



MANIFESTATIONS OF POST-MASTECTOMY SYNDROME, PATHOLOGY OF THE BRACHIAL NEUROVASCULAR BUNDLE IN CLINICAL MANIFESTATIONS

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Resume: 89 women with post-mastectomy syndrome were examined. The study revealed that the majority (94%) of the examined patients had functional biomechanical and neurovascular disorders after radical antitumor treatment of breast cancer. After surgery, patients were found to have regional postural imbalance of the muscles of the cervical-brachial region, functional blocking of the intervertebral joints in the cervical and thoracic spine, and an atypical motor pattern of "shoulder abduction "and or"shoulder flexion". Instrumental diagnostics revealed violations of peripheral and cerebral hemodynamics, nerve impulse velocity, and temperature distribution on the mastectomy side. The high efficiency of manual therapy in the complex of rehabilitation measures in patients with post-mastectomy syndrome is shown.

Key words: neurovascular disorders, biomechanical disorders, post-mastectomy syndrome, manual therapy.

Currently, oncologists, neurologists, surgeons, psychotherapists, rehabilitation specialists and chiropractors are involved in the rehabilitation of women who have undergone radical antitumor treatment for breast cancer. A multidisciplinary approach to the process of rehabilitation treatment of patients with postmastectomy syndrome is due not only to the complexity of this condition, but also to a wide variety of symptoms and manifestations that characterize this syndrome [1, 4]. Most often, patients with postmastectomy syndrome are diagnosed only with upper limb edema and shoulder joint stiffness. At the same time, the clinical picture of post-mastectomy syndrome is much broader and more diverse. Experience with patients undergoing radical antitumor treatment for breast cancer suggests that post-mastectomy syndrome is manifested not only by edema of the arm and stiffness of the shoulder joint, but also by a complex of disorders, among which neurovascular and functional biomechanical disorders should be highlighted. Currently, experts distinguish several clinical variants of post-mastectomy syndrome: edematous, neuropathic, cerebral and mixed. In 22% of women, the edematous variant of the course of post-mastectomy syndrome prevails, in 18% – the neuropathic variant with a predominance of the clinic of brachial plexus nerve compression, in 12% - the cerebral variant .

Materials and methods of research. We examined 89 women who underwent surgery for breast cancer, aged 45 to 74 years. The study involved 40 patients from the control group. To diagnose neurovascular and functional biomechanical disorders, a clinical and neurological examination and manual testing were performed. Special techniques of visualpalpation diagnostics were also used. At the same time, such functional biomechanical disorders of the motor system as functional block (FB), regional postural muscle imbalance (RPDM), and non-optimal motor stereotype were evaluated. Results of the study Analysis of the results of the study showed that patients who underwent radical treatment for breast cancer develop a complex neurovascular syndrome with impaired blood circulation of the upper limb and brain, the speed of nerve impulse conduction, and temperature distribution on the mastectomy side. In this case, the edematous arm is in a state of chronic ischemia. Movement disorders were represented by increased arm fatigue, decreased



muscle strength, which was often accompanied by hypotension and less often by muscle hypotrophy, especially in the hypotenar group. Sensitive disorders in the form of paresthesias, decreased pain and temperature sensitivity, as well as the absence of all types of sensitivity in the medial cutaneous nerve area of the shoulder were detected in 86% of patients. Vegetative-vascular disorders of the upper limb were observed in 79% of patients. In 2-3 years after RME, cerebral manifestations in the form of headache and dizziness came to the fore, which were often accompanied by nausea, in rare cases – vomiting. Vertebral-basilar insufficiency was characterized by vestibular disorders, tinnitus, color perception disorders, decreased vision, darkening of the eyes, the appearance of flies and colored circles in front of the eyes. Against this background, although in rare cases, there was a short-term loss of consciousness followed by general weakness, adynamia, general hyperhidrosis, tachycardia, pallor of the skin. Neurological status often showed nystagmus, diffuse decrease in muscle tone in the extremities, and instability in posture Romberg and when walking. Often, patients noted a decrease in memory for current events, increased anxiety, as well as a decrease in performance and interest in the environment. As a result of the study, it was revealed that almost all the examined women (94%) after radical treatment of breast cancer to some extent revealed functional biomechanical disorders in the form of regional postural muscle imbalance and functional blocking of the intervertebral joints at the cervical and thoracic levels. In most patients, these disorders were formed 1-3 years after surgery. The formation of regional postural muscle imbalance has its own characteristics depending on the type of RME and the time after surgery. distribution of RPDM by degrees in patients with post-mastectomy syndrome depending on the type of surgical intervention after combined treatment of breast cancer. The severity of regional postural muscle imbalance is significant (P So, for example, in patients after Halsted-Meyer RME (removal of the pectoralis major and pectoralis minor muscles) and by Peiti (removal of the pectoralis minor muscle) of grade 3 RPDM was observed much more often (30.9%) than in patients after less traumatic operations (11.3% and 5.1%). On the contrary, grade 1 PDM was detected in a larger number of patients (48.4% and 74.2%) who underwent less traumatic operations (according to the results of the study). Madden, Volkman, Pirogov, sectoral resection). Grade 2 RPDM was observed in the majority of cases (63%) in patients after Halsted-Meyer RME and in the following cases: Payty. The results of this study also show a statistically significant aggravation of the degree of RPDM in patients with post-mastectomy syndrome with an increase in the time after surgery in comparison with the control group. Determination of RPDM in women of the control group and patients with breast cancer before radical mastectomy did not reveal a statistically significant difference. Most of the women had no signs of RPDM. At the time of 1 year after surgery, a statistically significant difference between these groups of patients is revealed: grade 1 PDM in 47,6% of cases (in the control group-15.8%), grade 2 PDM in 41,2% of cases (in the control group – 8.3%), grade 3 PDM in 11,2% of cases (in the control group – 0). In the period of more than 2 years after the operation, the tendency to increase the severity of RDM increases in comparison with the control group, with a shift in the frequency of muscle imbalance towards RDM of the 2nd degree (51.1%) and RDM of the 3rd degree (25,5%). We also studied the frequency of the atypical motor pattern (AMP) "shoulder abduction" and/or" shoulder flexion " (Tab. 2) depending on the type Taxiway data Table. 2 show an increase in the frequency of detection of AMP with an increase in the volume of surgery. So with an increased volume of RME with removal of the large and/or small pectoral muscle (Halsted-Meyer operations, Piti) the frequency of AMP increases to 89%. With a decrease in the operation volume (operations for Madden, Volkman, Pirogov) AMP decreases to 68%, and after sectoral resection, the lowest AMP frequency is recorded-21%. The results of a study of AMP in patients treated for breast cancer, depending on the period after surgery, showed an increase in the frequency of AMP: in the period 1 year after surgery – 67%, and in the period more than 2 years after surgery-74%. A study of the frequency of AMP depending on the type of antitumor treatment and depending on the use of radiation therapy did not show a statistically significant difference. Results of a study of the frequency of functional



blockades in patients with postmastectomy Pre-and post-RME syndromes are presented in the Table. 3. Table 3 shows that in the first year after RME, there is the sharpest increase in the frequency of functional blockages in the cervical and thoracic spine (from 43% to 74% in the cervical spine and from 31% to 64% in the thoracic spine). In general, there is a statistically significant difference in the frequency of functional blockades after RME in comparison with the control group. Determination of the degree of functional blockages (by Stoddart) in the cervical-thoracic region was performed at various times after radical treatment of breast cancer. The data obtained indicate a worsening of mobility restrictions in the vertebral-motor segment of the cervical-thoracic spine with an increase in the time after surgery in comparison with the control group. The most significant changes in the degree of functional blockages are observed in C0-C1 (from 2.92 degrees to 1.44 degrees) and C3-C4 (from 2.94 degrees to 1.74 degrees). In other vertebral-motor segments of the cervical-thoracic region, negative dynamics are also detected for a period of 1 year or more after radical mastectomy in the form of changes in the degree of functional blockages from stage III-IV. on I-II art. At the same time, in the control group, the dynamics of the degree of functional blockages in similar follow-up periods did not show a statistically significant difference. The results of an instrumental examination of women after radical treatment for breast cancer showed a variety of manifestations of post-mastectomy syndrome. According to USDG data, the linear velocity of blood flow through the brachial and ulnar arteries on the affected side was reduced by 35%. 75.83% of patients showed signs of hemodynamically significant extravasal compression of the vertebral artery on the side of the RME performed during a positional test aimed at detecting hypertension of the anterior stair muscle.

Duplex vascular scanning revealed a decrease in the linear blood flow velocity in segments V1 and V2 of the vertebral artery on the side of radical treatment. At the same time, an increase in the size of the Intima media complex in the area of the source of the vertebral artery on the affected side of more than 1 mm was determined. Signs of extravasal compression of the subclavian and vertebral arteries on the side of radical treatment were detected in 66% of patients. During the EEG examination, 90% of all patients showed signs of disorganization of cortical rhythm in the background recording (Figure 1). At the same time, signs of depression of cortical rhythm in the background EEG were detected in 25% of patients. Almost all patients showed signs of irritation of the median structures of the brain in the background EEG. Teletermography data revealed an asymmetry of 0,8-2,1° C in different areas of the affected and intact hands in all patients. Attention is drawn to hypothermia of edematous soft tissues of the upper limb on the side of radical treatment. According to electroneuromyography, 62% of patients showed a slowdown in the rate of propagation of excitation along the ulnar nerve of the affected arm.

Results of treatment In order to correct the pathology of the brachial neurovascular bundle and biomechanical disorders, patients with post-mastectomy syndrome underwent complex treatment using pharmacotherapy, LED phototherapy and manual therapy. Patients received curantil at 0.025 g 3 p. a day, escuzan at 2 t-3 p. a day, before meals, vazobral at 2 ml-2 p. a day for 2 months; topically applied ointment girudoven2 p. a day for 2-3 weeks. In order to influence the anterior stair muscle, applications of the transdermal therapeutic system were used "Versatis", post-isometric relaxation (PIR) and drugs with muscle-relaxing effect (mydocalm-0.05 g 3 p. a day for 2 weeks). LED phototherapy was performed using the device "Tera Photo". All patients with functional biomechanical disorders underwent manual therapy sessions: releasing (relaxation) of the skin, fascia, subcutaneousfat cells; PIR of the trapezius muscles.

The studied bullet techniques for removing functional blocks at the cervical and thoracic levels of the spine. The effectiveness of rehabilitation therapy was taken into account according to the data of clinical-neurological and manual examination, and the results of electroneuromyography, ultrasound Dopplerography, teletermography and radiography were taken as the most objective indicators .After complex treatment, 79% of patients showed complete disappearance of pain and



heaviness in the arm against the background of restoring skin sensitivity and increasing the volume of passive and active movements in the shoulder joint. 73% of patients reported complete or almost complete recovery of arm muscle strength. The degree of regional postural muscle imbalance in the cervical-brachial region decreased by 1 degree in 58% of patients. Overall, there was a regression of functional biomechanical disorders in 82% of patients. Along with positive functional changes in the affected limb, there was a significant regression of complaints and objective symptoms of dyscirculatory phenomena in the vertebral-basilar basin. The use of manual therapy as part of the complex treatment of post-mastectomy syndrome contributed to both restoring the range of motion and relieving pain in the cervical and thoracic spine. According to ENMG, USDG, teletermography, and X-ray of the spine, patients with post-mastectomy syndrome after complex treatment showed improvement in macro - and microcirculation, nerve impulse conduction velocity, and biomechanical state of the spine. In general, the use of manual therapy in combination with drug and LED phototherapy in patients with post-mastectomy syndrome had a positive effect on its pathobiomechanical and neurovascular manifestations.

Discussion .The results of the study indicate a variety of clinical manifestations (pathobiomechanical, neurological, vascular, and cerebral) in patients undergoing radical treatment for breast cancer. The reasons for the formation of neurovascular compression in patients after radical treatment of breast cancer are anatomical prerequisites in the form of an inflection of neurovascular structures above the chest aperture when they pass under the clavicle in an extremely limited space. The reason for the formation of functional biomechanical disorders is postural-muscular imbalance in the cervical and thoracic spine that occurs after the removal of the mammary gland, small and large pectoral muscles. The consequence of RME is a developing violation of biomechanical balance, in which the intact side "pulls" the upper half of the body by weight to its side. At the same time, removal of the pectoralis major and minor muscles (auxiliary respiratory muscles) during surgery leads to a violation of the biomechanics of chest respiratory excursions, the formation of regional postural muscle imbalance, functional blocking of vertebrae in the cervical and thoracic spine, and other pathobiomechanical changes. That is why the inclusion of manual methods of correction of functional biomechanical disorders in the rehabilitation program of patients with post-mastectomy syndrome is extremely important and necessary.

Conclusions Thus, the results of this study demonstrate a large complex of clinical manifestations in patients with post-mastectomy syndrome. Radical antitumor treatment in patients with breast cancer inevitably leads to the formation of a complex neurovascular syndrome of the upper chest aperture and functional biomechanical disorders in the cervical-brachial region. Timely application of a complex of rehabilitation measures with mandatory use of manual therapy in patients with post-mastectomy syndrome should be mandatory in the complex of rehabilitation measures in these patients.

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