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ANALYSIS IN THE DIAGNOSIS OF BREAST CANCER GLANDS OF INFORMATION CONTENT OF DIGITAL MAMMOGRAPHY AND MAMMOSCINTIGRAPHY

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Abstract: Early diagnosis is known to be key to successful treatment, as it increases the effectiveness of antitumor treatment and creates favorable conditions for reducing the aggressiveness of therapy and the incidence of serious adverse effects. The effectiveness of mammography (MGM, ultrasound, and MRI) in detecting breast cancer (including malignant tumors with a number of more than 15 per 1 cm^2 of breast tissue) should be recognized as limited. X-ray density of breast tissue was assessed in types A and B mammographic patterns and increased X-ray density of breast tissue in types C and D mammographic patterns. In our study, increased X-ray density of breast tissue was found in 171 (39%) patients out of 437 examined women, and low X-ray density of breast tissue was found in 266 (61%). The study showed that the combined use of digital mammography and mammoscintigraphy with the domestic tumorotropic drug "99mTctechnetril" is the most accurate method for diagnosing minimal and multicentric breast cancer, regardless of the X-ray density of breast tissue.

Breast cancer (BC) is the leading cause of cancer morbidity and mortality in women. Early diagnosis is known to be key to successful treatment, as it increases the effectiveness of antitumor treatment and creates favorable conditions for reducing the aggressiveness of therapy and the incidence of serious adverse effects [1].

Currently, methods such as digital mammography (MMG), magnetic resonance imaging (MRI) and ultrasound examinations (US) are the main diagnostic tool for breast cancer [2]. However, their ability to detect minimal forms of breast cancer (the presence of a pathological lesion no more than 10 mm in diameter or visualization of grouped clusters of microcalcifications The effectiveness of mammography (MGM, ultrasound, and MRI) in detecting breast cancer (including malignant tumors with a number of more than 15 per 1 cm^2 of breast tissue) should be recognized as limited [3]. From a practical point of view, one of the most unfavorable consequences of the insufficient reliability of MMG, ultrasound, and MRI is the high rate of invasive interventions in the form of excisional breast biopsies [5]. To date, mammography has been considered the primary method for detecting breast tumors (BT). However, its accuracy is significantly reduced when diagnosing changes in dense BT tissue, especially when detecting minimal BT [2,3] and multicentric BT [4].

Digital MMG was performed with compression of the mammary gland using the standard technique in the craniocaudal and mediolateral projections.

(Figure 1).

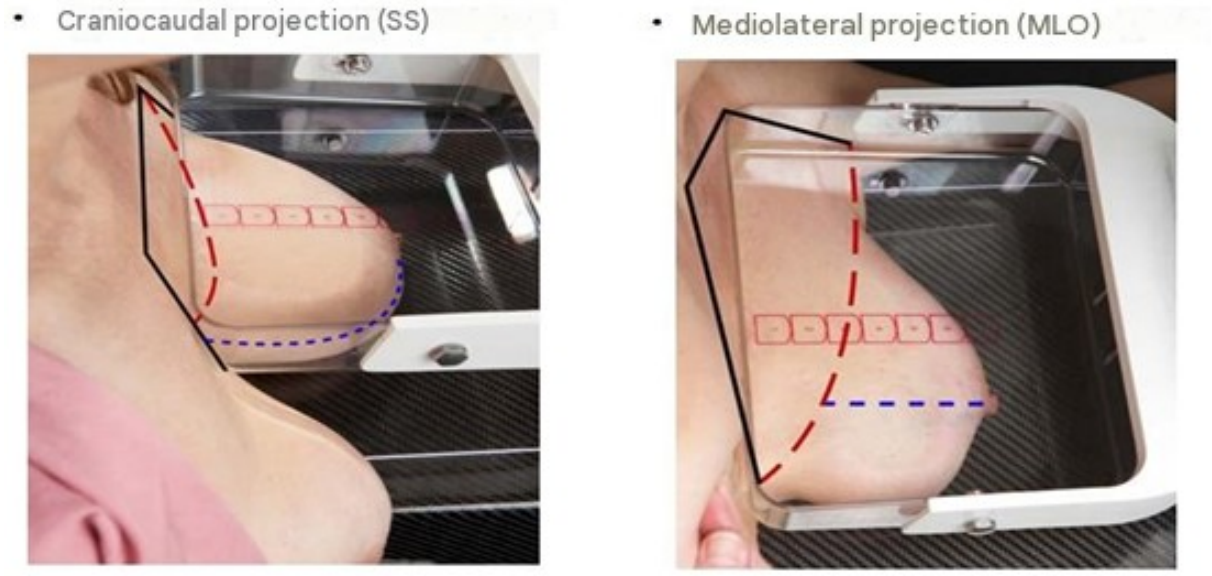


Figure 1. Basic positions for digital mammography

The study was performed on both sides, regardless of the location of the suspicious lesion, with the aim of timely diagnosis of clinically asymptomatic cancer in the opposite mammary gland.

When analyzing mammograms, the following were determined: X-ray density and structure of the mammary glands; if a pathological formation was detected, its characteristics were assessed – location, size, X-ray density, contours, presence of microcalcifications, connection with surrounding tissues; condition of the skin and subcutaneous tissue. The resulting images were analyzed and classified in accordance with the BI-RADS scale (Breast Imaging Reporting and Data System, 2014).

The criterion for the diagnosis of breast cancer was the presence of a nodular formation(s) or visualization of microcalcifications of a malignant type [Le Gal M., 2001]. The criterion for diagnosing minimal breast cancer was the presence of a pathological lesion with a diameter of no more than 10 mm [4]. The criterion for diagnosing multicentric breast cancer was the presence of two or more tumor nodes of various shapes and structures located in different quadrants of the breast [TNM staging system recommendations, 2016]. Also, the detection of individual additional grouped clusters [4] of malignant microcalcifications (more than 15 pieces per 1 cm^2) was considered signs of multicentricity. Mammographic diagnosis of breast cancer was established using BI-RADS assessment (Table 1).

Table 1. BI-RADS categories

Categories	Diagnosis
0	Poor-quality MMG, incorrect placement, insufficient projections. A repeat examination or additional imaging techniques are required.
1	Age norm
2	Benign changes

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Categories	Diagnosis
3	Probable benign changes
4	Suspicious changes
5	Almost certain malignant changes
6	Histologically confirmed breast cancer

The X-ray density of breast tissue was assessed in accordance with the BI-RADS system: A – fatty (breast fat with the presence of fibroglandular tissue less than 25% of the area of the mammogram), B – fatty with scattered fibroglandular tissue (foci of fibroglandular tissue from 25 to 50% of the area of the mammogram), C – non-uniformly dense (fibroglandular tissue from 51 to 75% of the area of the mammogram) and D – extremely dense (fibroglandular tissue more than 75%) (Figure 6). In accordance with the international recommendations of the ACR (American College of Radiology, 2014) low X-ray density of breast tissue was assessed in types A and B mammographic patterns and increased X-ray density of breast tissue in types C and D mammographic patterns. In our study, increased X-ray density of breast tissue was found in 171 (39%) patients out of 437 examined women, and low X-ray density of breast tissue was found in 266 (61%).

The study showed that the combined use of digital mammography and mammoscintigraphy with the domestic tumorotropic drug "99mTctechnetril" is the most accurate method for diagnosing minimal and multicentric breast cancer, regardless of the X-ray density of breast tissue.

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