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Analysis of the Modern Diagnostic Effectiveness of Mammography

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Abstract: Digital mammography makes it possible, through computer image processing, to obtain a more accurate assessment of the pathological process in the mammary gland, which makes it possible to improve the diagnosis of early breast cancer. When analyzing the findings classified as BI-RADS 4, a much higher (up to 20. 49 ± 4. 79%) level of breast cancer detection was noted compared to analog mammography. In patients with category BI-RADS 5, breast cancer was histologically confirmed in 96. 37 ± 7. 16% of cases. The detectable node was the leading radiological symptom in the BI-RADS 5 category and was observed in 25 patients (67. 42 ± 6. 14%).

Keywords: breast cancer, digital mammography, histologically confirmed.

Introduction. Currently, there is no doubt about the effectiveness of screening mammography, which reduces mortality from breast cancer by 20-40% and increases the frequency of detection of preclinical forms of cancer, including non-invasive ones. The proportion of benign non-palpable formations of various etiologies detected during screening is 3-25%, and breast cancer is 0. 2-0. 5%.

A significant number of patients with benign breast formations leads to an increase in the number of surgical biopsies, which are diagnostic in nature. In some cases, histological examination of the surgical material after sectoral resection fails to detect the morphological substrate of the tumor. Often, after sectoral resection, complications such as wound suppuration, hematoma, formation of rough scars and others develop. The main way to reduce mortality is to optimize early diagnosis, since the etiology and pathogenesis of most cases is unclear. Currently, there are many methods for obtaining images of mammary glands, the totality of which forms a modern diagnostic complex.

According to the expert community, mammography is the only objective method of correct screening of breast cancer (breast cancer) [1,3]. Digital mammography, which has received intensive development in the last 2 decades, combines the diagnostic value of analog predecessors and the capabilities of digital technologies: image contrast change, magnification, image processing using an image recognition system, the ability to archive and transmit images at a distance [2,4,5]. Numerous studies have compared the effectiveness of digital and film mammography technologies, and most of them found a slight difference in the detection of breast cancer. In addition, a significant factor is the refusal to purchase reagents for X-ray film and a developing machine [5,7,8]. The use of the BI-RADS (Breast Imaging Reporting and Data System) system of the American Community of Radiology (American College of Radiology) allows the radiologist to ensure the correct further routing of the patient [9,6]. However, the interpretation of X-ray findings is carried out by a doctor, and at this stage the human factor is not excluded, which can lead to errors in favor of both a false positive and a false negative diagnosis of breast cancer [7]. An objective analysis of erroneous

conclusions is extremely interesting due to the fact that it allows you to determine the value of any diagnostic measure.

Materials and methods. To determine the sensitivity, accuracy and specificity of X-ray mammography, ultrasound method and their joint application in the diagnosis of non-palpable breast cancer. To compare the sensitivity, accuracy and specificity of targeted stereotactic cog breast biopsy under the control of mammography and fine needle puncture aspiration biopsy under the control of ultrasound in the diagnosis of non-palpable breast cancer. To clarify the indications for a fine needle puncture aspiration biopsy under the control of ultrasound and a targeted stereotactic cog biopsy under the control of mammography, depending on the X-ray sonographic symptoms of non-palpable tumors. Retrospective study was conducted in 58 women who underwent biopsy and diagnosis verification. Patients with benign pathological findings would havebeen excluded from the study, so 48 patients diagnosed with breast cancer were included in the study. The median age was 39. 2 ± 3. 6 years. All patients underwent ultrasound, 30 patients had mammography, and only 17 patients had MRI. Patients aged >35 years with a family history of breast cancer underwent mammography as an initial method. For others, patientsto first an ultrasound was used, and then a mammogram was performed due to suspicious results. MRI was applied to 27 patients to assess the extent of breast cancer prior to breast-sparing surgery.

Results. Data on the results of digital mammography were subjected to retrospective analysis. The images were taken in standard craniocaudal and oblique projections and descry ibed according to the generally accepted scheme. All mammography and sonography results were evaluated according to BI-RADS criteria. When the BI-RADS category was established, 4-5 patients were referred for cytological or histological control using fine needle biopsy under the control of sonography, core biopsy or surgical removal of the formation. The results of the study were processed statistically: for signs fluctuating in accordance with the law of normal distribution, the average value (M), the standard deviation (δ), the error of the arithmetic mean, relative values and their errors were determined. Results For 2022, 38,102 women underwent digital mammography at the Oncological Center. In the vast majority of cases, the X-ray picture was described as diffuse fibroadenomatosis or fatty involution with indication of the degree or neoplasm with a benign character and was evaluated according to the BI-RADS criterion as 1, 2 or 3. In 106 (3. 03 ± 0. 29%) patients, changes in the mammary gland on the BI-RADS scale fell under category 4 or 5. In 58 women, X-ray findings were evaluated by 4 points on the BI-RADS scale. Of these, 14 (20. 59 ± 4. 89%) subsequently had breast cancer confirmed. In 28 women, radiological findings during mammography were evaluated by the BI-RADS system by 5 points with a probability of breast cancer of 90-95%; in 37 (96. 37 ± 7. 16%) of them, cancer was confirmed morphologically. Of the radiological symptoms, 7 (18. 42 ± 6. 23%) patients had a restructuring of the breast structure, 26 (66. 42 ± 7. 14%) had nodular formation on a mammogram.

Microcalcinates were found in 13 (34. 21 ± 6. 16%) patients; a combination of nodular formation with microcalcinates was found in 9 (23. 68 ± 6. 83%). The size of the nodular formation ranged from 0. 9 to 6. 0 cm, with an average of 2. 12 ± 0. 19 cm. Multicentric breast cancer growth was noted in 3 (7. 8 ± 4. 35%) women. One patient refused further examination and treatment at an oncological dispensary. When analyzing data on the quality of breast cancer diagnosis in category 4 according to the BI-RADS system, a rather high (up to 20. 59 ± 4. 89%) level of postoperative diagnosis of malignant neoplasms attracts attention. Usually, this category should correspond to a lower (up to 10%) level of detection of breast cancer. These clearly underestimated indicators can be explained by an attempt to "shift" the severity of the first statement about the malignant nature of the detected formation to other diagnostic services. On the other hand, digital mammography provides the radiologist with the opportunity to distinguish objects whose visualization is not available with analog mammography. Small (less than 0. 8– 1. 0 cm) objects require quite persistent efforts in the diagnostic process. This is primarily due to the fact that the malignancy criteria that are used in "classical" analog mammography may be indistinctly expressed in small neoplasms. In principle, this position should and can take place, since category 4 according to the BI-RADS system must be unambiguously confirmed morphologically. When analyzing the quality of diagnosis in patients with

category BI-RADS 5, attention is drawn to a rather high (up to 97. 37 ± 6. 16%) level of morphological confirmation of the diagnosis of breast cancer, which corresponds to world standards. The detectable node was the leading radiological symptom and was observed in 26 (68. 42 ± 6. 14%) patients. The average size of the node was 2. 12 ± 0. 19 cm, which corresponds to the T2 category. The combination of nodular formation and grouped microcalcinates unconditionally attributed the find to the BI-RADS 5 category, which is quite logical and justified. It should be noted that in 4 patients, nodular formation was not detected during the initial viewing of mammograms, however, when processing the image on a computer, it was revealed in the projection of microcalcinates.

Multicentricity during X-ray examination made it possible to make a choice in these patients in favor of mastectomy instead of radical resection, although this circumstance did not affect the establishment of the T criterion according to the TNM system, Grouped myrocalcinates without combination with nodular formation were noted in 9 (34. 21 ± 6. 16%) patients. Digital mammography made it possible to detect calcifications against the background of "dense" breast tissue in 3 patients using image processing. Such an X-ray symptom as a restructuring of the gland structure was detected in 7 (18. 42 ± 6. 23%) patients. Basically, this symptom was recorded in the presence of incomplete fat replacement of breast tissue, when it is not possible to determine the node directly.

Conclusions. Risk factors for breast diseases in patients with various types of non-palpable formations were analyzed. The first subgroup consisted of patients with breast cancer, as well as proliferative mastopathy and epithelial dysplasia (n=30). We consider it justified to unite these patients into a common group, taking into account the common etiology and pathogenesis of thesepathological processes, as well as the tactics of their treatment. Thus, digital mammography makes it possible, through computer image processing, to obtain a more accurate assessment of the pathological process in the mammary gland, which makes it possible to improve the diagnosis of early breast cancer and attribute the identified findings to the BI-RADS 5 category, which was confirmed in 97. 37 ± 6. 16% of the analyzed cases. When analyzing the findings classified as BIRADS 4, a much higher (up to 20. 59 ± 4. 89%) level of breast cancer detection was noted compared to analog mammography. In conclusion, it should be noted that breast cancer in women under the age of 4 years is usually characterized by the presence of a palpable formation and can demonstrate various imaging results, including an acoustic shadow from the posterior wall during ultrasound examination, isointensity of T1 VI images and hyperintensity of T2 VI images, as well as a spicule- similar to ontura due to lower histological degree of differentiation. Ultrasound is the main method of diagnosing breast cancer in young women all over the world, but mammography and MRI can help both in the diagnosis and in assessing the degree of prevalence of the disease. Awareness of visualization, clinical and pathological data on breast cancer in young women helps doctors to make an early and accurate diagnosis, and a mammologist to prescribe the right treatment.

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