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## Disorders of the upper limb on the operated side of the breast in women surgically treated for breast cancer

Marcin Rząca<sup>1</sup>, Krzysztof Sołowiej<sup>2</sup>, Sergiusz Łukasiewicz<sup>2</sup>, Andrzej Stanisławek<sup>1</sup>,  
Paweł Węgorowski<sup>1</sup>

<sup>1</sup> Department of Oncology, Chair of Oncology and Environmental Health, Medical University of Lublin, Poland

<sup>2</sup> Department of Oncological Surgery, Center of Oncology of the Lublin Region St. Jana z Dukli in Lublin, Poland

### Summary

**Admission:** Breast cancer is a cancer whose incidence is steadily increasing in the developed countries as well as in Poland. Treatment includes surgical treatment, which is the primary method of treatment, but give complications.

**The goal of the work** It is to present the disorders occurring limb on the operated side of the breast in women surgically treated for breast cancer

**Material and methods:** The study involved 151 women surgically treated for breast cancer (T<sub>1-4</sub> N<sub>0-3</sub> M<sub>0</sub>) in the Oncology Center of the Lublin Region St. John of Dukla in Lublin in 2013-2015.

**Results** Disorders manifesting various symptoms arising as a consequence of surgery limb occurred in more than half of all patients (60%). Secondary lymphedema after 6 months occurred in 29 women (19.2%). The limb on the operated breast tingling was observed in 32% of patients, numbness in 24% of patients, heaviness limbs in 15% of patients, limb sensation spreading in 15% of patients, ache in 30% of patients. Discomfort limb armpit and accompanied by 21% of respondents.

**Conclusions:**

1. The frequency of combining elderly disorders on the side of the operated breast is high.
2. Disorders upper limb on the operated side breast are more common if done axillary lymph nodes dissection.
3. Disorders upper limb on the operated side breast occur more frequently if there is secondary lymphedema.

**Keywords** Breast cancer, complications, surgery, upper extremity

**Introduction**

Breast cancer is a cancer whose incidence is steadily increasing in the developed countries as well as in Poland. Treatment is often associated combination therapy. I embrace that basic surgical method plus radiotherapy, chemotherapy and hormone therapy. Each treatment method has drawbacks, which also include complications after treatment.

Surgical treatment of breast cancer currently involves surgery within the breast as well as regional (axillary) lymph nodes. Surgery should be an utter oncologically. Within the chest treatment consists in removing the part of the breast (BCS) or the entire breast – mastectomy (AMP), while within the regional lymph nodes there is excision of the whole group of lymph nodes (axillary lymph node dissection ALND) or the removal of only a few sentinel nodes (SNLB). A compulsory element conserving therapy is adjuvant to radiation therapy, chemotherapy and hormonal therapy [1,2,3]. Among the complications of surgical treatment are mentioned typical surgical wound dehiscence, inflammatory condition, bleeding from the wound but also damage to the nerves and the lymphatic system, by violating their continuity. As a consequence, surgical patients may lead to the formation of secondary lymphedema and paresthesia. Their scope and intensity often depends among other things on the extent of the operation. For as a result of the removal of the lymph nodes of the armpit increases the likelihood of secondary lymphedema, which in addition to increased reserve the arm, forearm and hand may contribute to the occurrence of other symptoms including deformed limbs, tingling sensations (numbness), heaviness limbs, limb spreading feelings, discomfort, pain or skin changes. Appearing may also limit the mobility of the limbs. Their occurrence can reduce the efficiency of the patient resulting in hindering the daily life and operation of [4,5,6].

**The aim of the study** is to present limb disorders occurring on the side of the operated breast in women surgically treated for breast cancer depending on the type of surgery, the fact of lymphedema and the scope of intervention in the lymphatic system.

### **Material and methods**

In a study conducted in the years 2013-2015 was attended by 151 women treated for breast cancer (T<sub>1-4</sub> N<sub>0-3</sub> M<sub>0</sub>) in the Department of Surgical Oncology at the Oncology Center of the Lublin Region named St. John of Dukla, in Lublin. Tumor stage I (46%), II (42%), III (12%). Breast-conserving surgery was made 50% of women, amputation, also 50%. Sentinel lymph node biopsy was 59% of women and 41% of lymphadenectomy. The majority (68%) had no lymph node metastases (N0). Tumor size: T1-59%, T2-36%, T3-4, T4-1%. The majority (77%) tumors were located in the upper outer quadrant. Examined women lived in east - southern Poland, the Lublin area. The average age of women was 59.3 ± 10.1 years, mean BMI 27.4 ± 5.1 kg/m<sup>2</sup>. Induction treatment: chemotherapy: 13%. Adjuvant therapy: 65% of chemotherapy, radiotherapy, 68%, 54% hormonal therapy. Used according to the statistics evaluation and the qualitative and quantitative analysis was performed (Chi<sup>2</sup>, Spearman correlation R) based on the Statistica 10.0 PL. Research on bioethical committee agreed.

### **Results**

Assessing the frequency of common disorders associated women following breast surgery were used presented below variables. Secondary Lymphedema observed on the basis of the measurements for 29 of 151 patients (19.2%). The measurement was carried out before surgery and 6 months after surgery. The increase in limb circumference of at least 2 cm was treated as lymphedema. The measurements were made by one person scoop centimeter.

### **Disorders of the upper limb on the operated side and the type of breast surgery performed**

Each woman was made simultaneously at intervention in the breast and in the lymph system. Are carried out in four kinds of treatments (BCS+SNLB, BCS+ALND, AMP+SNLB, AMP+ALND, wherein: the breast conserving treatment: BCS, mastectomy: AMP, sentinel lymph node biopsy: SNLB, axillary lymph nodes dissection: ALND).

Limb deformities occurred in 5% of all respondents. The invasive procedure was more (especially a place lymphadenectomy), the deformation appearing more frequently, the relationship was not statistically significant ( $p = 0.26$ ). The occurrence of tingling, numbness any portion of the limb on the operated breast was observed in 32% of patients. Most occurred after chemotherapy. No significant statistical relationships ( $p=0.44$ ) relative to the occurrence of tingling, numbness in relation to the applied surgery. Heaviness limb on the operated breast was observed in 15% of patients. With the growth of invasive surgery feeling it was found more often, the relationship was not statistically significant, but it occurred to her tendency ( $p=0.07$ ). Spreading feeling in the limb on the operated breast was observed in 15% of all patients. This feeling is more common with increasing the invasiveness of the procedure, this correlation was statistically significant ( $p < 0.04$ ). Unpleasant experience discomfort in the leg on the side of the operated breast occurred in 21% of all respondents. Along with the increase in invasive surgery (especially in the lymphatic system) discomfort appeared frequently correlation was statistically significant ( $p < 0.02$ ). Pain in the limb on the side operated breast was present in 30% of the women. Pain occurred in the examined after each treatment, usually after breast conserving surgery combined with ALND (43%). No statistical significant correlation ( $p = 0.35$ ). Change occurred on the skin of 4% of all respondents. Often appear in patients with ALND performed, the relationship was not statistically significant ( $p=0.38$ ); Table 1, Figure 1.

Tab. 1 The incidence of symptoms in the test depending on the type of surgery performed

After surgery on the side of the operated breast:	Altogether		BCS + SNLB n = 53		AMP + SNLB n = 36		BCS + ALND n = 23		AMP + ALND n = 39		$\chi^2$	p
	n	%	n	%	n	%	n	%	n	%		
Deformation of upper limbs	7	5%	1	2%	1	3%	1	4%	4	10%	3.98	0.26
Tingling, numbness	49	32%	13	25%	14	39%	9	39%	13	33%	2.68	0.44
Heaviness limbs	23	15%	6	11%	4	11%	2	9%	11	28%	6.95	0.07
Feeling spreading in limb	22	15%	5	9%	3	8%	3	13%	11	28%	8.12	<0.04
Discomfort in upper limb	32	21%	6	11%	5	14%	8	35%	13	33%	10.23	<0.02
Pain in extremity	45	30%	13	25%	12	33%	10	43%	10	26%	3.3	0.35
Skin lesions	6	4%	0	0%	1	3%	2	9%	3	8%	5.09	0.17

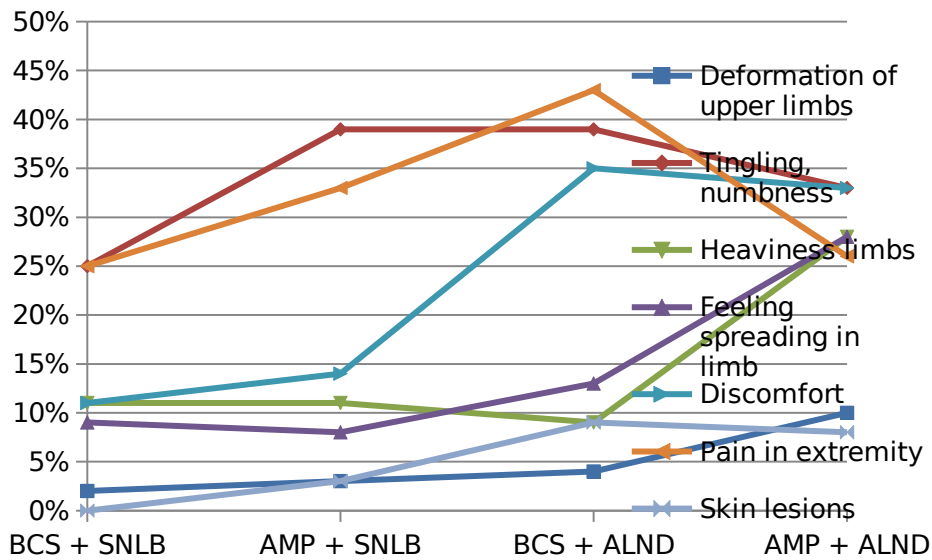


Fig. 1 Percent of symptoms in the test depending on the type of surgery performed

### Disorders of the upper limb on the operated side and the occurrence of breast lymphedema

The negative effects of the treatment were more frequent in patients, among which occurred lymphedema. Significant differences occurred in patients with and without lymphoedema most common deformity (18% vs. 2%;  $p < 0.0003$ ), heaviness upper limb (38% vs. 10%,  $p < 0.0002$ ), feelings spreading in a limb (38% vs. 12%,  $p < 0.03$ ) and discomfort (38% vs 17%,  $p < 0.01$ ); Table 2, Figure 2.

Tab. 2, the incidence of symptoms in the test and the occurrence of secondary lymphedema

Disorders after surgery on the side of the operated breast	lymphoedem a NO		lymphoedem a YES		$\chi^2$	p
	n	%	n	%		
Deformation of upper limbs	2	2%	5	18%	12.90	<0.0003
Tingling, numbness	38	31%	11	38%	0.49	0.48
Feeling of heaviness in the limbs	12	10%	11	38%	14.32	<0.0002
Spreading feeling in the limb	14	12%	8	28%	4.89	<0.03
Discomfort in upper limb	21	17%	11	38%	6.02	<0.01
Pain in extremity	33	27%	12	41%	2.30	0.13
Skin lesions	4	3%	2	7%	0.80	0.37

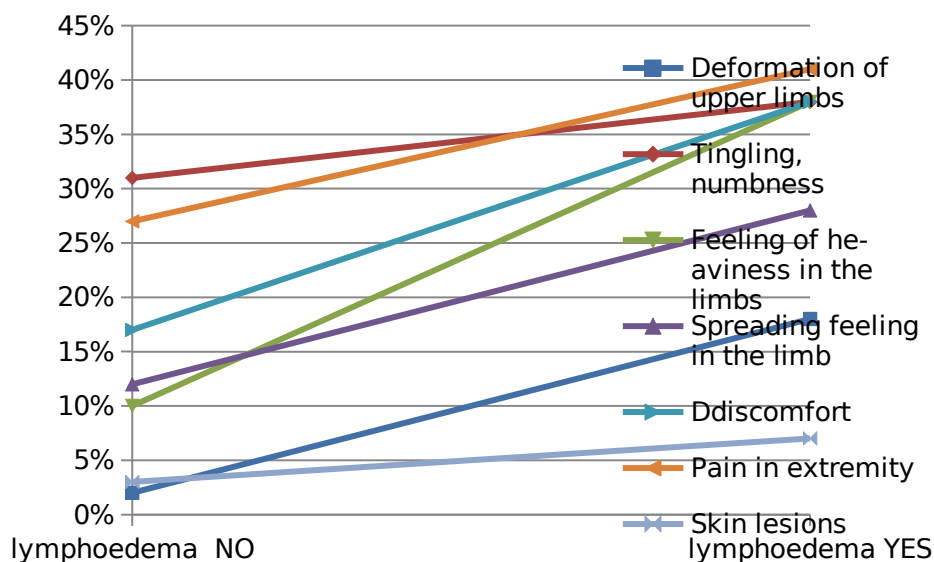


Fig. 2 Percentage of symptoms in the test and the occurrence of lymphedema

### Disorders of the upper limb on the operated side breast and the number of removed axillary lymph nodes (ALN)

With the increase of surgical intervention in the lymphatic system, often observed change in shape of the limb (deformation). relationship to positive and statistically significant ( $R=0.17$ ,  $p < 0.04$ ). Deformations occurred most often when removed was  $>10$  ALN (11%). There was no association with respect to the occurrence of tingling, numbness limb and scope of surgical intervention in the lymphatic system ( $R=0.02$ ,  $p=0.83$ ).

Heaviness limb appeared in the examined women more frequently the more were removed ALN ( $R=0.17$ ,  $p < 0.04$ ). Statistically significant correlation. Heaviness limb occurred in 31% of patients who were removed  $> 10$  ALN. A clear correlation statistical relationship concerned that a feeling in spreading the limb of the number of deleted ALN ( $R=0.23$ ,  $p < 0.01$ ). The number of deleted ALN was higher, spreading the feeling in the limb frequently occurred, in 28% of the removed  $>10$  ALN. Discomfort limb on the operated breast was connected statistically significant correlation with the number of removed ALN ( $R=0.28$ ,  $p < 0.001$ ). There was a positive correlation, including increased range of surgical intervention in the lymphatic system increased incidence of discomfort. The occurrence of pain in the limb of examined women was not related to the size of surgical intrusion into the

lymphatic system ( $R=0.03$ ,  $p=0.72$ ). Skin lesions often appear when the number of deleted ALN been greater. Occurs and a positive correlation was statistically significant relative to the total number of deleted ALN ( $R=0.18$ ,  $p < 0.03$ ). Skin lesions were 9% of the removed 5-10 ALN and 8% of the removed  $>10$  ALN; Table 3, Figure 3.

Tab. 3 incidence of symptoms in the test depending on the number of lymph nodes removed

After surgery on the side of the operated breast:	The number of removed axillary lymph nodes (ALN)						R	p
	<5		5-10		> 10			
	n	%	n	%	n	%		
Deformation of upper limbs	2	2%	1	5%	4	11%	0.17	<0.04
Tingling, numbness	29	31%	9	41%	11	31%	0.02	0.83
Heaviness limbs	11	12%	1	5%	11	31%	0.17	<0.04
Feeling spreading in limb	8	9%	4	18%	10	28%	0.23	<0.01
Discomfort in upper limb	11	12%	8	36%	13	36%	0.28	<0.001
Pain in extremity	26	28%	9	41%	10	28%	0.03	0.72
Skin lesions	1	1%	2	9%	3	8%	0.18	<0.03

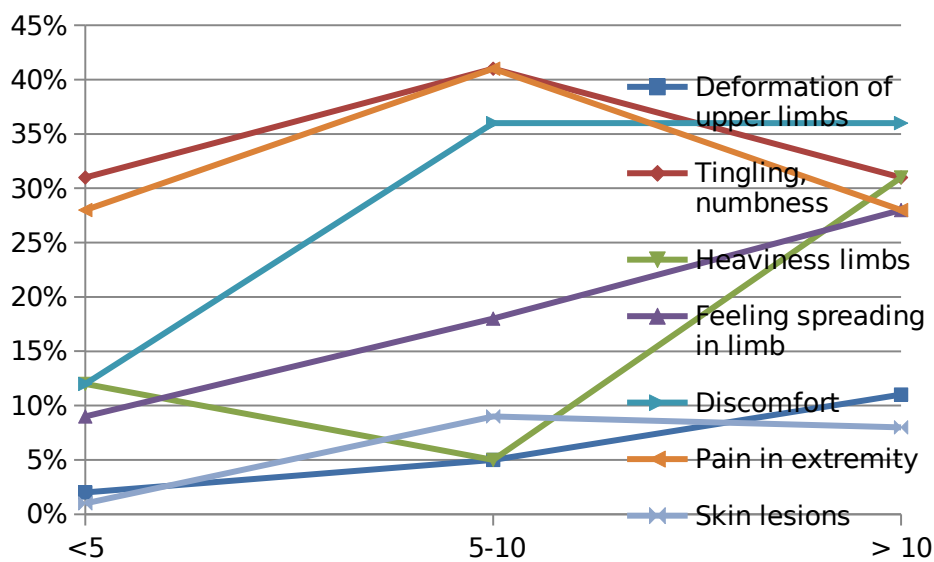


Fig. 3 Percentage of symptoms in the test depending on the number of lymph nodes removed

### **The occurrence of tingling and numbness in the limb and the fact that the use of adjuvant therapy chemotherapy (CHTH)**

Additionally, a study evaluating the relationship between the occurrence of pins and needles and the use of the fact CHTH completed. Tingling and numbness in the upper limb on the operated side breast occurred significantly more often in women treated CHTH than untreated (40% vs 19%p <0.01) Table. 4.

Tab. 4 The occurrence of tingling and numbness in the limb and the fact that the use of adjuvant treatment with chemotherapy

Tingling, numbness	adj. CHTH NO		adj. CHTH YES		$\chi^2$	P
	n	%	n	%		
Present symptoms	43	81%	59	60%	6.87	<0.01
Aabsent symptoms	10	19%	39	40%		

### **Discussion of the results**

Surgical complications and disorders as a consequence can be a lot. Some of them are unpleasant sensations, without the health risks to the patient and others may impede daily functioning. The occurrence of complications is determined by the type of treatment and its invasiveness.

### **Disorders of the upper limb on the side of the operated breast, as a consequence of anticancer treatment**

Disorders manifesting various symptoms arising as a consequence of surgery limb occurred in more than half of all patients (60%, n = 91), were significantly more frequent in women undergoing ALND than SNLB (71% and 53%, p <0.03). In our study, limb malformations observed, it concerned the 5% of all respondents. Most deformations occurred after the most invasive type of surgery AMP + ALND. With the removal of more of ALN was significantly more frequent occurrence of deformation. Deformations were more frequent in patients with lymphoedema than without swelling (18% vs. 2%), p <0.0003. In our study, tingling, numbness in the limb on the side of the operated breast was observed in 32% of



women, it is also the value observed by other researchers. Numbness of the upper limb took place in 41% of patients in research from KK Cheng et al. [7]. In studies Cleeland CS et al. numbness occurred within 24% of women with breast cancer [8]. In our study, no significant statistical relationships with respect to the occurrence of tingling, numbness and type of the surgical treatment. Also, there was no relationship between the number of deleted ALN. Tingling and numbness women slightly more often accompanied with swelling than without swelling (38% vs. 31%), the relationship was significant ( $p = 0.48$ ). In clinical study Sandra C et al. tingling also more common among subjects with lymphedema (35%) than without lymphedema (32%). Sandra C et al., also they indicated on the frequency of numbness of women 6 months after surgery. These occurred in 62% of subjects and in 70% of patients with lymphedema [9]. Wermuth MA et al. observed that numbness occurred significantly more frequently in the younger patients relative to older [10]. Chachaj A et al. observed that women with lymphedema (relative no lymphedema) is significantly more frequent tingling and numbness in the limbs (85% vs 48%) [1]. Presented in our study, depending on women living in eastern Poland seem to confirm the presented by other authors.

Often, tingling, numbness of the upper limb appeared not after surgery, but after chemotherapy which indicates its source. It turned out that the fact that the use of adjuvant chemotherapy significantly influence the frequency of pins and needles in the upper limb,  $p < 0.01$ . Tingling, numbness upper limb occurred in 19% of patients, which were not subjected to adjuvant chemotherapy and of 40% of the patients treated by this method. Significant relationship was observed with respect to other complementary methods.

Heaviness upper limb occurred in 15% of patients. This symptom appeared most often after most invasive surgery AMP+ALND (28% of them), but the type of operation performed did not determine that feeling significantly ( $p = 0.07$ ). Significant correlations exist between the number of deleted ALN and the occurrence of this symptom,  $p < 0.04$ , occurred most frequently on the removal of  $>10$  ALN. Heaviness upper limb several times more women accompanied with lymphedema of the absorbent than without (38% vs. 10%), this correlation was statistically significant,  $p < 0.00002$ . Spreading feeling in the limb occurred in 15% of patients. This symptom occurred significantly more frequently used with more invasive surgery, in particular comprising ALND ( $p < 0.04$ ). Significant statistical relationships combine well as the frequency spreading feeling in the limb of the number of deleted ALN ( $p$

<0.01). The frequency of this symptom grew along with the number of removed lymph nodes. Spreading feeling in the limb occurred significantly more frequently in women than without swelling of the swelling (28% vs 12%),  $p < 0.03$ . Discomfort limb armpit and accompanied by 21% of respondents Type of operation performed significantly affect the fact of discomfort, it was observed most frequently among patients undergoing BCS + ALND (35%) and AMP + ALND (33%). Also, the number of deleted ALN had a significant impact on the incidence of discomfort ( $p < 0.001$ ). Discomfort occurred in 12% of the removed <5 ALN, 36% of the removed ALN 5-10 and >10 ALN. Discomfort accompanied by a statistically significant test of lymphedema than without lymphedema (38% vs. 17%),  $p < 0.01$ . Some involved in the study, women also called symptoms as follows: "feeling overflow armpits", "discomfort at the change of weather", "tingling sensation in the limb", "feeling welts fodder", "small bumps under the skin". In our study, pain in upper limb on the operated breast it was observed in 30% of the respondents, it is close to the value received other researchers. In studies Cheng CC et al. pain occurred among 36% of patients in Singapore treated for breast cancer [7]. Cleeland CS in publications prevalence of pain among women treated for breast determined at 29% [8]. Bell RJ et al. increased incidences of pain after the surgical treatment of breast cancer of 45% of the surveyed in 1205 have had pain persists for at least three months, and of 80% of these pain occurred for at least 5 years [11]. Sandra C et al., indicated that the pain occurred 6 months after the operation, half of the respondents [9]. Wermuth MA et al. of the tested after 2-5 years from the surgical treatment of pain was observed to 30% of the patients [10]. In our study showed no significant correlation between the fact and the type of pain surgical treatment the pain of the most frequently performed surgical BCS + ALND and SNLB + AMP (43% and 33%),  $p=0.3$ . Schulze T et al. observed that pain was more prevalent among patients undergoing ALND (68%) than SNLB (16%) [12]. The own material there was no statistical relationships or trends between the number of deleted ALN, and by the fact of pain ( $p = 0.72$ ). In our study it indicated that the pain occurred more frequently in subjects with lymphedema than without lymphedema (41% vs 27%),  $p = 0.13$ . Also in the study Bell RJ et al. pain more frequent among respondents with secondary lymphedema [11]. The same relationship observed Sandra C. et al., in their studies [9]. Chachaj A et al. in a study conducted in the Lower Silesian Oncology Center in Wrocław (Poland) observed that women with edema significantly more likely to report the occurrence of pain from a limb (57% vs. 32%) and the operated breast (33% vs. 17%) [1]. In our study measured the intensity of pain

(VAS 1-10), patients indicating its presence and its average value was  $4.4 \pm 1.9$  (Min: 1 Max: 8). Pain most frequently performed sporadically, characterizing it tested often used the statement "to exchange weather" (n=6). Few examined to establish his character as "stabbing," "jerking". Skin lesions in their own material appeared after 6 months after surgery in 4% of all respondents, most often subjected to ALND (ALND+BCS - 9%, ALND+AMP - 8%). The greater the value observed Cheng CC et al. changes in the skin as a result of antitumour treatment of breast cancer were 19% of his patients [7]. The occurrence of skin lesions among subjects had a significant influence deleted number ALN ( $p < 0.03$ ). Together with the ALN removed more skin changes were more frequent (<5% ALN-1, 5-10 ALN-9%, >10% ALN-8%).

### **Conclusions**

1. The frequency of combining elderly disorders on the side of the operated breast is high.
2. Disorders upper limb on the operated side breast are more common if done axillary lymph nodes dissection.
3. Disorders upper limb on the operated side breast occur more frequently if there is secondary lymphedema.

### **Literature:**

1. Chachaj A, Małyszczak K, Lukas J i wsp.: Jakość życia kobiet z obrzękiem limfatycznym kończyny górnej po leczeniu raka piersi. *Współczesna Onkologia* 2007; 11: 444–448.
2. Reanalysis and results after 12 years of follow-up in a randomized clinical trial comparing total mastectomy with lumpectomy with or without irradiation in the treatment of breast cancer. *NEngl J Med.* 1995; Nov 30, 333, 22: 1456-1461.
3. Fisher B, Dignam J, Wolmark N, Mamounas E, et al.: Lumpectomy and radiation therapy for the treatment of intraductal breast cancer: findings from National Surgical Adjuvant Breast and Bowel Project B-17. *J Clin Oncol* 1998; Feb;16, 2: 441-452.
4. Gardas-Skowrońska A, Kułakowski A: *Onkologia. Podręcznik dla studentów medycyny*, Wydawnictwo Lekarskie PZWL, Warszawa 2003.
5. Passic SD, Newmann ML, Brennan M, Holland J: Psychiatric consultation for women undergoing rehabilitation for upper-extremity lymphedema following breast cancer treatment. *J. Pain Symptom Manage* 1993; 8, 226-233.
6. Tobin MB, Lacey HJ, Meyer L, et al.: The psychological morbidity of breast cancer – related arm swelling. *Psychological morbidity of lymphoedema. Cancer* 1993; 72: 3248-3252.

7. Cheng KKF, Devi RD, Wong WH, Koh C: Perceived symptoms and the supportive care needs of breast cancer survivors six months to five years post-treatment period. *Eur J Onc Nurs* 2014; 18: 3-9.
8. Charles S: Symptom Burden: Multiple Symptoms and Their Impact as Patient-Reported Outcomes. *J Natl Cancer Inst Monogr* 2007; 37: 16 – 21.
9. Hayes SC, Janda M, Cornish B, Battistutta D, Newman H: Lymphedema After Breast Cancer: Incidence, Risk Factors, and Effect on Upper Body Function. *J Clin Oncol* 2008; 26: 3536-3542
10. Warmuth MA, Bowen G, Prosnitz LR, Chu L, Broadwater G, Peterson B, Leight G, Winer EP: Complications of axillary lymph node dissection for carcinoma of the breast: a report based on a patient survey. *Cancer* 1998; Oct 1;83,7:1362-1368.
11. Bell RJ, Robinson PJ, Nazeem F, Panjari M, Fradkin P, Schwarz M, Davis SR.: Persistent breast pain 5 years after treatment of invasive breast cancer is largely unexplained by factors associated with treatment. *J Cancer Surviv* 2014; Mar.8, 1: 1-8.
12. Schulze T, Mucke J, Markwardt J, et al.: Long-Term Morbidity of Patients With Early Breast Cancer After Sentinel Lymph Node Biopsy Compared to Axillary Lymph Node Dissection. *Journal of Surgical Oncology* 2006; 93:109–119.