Eighteen Sensations After Breast Cancer Surgery: A Comparison of Sentinel Lymph Node Biopsy and Axillary Lymph Node Dissection

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Purpose/Objectives: To evaluate prevalence, severity, and level of distress of 18 sensations at 3–15 days (baseline), 3 months, and 6 months after breast cancer surgery; to compare sentinel lymph node biopsy (SLNB) to SLNB with immediate or delayed axillary lymph node dissection; to evaluate the Breast Sensation Assessment Scale© (BSAS©) for reliability and validity.

Design: Prospective, descriptive.

Setting: Evelyn H. Lauder Ambulatory Breast Center at Memorial Sloan-Kettering Cancer Center in New York City.

Sample: 283 women with breast cancer; 187 had SLNB, and 96 had SLNB and axillary lymph node dissection.

Methods: Patients completed the BSAS© at baseline, three months, and six months after surgery.

Main Research Variables: Prevalence, severity, and level of distress of sensations in patients who had breast cancer surgery.

Findings: Sensations were less prevalent, severe, and distressing following SLNB compared with axillary lymph node dissection at all three time points. Tenderness and soreness remained highly prevalent following SLNB at the three time points. Tenderness, soreness, tightness, and numbness were among the most severe and distressing symptoms in both groups. The BSAS© demonstrated good reliability and validity.

Conclusions: Overall prevalence, severity, and level of distress were lower following SLNB compared with axillary lymph node dissection at baseline, three months, and six months after surgery. Certain sensations remained prevalent, severe, and distressing in both groups. The BSAS© is a reliable and valid instrument.

Implications for Nursing: Nurses should be familiar with prevalent sensations patients experience after SLNB and axillary lymph node dissection so they can provide education and support.

Key Points . . .

- Sensations are less prevalent, severe, and distressing following sentinel lymph node biopsy (SLNB) compared with axillary lymph node dissection at 3–15 days, 3 months, and 6 months after breast cancer surgery.
- Certain sensations remain prevalent, severe, and distressing for at least six months following SLNB.
- The Breast Sensation Assessment Scale©, which has been tested for reliability and validity, can be used by nurses in their clinical practice to evaluate sensations.

Patients who undergo breast cancer surgery often describe a variety of postoperative sensations in and around their axilla, breast, and chest wall and question whether these feelings are normal. At times, these sensations can be severe and distressing. If not prepared adequately prior to surgery, patients can interpret these postoperative sensations as an indication that something is wrong, adding uncertainty and anxiety to an already stressful event. The benefits of providing preparatory information to patients who are undergoing diagnostic or therapeutic procedures have been well documented. A variety of studies have demonstrated that distress during a threatening event is reduced when subjects have accurate expectations about the physical sensations they will experience (Johnson, 1972, 1996; McHugh, Christman, & Johnson, 1982).

The sensations that patients experience after breast cancer surgery are poorly understood and are understudied with regard to prevalence, severity, level of distress, and duration. In particular, little research is available that documents the impact of postoperative sensations on patients following a

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sentinel lymph node biopsy (SLNB). Historically, axillary lymph node dissection was the standard surgical procedure performed to determine a patient's disease prognosis and treatment plan. Axillary lymph node dissection, however, is associated with considerable morbidity. Because injury or resection of specific nerves in the operative field may occur, many patients experience distressing sensations that include numbness, tenderness, pulling, and soreness (Baron et al., 2000). Patients also are at an increased risk for developing lymphedema, cellulitis, and impaired shoulder mobility.

SLNB is the resection of the first lymph node or nodes (more than one sentinel node may exist) in the lymphatic basin that receive lymph flow from a primary tumor (Hill et al., 1999). This procedure was pioneered in patients with early-stage malignant melanoma and showed great promise in reducing the number of unnecessary lymph node dissections for that patient population (Morton et al., 1992). According to the sentinel lymph node hypothesis in breast cancer, if tumor cells have metastasized from the breast to the axilla, they will first travel to and be detected in the sentinel lymph node (or nodes). If the sentinel node is negative for metastatic disease, presumably the remaining lymph nodes also will be negative, thus eliminating the need to perform a standard axillary lymph node dissection. Numerous studies now have validated this hypothesis in early-stage breast cancer, and SNLB has become a standard of care for this patient population (Albertini et al., 1996; Giuliano, Jones, Brennan, & Statman, 1997; O'Hea et al., 1998; Veronesi et al., 1997). Disruption of the axillary nerves and lymphatics occurring during SLNB is less than that seen in axillary lymph node dissection. Therefore, postoperative sensations experienced by patients following SLNB are expected to be less extensive and severe than those seen in patients following axillary lymph node dissection. However, this theory first must be demonstrated before any conclusions can be reached.

Literature Review

Prior to the development of the SLNB technique, researchers conducted several studies to gain a better understanding of the characteristics and incidence of sensations following breast cancer surgery. Maunsell, Brisson, and Deschenes (1993) interviewed 223 women three months after either modified radical mastectomy (i.e., removal of the breast, nipple, and most of the lymph nodes under the arm), total mastectomy (i.e., removal of the breast and nipple), or breast-conserving treatment (i.e., removal of the breast tumor, a margin of surrounding healthy tissue, and in most cases, an axillary dissection, followed by radiation therapy to destroy any remaining cancer cells in the breast tissue). At three months postsurgery, 82% of the women experienced at least one sensation in the affected arm. Numbness was the most prevalent sensation (58%), followed by pain (55%), and stiffness (40%). Eighteen months later, the researchers interviewed 201 of the same women and found that little had changed. Women who had undergone axillary dissection experienced a significantly higher number of sensations than women who had not undergone the procedure.

Tasmuth, von Smitten, Hietanen, Kataja, and Kalso (1995) reported that of a group of women who underwent modified radical mastectomy (n = 283) or breast-conserving treatment (n = 184), half experienced postoperative pain, paresthesias, and "strange sensations." Surprisingly, women who had undergone breast-conserving treatment reported significantly more pain both in the scar and the ipsilateral arm than those who had undergone a modified radical mastectomy.

Kroner, Krebs, Skov, and Jorgensen (1989) specifically examined the incidence of phantom sensations after mastectomy. The authors interviewed 120 women three weeks after mastectomy and 110 of the same women one year later and determined that no significant decline in sensations occurred during the first year. The incidence of phantom pain and nonpainful phantom sensations was 13% and 15%, respectively, three weeks after mastectomy and 13% and 12%, respectively, after a year. Six years later, the incidence remained remarkably constant at 17% and 12%, respectively, in 69 of the same women (Kroner, Knudsen, Lundby, & Hvid, 1992). Age did not affect the occurrence of phantom pain, nor did early or late postoperative sequelae or radiation therapy.

To date, only two studies exist in the literature that compare the morbidity seen in SLNB and axillary lymph node dissection. The first study examined arm circumference, subjective lymphedema, pain, numbness, arm strength, mobility, and stiffness (Schrenk, Rieger, Shamiyeh, & Wayand, 2000). The study evaluated 35 patients for each surgical procedure 4–28 months postsurgery. Results showed a significantly higher rate of subjective lymphedema, pain, numbness, and decreased arm mobility in patients following axillary lymph node dissection compared with SLNB. Patients also had significant increases in the upper and forearm circumferences of the operated arm following axillary lymph node dissection. No difference between the two groups was evident with regard to arm stiffness or arm strength.

In the second study, patients who had undergone SLNB (n = 144) reported one month after surgery significantly less pain, arm swelling, arm numbness and tingling, limitation in arm and shoulder movement, and seromas requiring aspiration than patients who had axillary lymph node dissection. Six months later, patients who had undergone SLNB reported significant reductions in pain, arm swelling, and arm numbness and tingling (Swenson, Nissen, Ceronsky, & Tuttle, 2001).

Little is known about the impact of sensations in patients who undergo SLNB. The purpose of this study was to evaluate prevalence, severity, and level of distress of 18 sensations in a large population at 3–15 days (baseline), three (± 1) months, six (± 1) months, 12 (± 2) months, and 24 (± 3) months after breast cancer surgery. Patients who had undergone SLNB as their only axillary procedure were compared with patients who had SLNB with immediate or delayed axillary lymph node dissection. An axillary lymph node dissection usually is indicated if the sentinel node is positive for malignancy. This article includes data collected over the six-month follow-up period. The 12- and 24-month data will be presented at a future time when patient follow-up is complete.

This study also included further evaluation of the reliability and validity of the Breast Sensation Assessment Scale© (BSAS©), the instrument used to measure the prevalence, severity, and level of distress of patient sensations.

Methods

Sample and Setting

Two hundred eighty-three patients had completed baseline, three-month, and six-month questionnaires by

March 2001. Researchers recruited patients between November 1999 and November 2000 at the Evelyn H. Lauder Ambulatory Breast Center at Memorial Sloan-Kettering Cancer Center (MSKCC) in New York City. Eligible patients included those who

- Had undergone SLNB alone
- Had undergone SLNB with total mastectomy (with or without immediate reconstruction)
- Had undergone SLNB with breast-conserving treatment
- Had any of the above three surgeries followed by either an immediate or delayed axillary lymph node dissection
- Were at least 18 years old.

Patients were excluded if they had undergone breast-conserving treatment or total mastectomy without SLNB. To avoid variables that may have confounded patient responses, patients also were excluded if they had had surgery for a prior breast cancer, bilateral breast surgery, or preoperative chemotherapy.

Instrument

Researchers measured sensations using the **BSAS©,** an instrument that demonstrated adequate reliability and validity in a pilot study (Baron et al., 2000) (see Figure 1). The BSAS© was used to measure the prevalence (i.e., presence or absence) of 18 sensations. Patients used Likert-type scales to rate the severity (on a 1–4 scale) and level of distress (on a 0–4 scale) for each sensation reported. An additional question measured the prevalence of phantom sensations in patients following mastectomy.

The reliability of the instrument also was reevaluated. When testing for interitem reliability in the pilot study, 18 sensations fell into four distinct subscales that had high internal consistency and a clinically rational relationship to one another. The four subscales—discomfort, mobility, paresthesias, and piercing (formerly referred to as lancinating)—were based on the types of sensations clinically described within each subscale (Baron et al., 2000). To ensure that the subscales in the BSAS© were stable, the item reliability of the BSAS© was retested. Cronbach's alpha coefficient was assessed for the total sample (n = 283) at baseline. The criteria for acceptable reliability was set at greater than 0.70 (Nunnally, 1978). To assess test-retest reliability, researchers identified 30 patients who met the eligibility criteria and were five to seven months following axillary surgery. These 30 patients completed the survey on two separate occasions, one week apart. The test-retest reliability was assessed using Pearson's correlation coefficient.

Fisher's exact test was used to compare the proportion of each group (SLNB versus axillary lymph node dissection) reporting individual sensations and high levels of severity and distress at different points in time. Student's t test was used to determine statistically significant difference of age in the SLNB and axillary lymph node dissection groups.

Procedure

After the institutional review board at MSKCC approved the study, a full-time research assistant identified eligible patients and recruited them in person during their initial postoperative visit. After providing an explanation of the study and obtaining written informed consent, the research assistant gave the BSAS© to patients and explained how to complete it. The patients completed the instrument during that visit. The research assistant then reviewed the instrument in person with the patients to ensure accuracy and completeness. Patients also completed a form requesting information on their demographic profile, type and side of surgery, type of reconstruction (if applicable), and side of their dominant hand. The research assistant reviewed the medical records and completed a form that documented the stage of disease and the number and status (positive or negative) of nodes removed.

Subsequent questionnaires were mailed to patients two and five months following their surgery, along with a form to ascertain treatment information (e.g., chemotherapy, radiation) and status of breast reconstruction, if applicable. If the questionnaire was not returned one month after it was mailed, the research assistant made a reminder phone call. The questionnaire then had to be returned within one month or researchers considered the data for the time period ineligible. If the reminder call elicited no response, the research assistant asked patients at their next appointment if they wished to continue in the study. The research assistant contacted patients by telephone up to five times to obtain missing data. In the end, less than 1% of the items on the mailed questionnaires remained unanswered.

Patients who had to return to the operating room for a delayed axillary lymph node dissection because of the identification of a positive SLNB completed a second baseline questionnaire 3–15 days after the second surgical procedure. Researchers re-

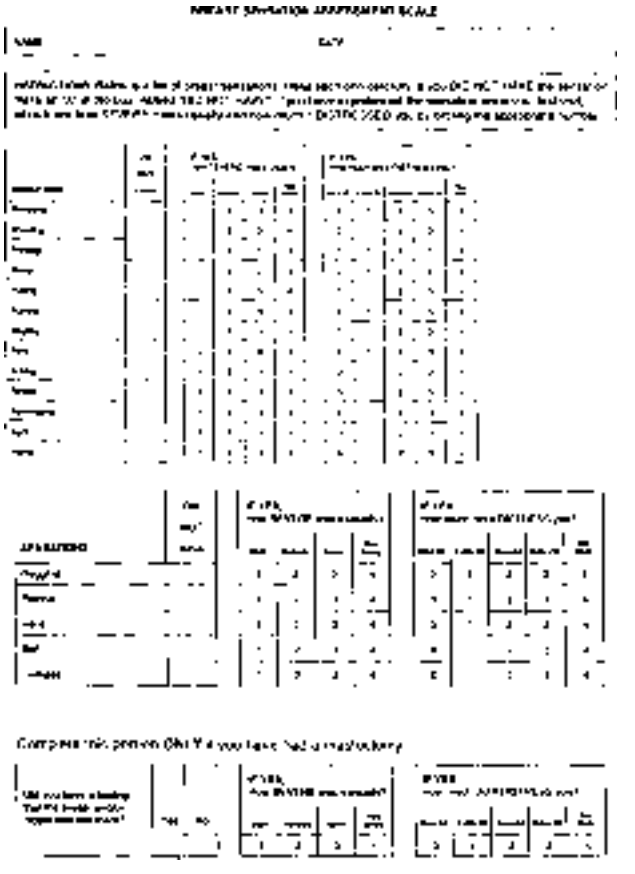

Figure 1. Memorial Sloan-Kettering Cancer Center Breast Sensation Assessment Scale©

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Table 1. Characteristics of the Patient Sample

	SNLB		ALND	
Characteristic	**n**	**%**	**n**	**%**
Married	128	68	68	71
Caucasian	162	87	79	83
Type of surgery				
Breast-conserving treatment	149	80	55	57
Total mastectomy	38	20	41	43
Stage of disease				
0 (ductal carcinoma in situ)	27	15	–	–
I	139	74	8	8
II	21	11	87	91
III	–	–	1	1
Characteristic	**$\bar{x}$**	**Range**	**$\bar{x}$**	**Range**
Age	58	27–84	54	32–85

SLNB—sentinel lymph node biopsy (N = 187); ALND—axillary lymph node dissection (N = 96)

moved the results of their first questionnaire from data analysis. The date of the second surgical procedure served as the new baseline date for completion of future questionnaires.

Results

Sample

A total of 630 patients were eligible for the study. Although the intent was to approach every eligible patient consecutively, this was not always feasible. Of the 630 eligible patients, 444 were offered the opportunity to enroll in the study. Of those, 399 patients enrolled and 45 refused. Of the 186 who did not participate, 92 were missed because of staffing difficulties, 61 had either a late postoperative appointment (beyond the 15 days) or none at all, 25 did not speak English, and 8 had miscellaneous reasons (e.g., car accident, heart attack). Of the 399 enrolled patients, 49 had not yet reached their six-month follow-up, 35 did not return the three-month questionnaire, and 18 did not return the six-month questionnaire within the required time, which led to a dropout rate of 13% at six months. Fourteen patients were eliminated when researchers recognized that they did not meet eligibility requirements. The following are the results of the remaining 283 patients who completed the questionnaire at 3–15 days (baseline) and at three and six months.

The clinical and demographic characteristics of the study population are shown in Table 1. Almost twice as many patients had SLNB as had axillary lymph node dissection, and most of these patients had early-stage breast cancer. The majority of patients in both the SLNB and axillary lymph node dissection groups were married and Caucasian. Patients who had SLNB were significantly older ($p = 0.01$) than those who had axillary lymph node dissection.

Sensations

Overall prevalence of sensations was determined using percentages of patients reporting the sensation as "present." Table 2 compares the prevalence rates of SLNB and axillary lymph node dissection at baseline, three months, and six months. Most sensations were less prevalent in patients who had SLNB. P values were recorded only for significant differences ($p < 0.01$). At baseline, both populations reported tenderness and soreness as the two most prevalent sensations. At three and six months, tenderness remained the most prevalent in the patients who had undergone SLNB whereas numbness became the most prevalent in patients who had undergone

Table 2. Prevalence of Individual Sensations at Baseline, Three Months, and Six Months After Surgery

	Baseline		Three Months		Six Months	
Sensation	**SLNB %**	**ALND %**	**SLNB %**	**ALND %**	**SLNB %**	**ALND %**
Tender	88	90	64	54	55	51
Sore	81	88	51	56	46	45
Pull	60	76	40	58*	35	52*
Pain	59	75*	24	30	27	30
Ache	58	73	28	40	31	45
Twinge	58	60	43	50	50	54
Tight	55	80**	39	69**	35	65**
Stiff	47	70**	24	46**	18	46**
Prick	43	47	36	31	30	39
Throb	41	40	19	24	23	27
Shoot	40	45	36	39	37	39
Numb	37	78**	43	78**	39	81**
Burn	36	44	25	20	17	15
Tingling	35	53*	29	49*	34	38
Hard	34	35	42	43	36	44
Sharp	34	46	24	33	27	38
Nag	24	34	13	14	12	22
Penetrate	20	18	11	14	12	17

SLNB—sentinel lymph node biopsy (N = 187); ALND—axillary lymph node dissection (N = 96)
* $p < 0.01$
** $p < 0.001$

axillary lymph node dissection. At all three time points, patients who had undergone axillary lymph node dissection reported significantly more tightness, numbness, and stiffness than those who had undergone SLNB. At baseline, patients who had undergone axillary lymph node dissection also reported significantly more pain.

Four patients experienced no sensations at baseline. These patients all had breast-conserving treatment and SLNB. Two of these patients developed sensations at three months. At three months, 13 patients had no sensations. Twelve of the 13 patients had undergone breast-conserving treatment and SLNB, and one patient had undergone breast-conserving treatment and axillary lymph node dissection. None of these 13 patients developed sensations at six months. At six months, 25 patients had no sensations. Twenty-four of these patients had undergone breast-conserving treatment and SLNB, and one patient had undergone breast-conserving treatment and axillary lymph node dissection.

Researchers also examined the incidence of phantom sensations in those women who had mastectomies. Of the 79 patients who had a mastectomy, at baseline 29 (37%) reported continuing to feel the breast or nipple. At three months, 30 (38%) patients had these sensations, and at six months, 28 (35%) had them. Each time point, however, did not always include the same patients. Some patients experienced phantom sensations only at baseline whereas others developed them for the first time at three and even six months.

The severity of each sensation (see Table 3) and the level of distress that it caused (see Table 4) were determined using the percentages of patients reporting the sensation as "severe" or "very severe" and as causing "quite a bit" or "very much" distress. At baseline, numbness, stiffness, and tingling were significantly more severe and tightness and stiffness were significantly more distressing in the axillary lymph node dissection group ($p \leq 0.01$) than in the SLNB group. At baseline, both groups reported tenderness, soreness, tightness, and numbness as being most severe (see Figure 2). These sensations also were among the most distressing to patients at each of the three time points (see Figure 3).

Instrument

Researchers completed further evaluation of the reliability and validity of the instrument. The 18 sensations continued to fall into the same four groups as in the pilot study. Cronbach's alpha coefficients for the subscales were even higher than were those in the pilot study (see Table 5), thus demonstrating the item reliability of the BSAS©. In addition, test-retest correlations for the four subscales and summary score (an average of the four subscales) were acceptable in 25 of the 30 patients (SLNB = 15, axillary lymph node dissection = 10) who completed the survey twice (see Table 6).

Discussion

Findings from this study demonstrated that although the overall prevalence, severity, and level of distress of sensations were lower in SLNB compared with axillary lymph node dissection at baseline and at three and six months, some associated morbidity exists with SLNB. Two sensations related to discomfort (e.g., tenderness, soreness) remained highly prevalent at all three time points in the SLNB group. They also were the two most severe and distressing sensations reported in the SLNB group at baseline. Although the current study's findings show significant differences in postoperative experience of sensations between the two patient groups, they also demonstrate many similarities. Both groups reported similar sensations as being the most prevalent, severe, and distressing at baseline. And for many sensations, no significant difference was seen between SLNB and axillary lymph node dissection. With regard to discomfort, the two other studies that compared SLNB with axil-

Table 3. Percentage of Women Reporting Sensations as "Severe" or "Very Severe" at Baseline, Three Months, and Six Months After Surgery

Sensation	Baseline		Three Months		Six Months	
	SLNB	ALND	SLNB	ALND	SLNB	ALND
Sore	24	32	7	12	5	7
Tender	24	34	9	9	8	10
Numb	17	40**	13	33**	10	31**
Tight	16	29	9	21*	4	17**
Pull	13	23	6	13	6	13
Ache	13	23	4	4	5	6
Burn	10	16	5	4	3	2
Hard	10	12	12	9	5	12
Pain	10	19	5	5	4	8
Sharp	9	17	4	12	4	7
Stiff	9	26**	5	9	3	9
Prick	8	13	1	7*	3	6
Twinge	8	13	2	5	3	7
Shoot	7	13	3	9	3	5
Penetrate	7	6	1	4	2	6
Throb	5	10	1	1	1	3
Tingle	5	17*	2	4	2	5
Nag	5	13	3	1	1	3

SLNB—sentinel lymph node biopsy (N = 187); ALND—axillary lymph node dissection (N = 96)
* $p < 0.01$; ** $p < 0.001$

Table 4. Percentage of Women Reporting Sensations as "Quite a Bit" or "Very" Distressing at Baseline, Three Months, and Six Months After Surgery

	Baseline		Three Months		Six Months	
Sensation	SLNB	ALND	SLNB	ALND	SLNB	ALND
Sore	14	25	7	8	5	10
Tender	14	25	6	7	8	9
Tight	12	27*	8	15	4	14*
Ache	11	17	5	2	5	8
Numb	11	21	5	16*	6	17*
Pull	10	16	4	9	5	12
Pain	9	20	5	4	5	8
Hard	8	6	8	5	4	12
Stiff	8	21*	3	8	2	9*
Burn	8	15	4	4	2	3
Prick	6	4	1	3	3	5
Sharp	6	15	3	12*	4	7
Shoot	5	8	2	8	3	5
Penetrate	5	6	2	3	2	5
Nag	5	8	3	1	2	5
Throb	4	10	1	1	2	3
Twinge	4	6	1	3	1	6
Tingle	3	9	1	1	2	4

SLNB—sentinel lymph node biopsy (N = 187); ALND—axillary lymph node dissection (N = 96)
* $p \leq 0.01$

lary lymph node dissection obtained information on pain only. Swenson et al. (2001) reported significantly less pain reported at one and six months postoperatively by patients who had undergone SLNB than by patients who had axillary lymph node dissection. Schrenk et al. (2000) also found significant differences between test results at four months and 28 months.

In the current study, pain was significantly lower at baseline ($p = 0.009$) in patients who underwent SLNB, but the difference was not statistically significant at three and six months. By obtaining information on a variety of pain-like descriptors, researchers were able to gain a more thorough understanding of the patients' experience with discomfort after surgery than if

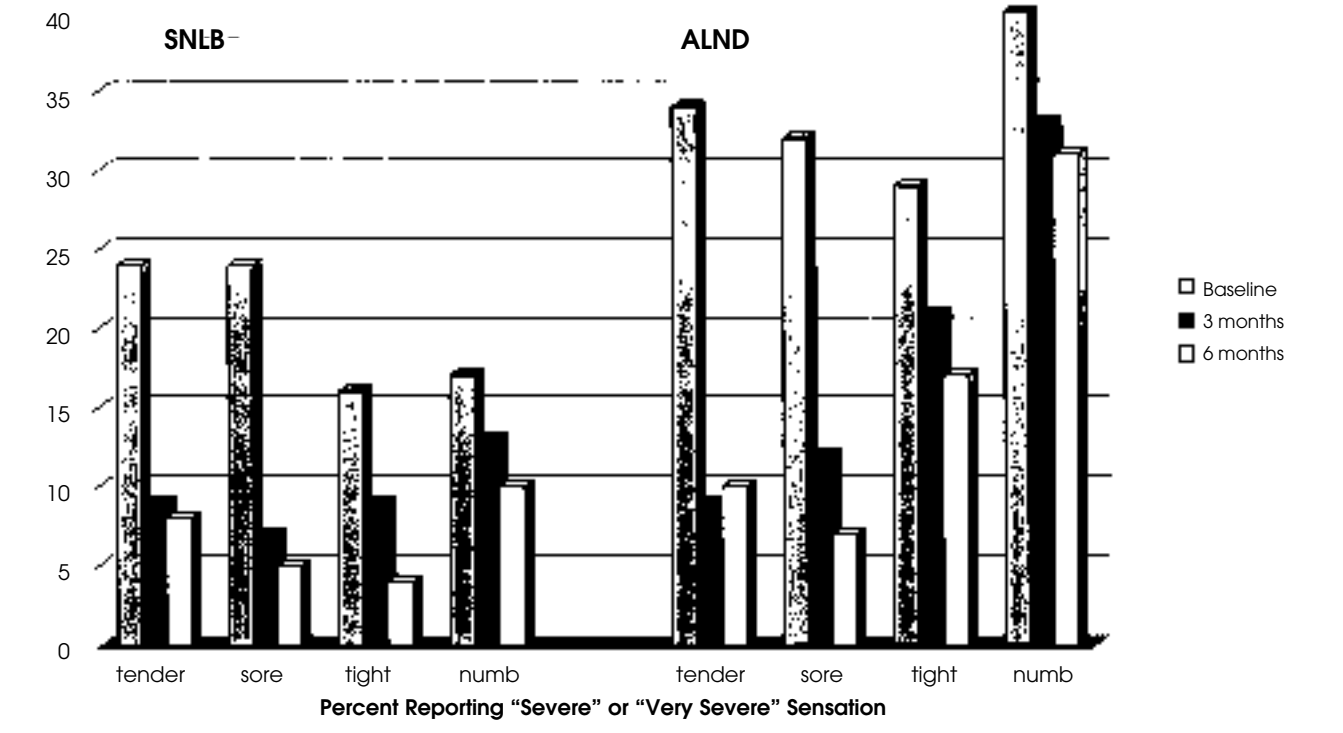

Figure 2. Severity of Sensations at Baseline, Three Months, and Six Months: Comparison of Sentinel Lymph Node Biopsy and Axillary Lymph Node Dissection

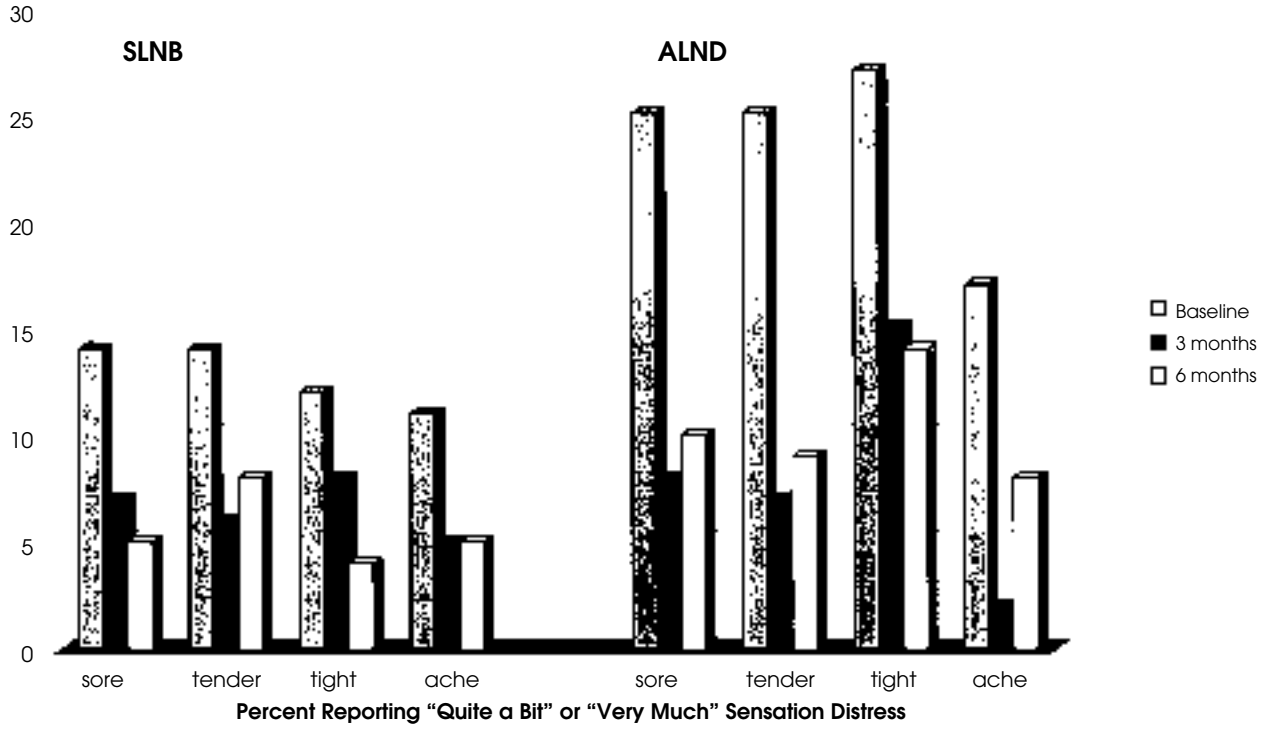

Figure 3. Level of Distress From Sensations at Baseline, Three Months, and Six Months: Comparison of Sentinel Lymph Node Biopsy and Axillary Lymph Node Dissection

they had just asked about pain. All three studies showed significantly more numbness in the patients who had undergone axillary lymph node dissection. Schrenk et al. (2000) found no significant difference between the two groups in terms of arm stiffness, whereas this study found a significant difference at all three time points. Although these findings demonstrate some similarities and some differences among the three studies, an exact comparison is difficult to make. Although all three studies followed patients prospectively, this study used different time points and different mechanisms of obtaining information that could play a role in the variation of patient responses. This study also was the only one to use a validated instrument.

All patients who reported no sensations at all three time points had undergone breast-conserving treatment with SLNB. In addition, one patient who had breast-conserving treatment and axillary lymph node dissection had no sensations at three months, and another who had breast-conserving treatment and axillary lymph node dissection had no sensations at six months. These findings demonstrate a benefit with regard to postoperative sensations in patients who have breast-conserving treatment with SLNB.

The percentage of phantom breast sensations in this study was similar to the findings in the pilot study (34% within the first month after surgery) (Baron et al., 2000). Kroner et al. (1992) reported a lower incidence of 26% at three weeks after surgery, 25% at one year after surgery, and 26% six years later. This study's incidence also may decrease over time.

The BSAS© represents the first effort to develop a psychometrically validated instrument to evaluate patients who have undergone axillary surgery. The item generation and subsequent statistical reduction were methodologically rigorous. The instrument has acceptable item reliability as demonstrated in the pilot study (Baron et al., 2000) and reconfirmed in this study. In addition, the instrument has been

Table 5. Comparison of the Breast Sensation Assessment Scale© Subscale Alpha Coefficients in the Current and Pilot Studies

		Alpha Coefficients			
		Current Study		Pilot Study	
Subscale	Sensations	Severity	Distress	Severity	Distress
Discomfort	Throbbing, sore, aching, tender, painful, numb	0.83	0.87	0.73	0.79
Mobility	Pulling, tight, hard, stiff	0.79	0.81	0.73	0.75
Paresthesias	Pricking, burning, tingling, twinges	0.72	0.69	0.60	0.65
Piercing	Shooting, sharp, penetrating, nagging	0.77	0.82	0.68	0.67

Table 6. Test-Retest Reliability Correlations for the Subscales and Summary Score

Subscales	Correlation Coefficient* (n = 25)
Discomfort	0.924
Mobility	0.795
Paresthesias	0.823
Piercing	0.773
Summary	0.906

* p = 0.01

demonstrated to have good test-retest properties. Because no gold standard exists with which to compare the BSAS©, validation of the BSAS© is demonstrated through construct validity (Aday, 1996; McDowell & Newell, 1996). This instrument demonstrates construct validity in that it can detect differences between patients with SLNB and axillary lymph node dissection. In addition, the instrument appears to maintain its sensitivity over time since surgical procedure, in that the prevalence, severity, and level of distress decrease with time following both SLNB and axillary lymph node dissection. Further construct validation may include correlating the BSAS© scores of patients with quality-of-life measures. Although validation will be an ongoing process, the current study's researchers believe that the BSAS© has demonstrated sound psychometric properties and should be incorporated into prospective trials.

Researchers made every effort to ensure that patients were not lost to follow-up. For patients who agreed to participate, the response rate was 87%. This demonstrates efforts to obtain a complete data set. This survey's response rate exceeds the minimum of 70% that is considered acceptable for the validity of surveys (Aday, 1996; Salant & Dillman, 1994).

Limitations

Patients did not identify the exact location of the sensations (i.e., axilla or breast). Researchers attempted to ask this in the pilot study, but patients felt that it was time-consuming and difficult to specify. In retrospect, however, this information would be beneficial to help gain a better understanding of how much of an impact the actual breast surgery (total mastectomy versus breast-conserving treatment) has on postoperative sensations. Researchers also did not obtain information on the infection rate, which may have an impact on patients' responses to certain sensations. The sample size consisted predominately of Caucasian married women, thus limiting generalization to all demographic groups.

Implications for Nursing

Although sensations are less prevalent following SLNB, they still are present. Nurses should become familiar with the prevalent sensations after both SLNB and axillary lymph node dissection so they can more accurately explain to patients what they can expect postsurgery. Providing this information could help alleviate unnecessary patient anxiety and distress and avoid misconceptions. Nurses also should reinforce this information during postoperative visits. This not only validates which sensations are a normal and expected part of the healing process but often encourages patients to discuss their feelings and experiences. Nurses can use the BSAS© to evaluate prevalence, severity, and level of distress of sensations with their own patients. Patients who undergo mastectomy should be prepared for the possibility of phantom sensations. They may be particularly hesitant or embarrassed to discuss phantom sensations, yet, inwardly, they often are very concerned and upset by them. Patients also can be educated regarding factors that may provide relief from the sensations, including position change, medication, and rest (Baron et al., 2000).

Future Directions

Thus far, this study has produced results on 283 patients who have completed the BSAS© at 3–15 days and three and six months after surgery. Researchers will learn much more information as the study progresses and the data are analyzed at the 12- and 24-month periods. Further analysis will be performed on specific variables (e.g., chemotherapy, radiation, breast reconstruction, patient age) that may influence individual sensations. Research also should investigate the impact of mastectomy versus breast-conserving treatment on sensations reported after axillary surgery.

Conclusions

The overall prevalence, severity, and level of distress of postoperative sensations were lower following SLNB when compared with axillary lymph node dissection at 3–15 days and three and six months after surgery. Certain sensations, however, remained prevalent, severe, and distressing following SLNB. Nurses must have knowledge about these sensations to provide accurate education and support to patients both preoperatively and postoperatively. The BSAS© demonstrates acceptable reliability and preliminary validity and may be used by nurses in their clinical practice to evaluate sensations.

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  www.y-me.org
- National Breast Cancer Coalition
  www.natlbcc.org
- Susan G. Komen Breast Cancer Foundation
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