The decision to stratify patients into two operative procedure groups was related to the use of axillary lymph node dissection, which is considered an aggressive approach. Breast cancer therapy has changed in recent years, and the use of breast-conserving treatment is increasing.[29] The exploration of lymph nodes suggests the possibility of advanced disease, besides causing higher pain stimuli. The number of patients of this sample included in this aggressive surgery group was higher, but

their scores for anxiety, depression, and pain incidence did not differ from those in the less aggressive surgical group. Patients who were already in pain or at risk of mood disorders in the preoperative period were not at risk of higher pain scores after the surgical procedures, considering the null confidence interval found.

This study has some limitations. Some patients refused to participate, and this may raise an interesting point, i.e., the exclusion of patients who did not consent. Although this is unavoidable, anxious patients are more likely to refuse to participate in a study; thus, this investigation may not have included the most anxious patients. Whenever VAS scores are routinely collected postoperatively, it would be worth seeking ethical committee approval to ask these patients for permission to at least include their VAS scores in an analysis, to compare VAS scores between those who consented with those who refused to enter such studies. Another limitation relates to the reduced number of patients who underwent non-aggressive surgery, as it means that the analyses comparing different types of surgeries could be underpowered.

In conclusion, although the majority of patients in this sample did not exhibit depression or anxiety, the use of questionnaire for coping mechanisms as well as the investigation of preoperative pain did not have a strong predictive value for additional postoperative pain. Patients with a higher isolated anxiety score reported higher postoperative pain scores.

Disclosure

The authors report no conflicts of interest.

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