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MORPHOMETRIC PARAMETERS OF MAMMARY GLANDS IN WOMEN OF DIFFERENT BODY TYPES IN NORMALITY AND IN BREAST CANCER

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Objective: to compare macromorphometric breast data with the constitution of women who need aesthetic breast correction in normal conditions and in breast cancer.

Material and methods. There was conducted macromorphometry of the mammary glands in 101 healthy women and 24 women with a confirmed diagnosis of breast cancer, using the Body Logic system, as well as anthropometry and somatotyping with indication of sthenic, ectomorph and endomorph body types.

Results and discussion. Among women with aesthetic problems of mammary glands, tubular breast deformity was revealed in 17.6% of sthenics, 23.5% of ectomorphs, and 58.8% of endomorphs. In breast cancer, tubular deformity was not detected. The Norwood Index, as an objective criterion of tubularity, had the largest value in endomorph women.

Conclusion. Endomorph women were more susceptible to the development of tubular breast deformity in comparison with women of other body types. In the physique of women with breast cancer, asthenomorphy predominates.

Key words: mammary gland, breast cancer, morphometry, tubularity, somatotype.

Introduction. In modern mammology, much attention is paid not only to the health of the mammary glands, but to the aesthetics as well [1- 3, 5]. High concern of women for their appearance, including breast, necessitate constant improvement in plastic surgery technologies. Breast surgical procedures performed in the modern world can be called the evolutionary achievement of medical science. At the same time, aesthetic operations with the use of silicone implants sometimes lead to adverse medical consequences - these can be both clinical complications and patient's dissatisfaction with the result.

Capsular contracture is one of the most frequent clinical complications of augmentation mammoplasty. According to the data from different authors, it occurs in about 74% of women. Furthermore, in 12% of women the formation of a dense capsule around the implant requires re-operation in the first 2 years given that this percentage increases with time and over the next 3 years it reaches 20%. The prevention of the development of capsular contracture has been worrying plastic surgeons since the introduction of mammoplasty into practice. By now, there has been identified a sufficient number of reasons causing capsular contracture. However, there is no single treatment, neither criteria have been developed to predict the development of capsular contracture nor preventive measures [5, 9]. In this regard, fundamental disciplines can help the surgeon. In particular, constitutional anatomy allows us to consider issues of breast surgery from individual perspective [6]. However, despite all the relevance of the clinical anatomy of mammary glands in terms of its practical application, studies that compare the morphometric characteristics, taking into account the constitution of the body, are not numerous.

Also of great scientific interest is breast cancer. The disease, its pathogenesis, clinical course have been the subject of many studies in oncoepidemiology. In the literature, there are works related to the nature of the course of cancer in humans, depending on the type of physique.

In connection with the importance of the problem, there was set the objective of the research: to conduct a comparative analysis of the results of breast macromorphometry and the somatotype of women who need aesthetic breast correction, as well as in breast cancer.

Material and methods. The research was carried out among 101 women of the first period of mature age (21-35) who applied to the clinic of plastic surgery for the possibility of surgical correction of mammary glands. The criterion for exclusion from the survey was the presence of childbirth in case history. Twenty-four women with a specified diagnosis of breast cancer were also examined.

Breast macromorphometry was carried out using the Body Logic system, developed specifically for the company "Mentor", a manufacturer of silicone implants [7]. The following measurements were included into the research program: the distance from jugular notch to breast crease, from jugular notch to nipples, from nipples to breast crease, from nipples to breast crease under tension, thickness of the skin-glandular fold in the upper poles of the mammary gland. The elasticity of the skin in the lower pole region was also evaluated.

After measuring the diameter and degree of protrusion of the areola, the Norwood index (IN) was calculated using the following formula: IN = areola protrusion / areola diameter. On the basis of IN value, tubular breast deformity was either established or excluded.

Somatotype was defined by Rees-Eysenk index distinguishing three body types: sthenic, ectomorph and endomorph. Body mass index (BMI) was also calculated, the values of which were in-

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terpreted in accordance with the WHO recommendations.

In the statistical processing of the retrieved data, nonparametric methods for data analysis were used in MS Office Excel 2010, as well as SPSS Statistics 22.0. Central tendencies and dispersions of quantitative characteristics were evaluated by the median, the third and the first quartiles of LQ; Uq. The significance of intergroup differences in quantitative characteristics was evaluated using the non-parametric Mann-Whitney U test, qualitative – using $\chi 2$ criterion. Correlation analysis was also used.

Results and discussion. The examined women were divided into three groups according to their somatotypes: normosthenic (sthenic) somatotype was detected in 32.7% of women, asthenic (ectomorph) - in 33.7%, and endomorph (pyknic) type - in 34.6% of women.

The median length of women's body was 164.0 [158.8; 167.2] cm, body weight - 62.8 [59.4; 64.7] kg. It should be noted that endomorphy (pyknic type) is not always associated with overweight; it can be connected with large size of the chest, defined in the frontal plane. Our research confirmed this concept. Among the examined women there were no registered persons with overweight and obesity. 80.2% of women had normal BMI values. 19.8% of women had weight deficit.

The use of individual typological approach during the initial examination of women revealed a number of significant features of the morphometric parameters of the mammary glands, depending on the body type. In women of sthenic somatotype, the distance from the jugular notch to the breast crease was 24.7 [24.1; 25.2] cm, which is significantly less than that of the representatives of asthenic somatotype (25.5 [23.6; 25.7] cm) and more than that of the pyknic somatotype (23.4 [20.5; 26.2] cm).

According to the distance from the jugular notch to the nipple, somatotypes were clearly ranged: the smallest distance was found in sthenics (17.0 [16.5; 17.1] cm), the biggest one in endomorphs (18.3 [17.9; 18.6] cm), ectomorphs occupied a middle position between the sthenics and endomorphs by the value of this parameter (17.5 [17.3; 17.6] cm). Also, women of pyknic type were characterized by minimal values of the distance from the nipple to the breast crease at rest and during tension in the absence of statistically significant differences in the indicated characteristics between the representatives of asthenic and sthenic somatotypes. The thickness of the skin-glandular folds in the upper poles of the breast and skin extensibility in the area of the lower pole of the gland revealed no typological features (table 1).

Tubular breast deformity was detected in 33.6% of women who needed aesthetic correction. At the same time, a differentiated approach to this problem, taking into account the body type, made it possible to identify a number of specific features. Thus, the Norwood index for women of sthenic type was 0.31 [0.24; 0.36], which was not significantly different from asthenic - 0.27 [0.24; 0.36], p = 0.158. At the same time, women of pyknic type were characterized by its higher values - 0.44 [0.24; 0.57]; p = 0.023.

The frequency distribution of the tubular mammary gland, depending on the somatotype, is presented in Figure 1.

It was adjusted that the aesthetic problems of women of pyknic somatotype were due to the presence of tubular breast deformity, which was registered in 58.8% of cases in our study. Among ectomorphs, the tubular mammary gland was found in 23.5% of cases, and in 17.6% of cases in sthenics.

The correlation of the tubular breast deformity with the morphometric parameters of the mammary gland and the somatotype was objectively confirmed by the results of the correlation analysis. There were established strong inverse correlations between the Norwood index and the distance from the jugular notch to the breast crease (r = -0.865), the Norwood index and the distance from the nipples to the breast crease in a free state (r = -0.879) and under tension (r = -0.885). Also, this index correlated with the thickness of the skin-glandular fold in the region of the upper pole of the mammary gland (r = 0.716) and the elasticity of the skin in the region of the lower pole of the gland (r = -0.674).

There were found direct correlations of the average force between the Norwood index and BMI (body mass index) (r = 0.523). In other words, when the BMI was higher, there was a greater risk of the formation of tubular breast deformity.

It was revealed that women suffering from breast cancer mainly belong to the asthenic type of physique. This somatotype occurred in 18 of the 24 examined. A picnic somatotype was detected in 4 patients, and only in 2 women the physique was rated as normosthenic.

Preoperative macromorphometry of the mammary glands did not reveal a single case of tubular deformation of the gland.

Conclusion. The need for anatomical justification in determining the tactics of corrective surgery of the mammary glands is out of the question. Questions of the anthropological approach during mammoplasty had already been raised earlier. In the work of V.N. Casanova et al. [4] special attention was paid to the influence of the ethnic component on the formation of various forms of mammary glands, it was recommended to consider it when selecting an implant and it was important for the development of measures to prevent adverse postoperative complications. At the same time in the available literature there was practically no information about the constitutional features of the morphometric parameters of the mammary glands in the formation of its anatomical features that require aesthetic correction. In the present work, there had been made an attempt to com-

Morphometric parameters of mammary glands depending on somatotype

Parameter	Somatotype		
	Normosthenic	Asthenic	Pyknic
Distance from the jugular notch to the submammary fold, sm	24.7 [24.1; 25.2]	25.5 [23.6; 25.7]	23.4 [20.5; 26.2]
	p_{1-2}=0.003; p_{2-3}=0.012 ; p_{1-3}=0.031		
Distance from the jugular notch to the nipple, cm	17.0 [16.5; 17.1]	17.5 [17.3; 17.6]	18.3 [17.9; 18.6]
	p_{1-2}<0.001; p_{2-3}<0.001; p_{1-3}<0.001		
Distance from the nipple to the submammary fold, sm	8.1[8.0; 8.2]	8.1 [7.8; 8.3]	4.8 [2.5; 8.1]
	p_{1-2}=0.560; p_{2-3}=0.013; p_{1-3}=0.008		
Distance from the nipple to the submammary fold in tension, sm	9.7 [9.5; 9.8]	9.7 [9.3; 9.9]	6.0 [4.0; 9.9]
	p_{1-2}=0.925; p_{2-3}=0.048; p_{1-3}=0.044		
Thickness of the skin-glandular fold in the upper poles of the breast, cm	2.8 [2.7; 3.1]	2.5 [2.1; 3.0]	3.2 [2.3; 3.4]
	p_{1-2}=0.065; p_{2-3}=0.078; p_{1-3}=0.089		
Skin extensibility in the area of the lower pole	1.6 [1.5; 1.7]	1.6 [1.4; 1.7]	1.5 [1.4; 1.8]
	p1-2 =0.905; p2-3 =0.765; p1-3=0.771		

pare the data of breast morphometry with the body type of women, which we regard as a scientific novelty. According to the results of the work, the following conclusion can be made: women of pyknic somatotype were more susceptible to the development of tubular breast deformity in comparison with women of other body types. Given the conjugation of pycnomorphy of the physique with the formation of tubular deformation of the breast and asthenomorphy with breast cancer, it can be assumed that there is no connection between the development of this disease and the presence of the tubular form of the mammary gland.

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