SJIF Impact Factor (2024): 8.675| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 9 | Issue: 5 | May 2024 - Peer Reviewed Journal

MULTIMODAL APPROACH TO BREAST CANCER DIAGNOSIS: CLINICAL OBSERVATIONS

Rashidova Maxliyoxon Baxodir kizi[1], Ibragimov Said Sanjarovich[2], Yakubbekova Soxibaxon Sadik kizi[3]

[1]Assistant at the Department of Medical Radiology
[2]Doctor of Medical Sciences, Professor of the Department of Medical Radiology
[3]PhD, Associate Professor of the Department of Oncology
Andijan State Medical Institute

ANNOTATION

Modern comprehensive diagnostics and high-quality morphological diagnosis are important conditions for developing an optimal treatment algorithm for suspected recurrence of breast cancer. Our own clinical example shows the importance of a multimodal approach to the differential diagnosis of secondary tumor lesions. Thanks to modern clinical and radiological diagnostics, interventional technologies, high-quality morphological analysis and close interaction of all members of the multidisciplinary team, it was possible to verify a non-tumor lesion (sarcoidosis) in a patient with suspected relapse of breast cancer and plan the correct treatment tactics.

KEYWORDS : *multimodal approach , diagnosis, breast cancer , ultrasound .*

INTRODUCTION

Historically, breast cancer (BC) was viewed as a single disease. The development of science initially made it possible to identify hormone-dependent tumors as a separate group based on the expression of steroid hormone receptors: estrogen (ER) and progesterone (PgR), the presence of which indicates a relatively favorable prognosis and the potential sensitivity of the tumor to endocrine therapy [1,5] .

Then they proved the diagnostic and prognostic significance of determining the expression of the oncogene human epidermal growth factor (HER2 – human epidermal growth factor receptor 2), increased expression of which is associated with an unfavorable prognosis and an increased risk of disease relapse [7] .

Many authors also note the importance of determining cell proliferation markers, among which the first place is occupied by the Ki-67 antigen, which is expressed in all phases of the mitotic cycle and is an independent prognostic factor that determines the likelihood of relapse, overall and disease-free survival [1, 2].

The sources of breast cancer are 3 cell lines: cells of the luminal (inner) lining of the milk ducts, myoepithelial cells of the ducts and alveolar cells that synthesize milk proteins [8,9] .

Based on taking into account the listed factors, namely the production of estrogen and progesterone receptors in the tumor, the HER2 protein and the rate of cell division, the following subtypes of breast cancer are currently distinguished [3]: luminal A, luminal B, HER2 positive, triple negative.

Luminal subtype A includes tumors that produce estrogen and/or progesterone receptors and develop from the inner layers of the ducts and lobules of the mammary gland, do not produce HER2 and have a Ki-67 index of less than 20%.

Luminal subtype B includes tumors that produce estrogen and/or progesterone receptors and develop from the inner layers of the ducts and lobules of the mammary gland; these tumors can be either HER2 negative or positive, the Ki-67 index is more than 20% [10] .

HER2 positive tumors include tumors that do not produce estrogen and progesterone receptors, but produce large amounts of the HER2 protein [3]/

The triple negative subtype includes tumors in which there is no production of estrogen and progesterone receptors and no overexpression of the HER2 protein is detected.

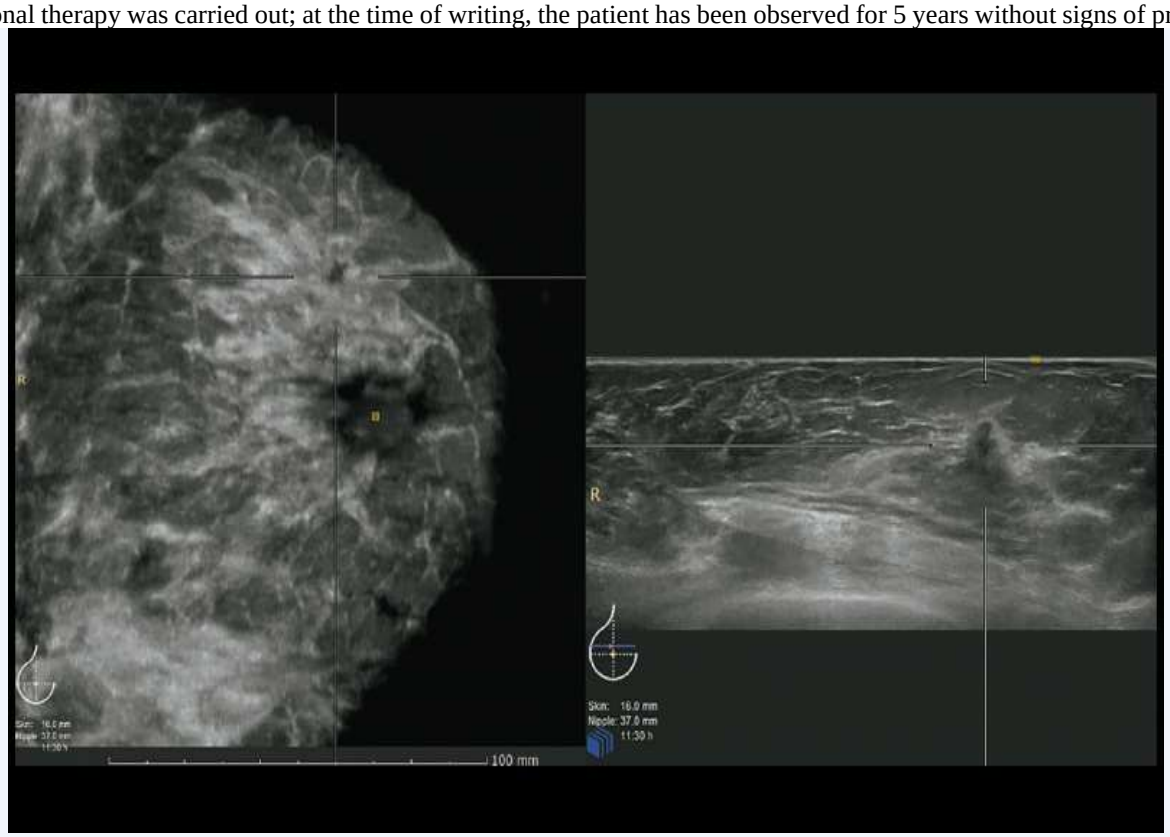
SJIF Impact Factor (2024): 8.675| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 9 | Issue: 5 | May 2024 - Peer Reviewed Journal

The triple negative subtype of breast cancer is characterized by a high proliferative index with average values of more than 40%, the largest size of tumor nodes, low life expectancy, and a higher risk of developing hematogenous organ metastases, in particular to the lungs and liver. In 10% of patients with triple negative breast cancer, a BRCA1 (Breast Cancer Antigen 1) mutation is detected, while 80% of patients with a BRCA1 mutation belong to the triple negative subtype [4].

Ultrasound (US), X-ray mammography (X-ray mammography), and magnetic resonance mammography (MR-MG) images vary among tumor types.'

Clinical observation 1

Patient M., 39 years old. Ultrasound in the automatic breast volume scanning mode (ABVS – automatic breast volume scanning) (Fig. 1) in the right mammary gland at 12.30 on the conventional dial, 41 mm from the nipple at a depth of 16 mm, visualizes a formation of reduced echogenicity, vertically located, with a fuzzy contour, size about 0.6 cm, with an acoustic shadow, with an increase in the echogenicity of the surrounding tissues (desmoplasia zone), in the coronal projection during three-dimensional reconstruction, a radiant contour is noted. Conclusion: suspicion of cancer of the right breast BI-RADS 4. The patient was sent to MG with tomosynthesis (Fig. 2), according to the results of which an irregularly shaped node with an indistinct stringy contour measuring 1.0 x 0.8 cm was visualized in the upper outer quadrant, except In addition, at the border of the internal quadrants two more formations with stringy contours up to 0.4 cm are noted, and medially there is another similar area measuring 0.6 x 0.3 cm. MR-MG confirmed multicentric tumor growth: in areas of pathological vascularization, accumulation graphs contrast agent show peak enhancement in the first 2 minutes of contrast, followed by rapid clearance of the contrast. Conclusion: stage I right breast cancer (luminal A, ER+, PgR+, HER2 negative, Ki-67 15%). A combined treatment including radical resection, radiation therapy, and hormonal therapy was carried out; at the time of writing, the patient has been observed for 5 years without signs of progression.



Rice. 1. Ultrasound of the right breast of patient M, in ABVS mode (coronal and horizontal sections).

SJIF Impact Factor (2024): 8.675| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 9 | Issue: 5 | May 2024 - Peer Reviewed Journal

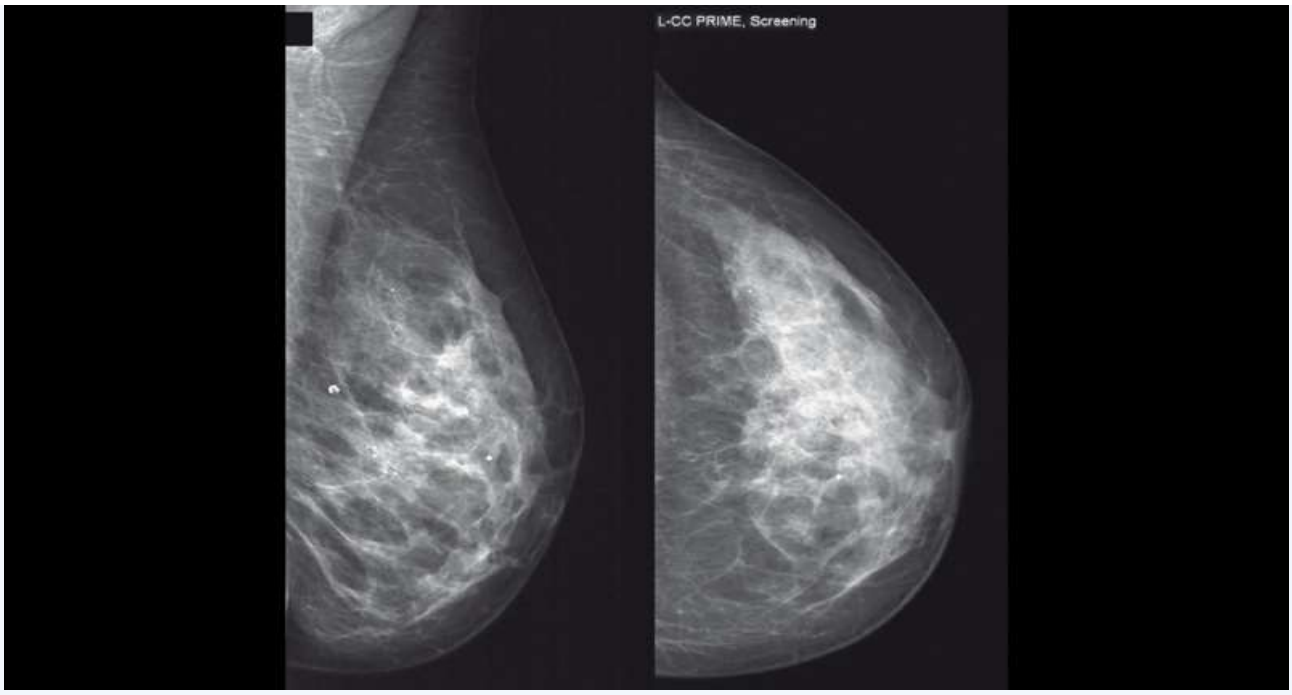
Rice. 2. MG and tomosynthesis of the right breast of patient M.

Thus, in this patient, a small tumor node was visualized equally well both with ABVS ultrasound and with MG. The tomosynthesis mode confirms the need for morphological verification.

Clinical observation 2

Patient T., 41 years old. In MG (Fig. 3), a dense background of glandular tissue is noted in the upper outer quadrants of both mammary glands, which requires clarification. With ABVS in the left mammary gland (Fig. 4), at 1 o'clock on the conventional dial, 31 mm from the nipple at a depth of 10 mm, a hypoechoic formation measuring 1.0 x 0.9 cm with an indistinct, radiant contour in the coronal projection, vertical orientation, with a weak acoustic shadow, with color Doppler mapping (CDC) - with single vessels of the arterial spectrum, in the elastography mode it is colored as hard, and the zone of increased rigidity goes beyond the boundaries of the formation in the gray scale; in the pulse wave mode, the speed of the shear wave is not determined (is beyond the limits of sensitivity techniques). In addition to the formation described above, several more hypoechoic areas are visualized in the coronal section at the border of the outer and at the border of the lower quadrants. Conclusion: ultrasound picture of the tumor of the left mammary gland BI-RADS 4. To clarify the nature of the changes at the border of the outer and at the border of the lower quadrants, tomosynthesis was performed, in which (Fig. 5) in the left mammary gland on sections 23–24 against the background of adenosis in the upper outer quadrant the presence of a nodular formation measuring 1.0 cm was confirmed and another area of deformation of the pattern of the glandular-fibrous complex, suspicious for a tumor nodule, was identified. To exclude multicentricity of the tumor, MR-MG was performed (Fig. 6), which revealed contrast enhancement of only one node. A core biopsy revealed invasive lobular cancer of the left breast of the 2nd degree of malignancy, luminal B, HER2 negative, Ki-67 54%.

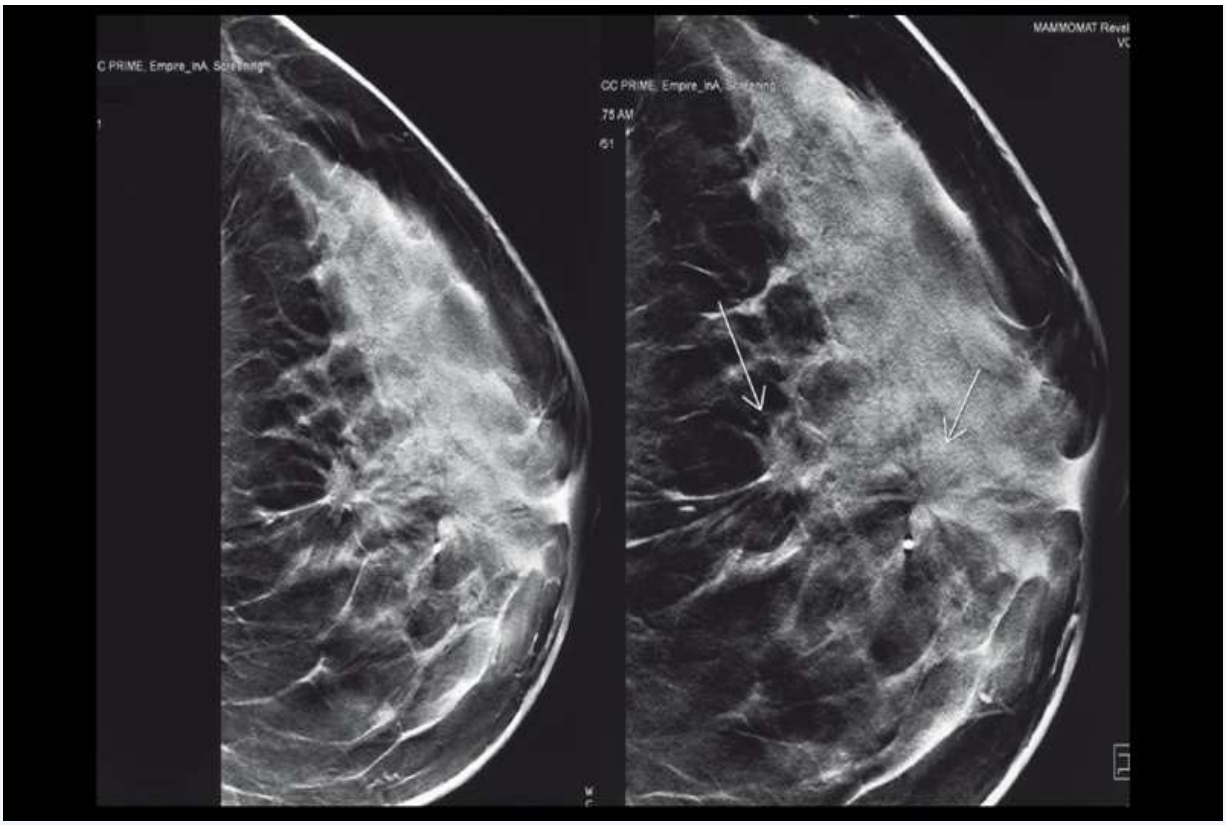
SJIF Impact Factor (2024): 8.675| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 9 | Issue: 5 | May 2024 - Peer Reviewed Journal



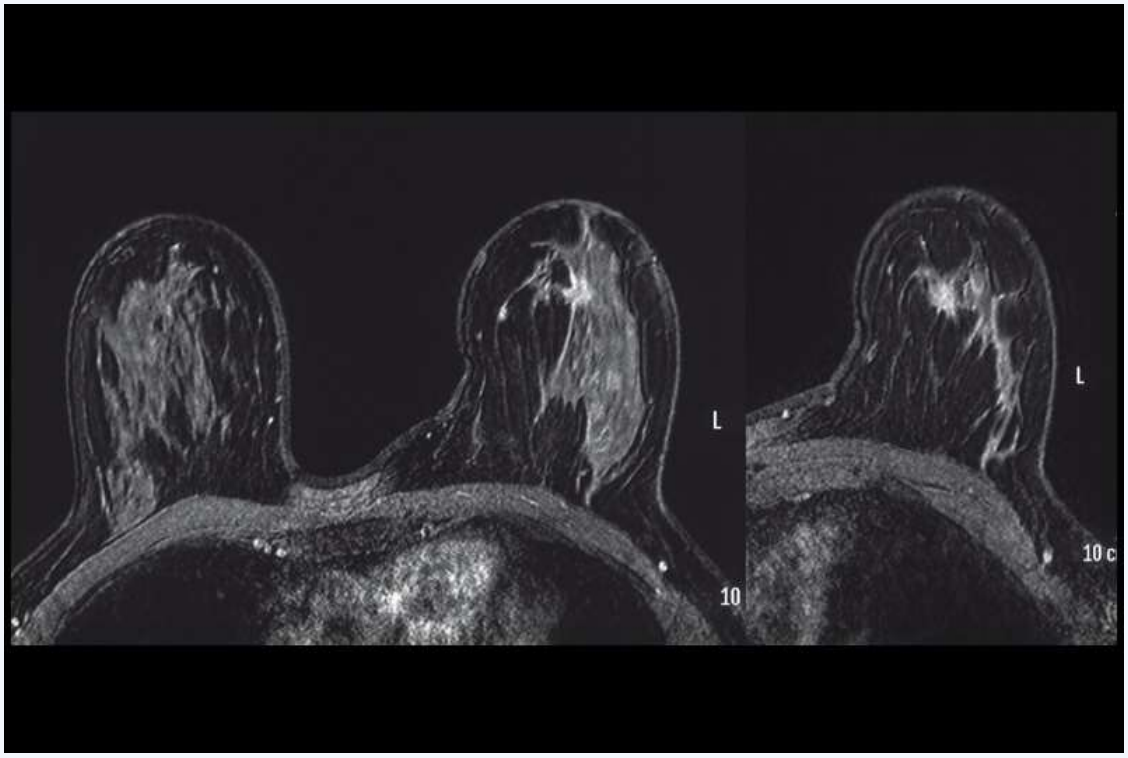
Rice. 3. MG of the left breast of patient T, dense background.

Rice. 4. Ultrasound of the left breast of patient T. ABVS mode, coronal and horizontal projections.

SJIF Impact Factor (2024): 8.675| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 9 | Issue: 5 | May 2024 - Peer Reviewed Journal



Rice. 5. Tomosynthesis of the left breast of patient T.



Rice. 6. MR-MG of patient T.

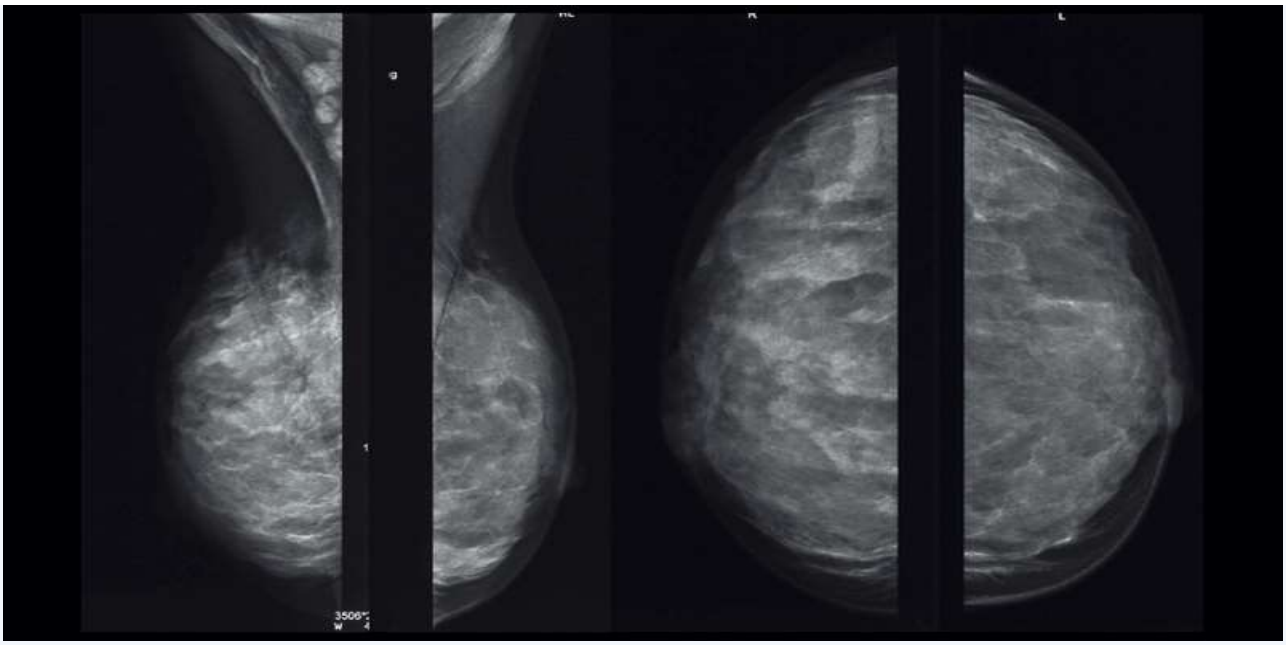
In this observation, the MG is uninformative due to the dense background, ultrasound in the ABVS, Color Doppler and elastography modes demonstrates characteristic symptoms of a malignant neoplasm (acoustic shadow, radiance of the

SJIF Impact Factor (2024): 8.675| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 9 | Issue: 5 | May 2024 - Peer Reviewed Journal

contour, presence of blood flow, high stiffness), but does not exclude the presence of other foci of neoplasia, tomosynthesis strengthens the suspicion MR-MG helps to dot the "I" on the multicentricity of the tumor. A combined treatment including radical resection, radiation therapy, and hormonal therapy was performed; the patient was observed for 2 years without signs of progression.

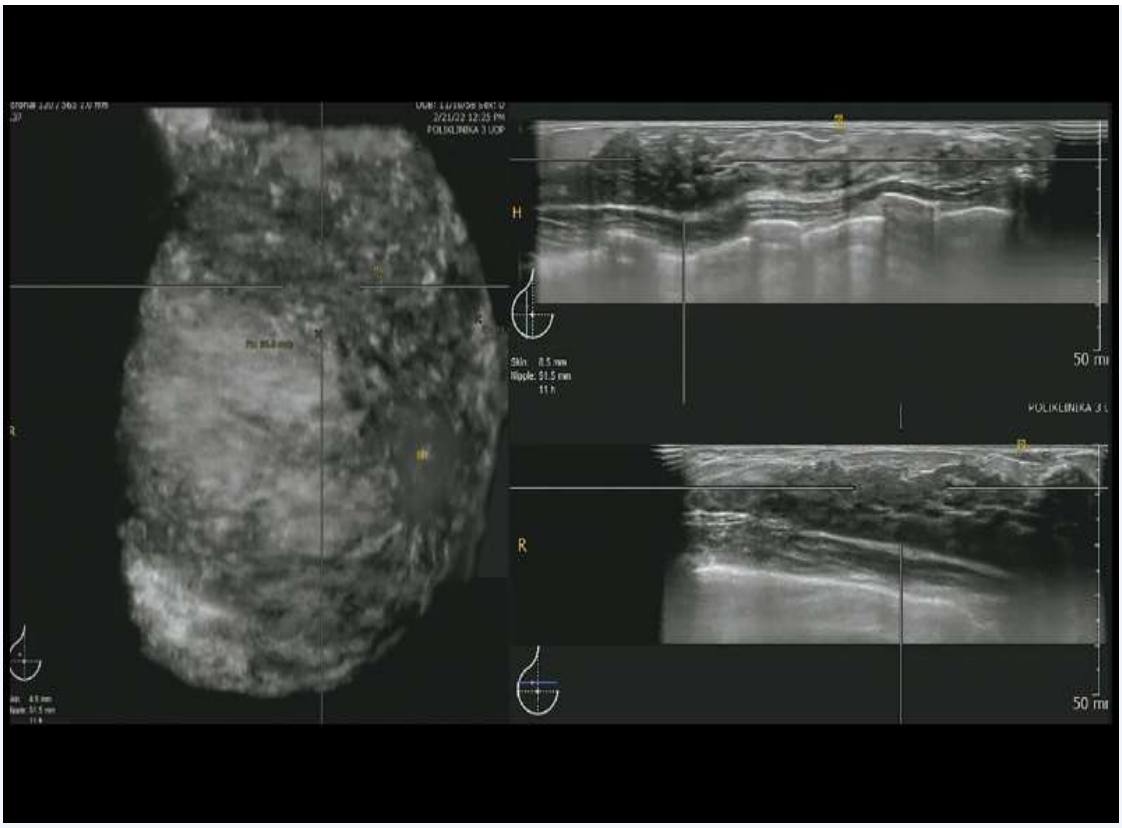
Clinical observation 4

Patient Sh., 41 years old. She noticed a formation in the right mammary gland herself 6 months after the injury, noted rapid growth over 2 months, had a history of childbirth 2 years ago, and did not breastfeed. Upon palpation in the upper quadrants of the right mammary gland, a dense tuberous formation up to 10.0 cm in size is determined. On mammograms (Fig. 7): a dense background, well-defined glandular tissue, the structure of the entire mammary gland tissue is compacted, lobulated, with areas of maximum density in the central sector and in the upper outer quadrants, a round formation measuring 0.7 x 0.5 cm (cyst?) is visualized in the right mammary gland. With ABVS (Fig. 8), in the right breast in the upper quadrants, corresponding to the zone of palpable compaction, a thickened layer of the glandular-fibrous complex (19 mm versus 11 mm) of reduced echogenicity, measuring up to 10.0 x 5.0 cm, is visualized compared to the contralateral side , without an acoustic shadow, in the coronal projection during three-dimensional reconstruction the contour is unclear, without radiance, in the compression elastography mode it is mapped neutrally, no areas of pathological stiffness were identified. At the border of the outer quadrants there is a 0.6 cm cyst. Conclusion: the ultrasound picture may correspond to the nodular form of fibrocystic mastopathy of the right breast BI-RADS 3.

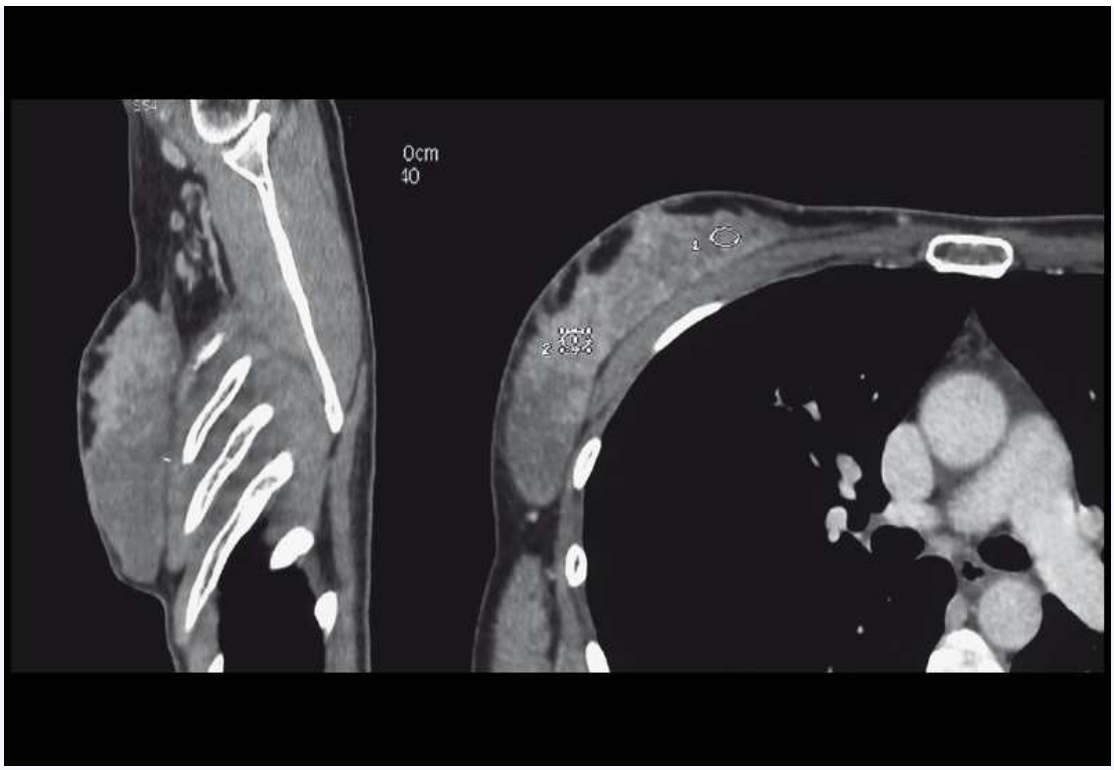


Rice. 7. MG of patient Sh.

SJIF Impact Factor (2024): 8.675| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 9 | Issue: 5 | May 2024 - Peer Reviewed Journal



Rice. 8. Ultrasound of the right breast of patient Sh. ABVS mode, sagittal, vertical and horizontal sections.



Rice. 9. CT scan of the chest organs of patient Sh.

According to the results of core biopsy: invasive ductal carcinoma of the right breast in situ (HER2 positive +++, ER0, PgR0, Ki-67 25%). According to the preoperative examination program, a CT scan of the abdominal cavity, pelvis and chest with intravenous

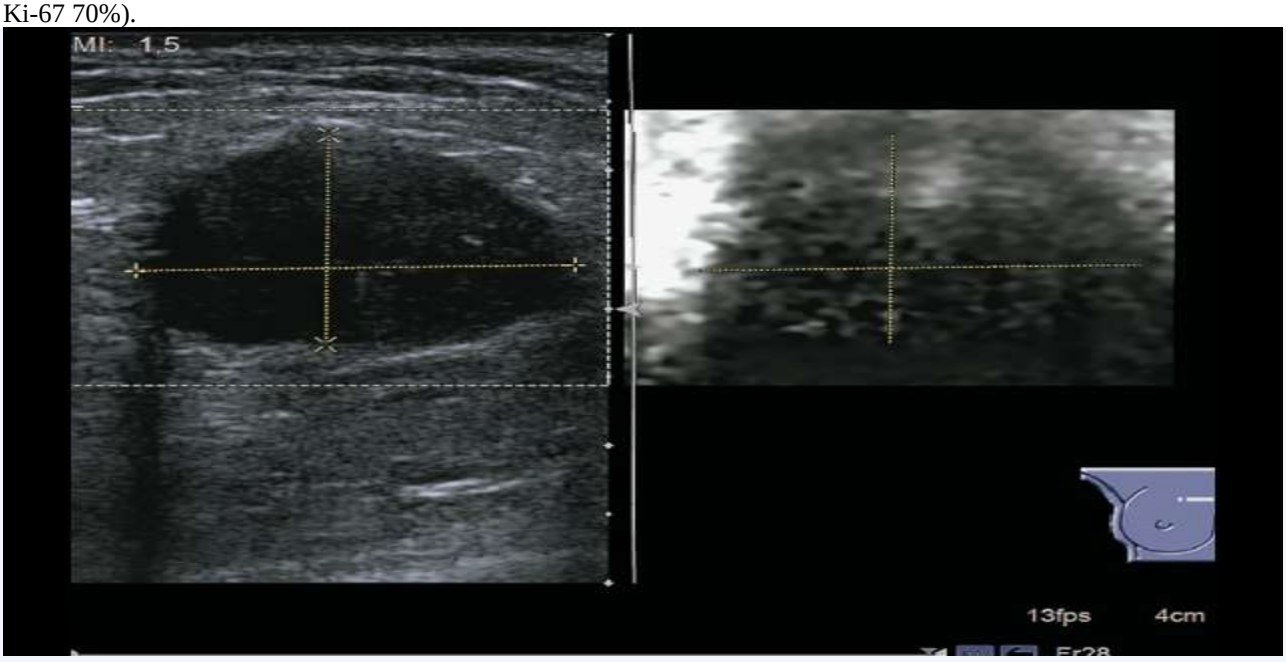
SJIF Impact Factor (2024): 8.675| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 9 | Issue: 5 | May 2024 - Peer Reviewed Journal

contrast was performed (Fig. 9), in which about half of the volume of the right mammary gland is occupied by a zone of contrast enhancement of glandular tissue, characteristic of a malignant process. Subcutaneous radical mastectomy with simultaneous endoprosthetics, chemoradiotherapy, targeted treatment was performed; at the time of writing, the patient has been observed for 2 years without signs of progression.

In this observation, neither the mammographic nor the ultrasound picture (including in the ABVS, Color Doppler and Elastography modes) raised suspicions about an oncological process; the key role in prescribing a core biopsy was played by the dissonance between the palpation picture (stony density) and the absence of any visual signs. And only CT, which is not a standard technique in the diagnosis of breast cancer, made it possible to see the boundaries of the pathological process and retrospectively re-evaluate the ABVS data.

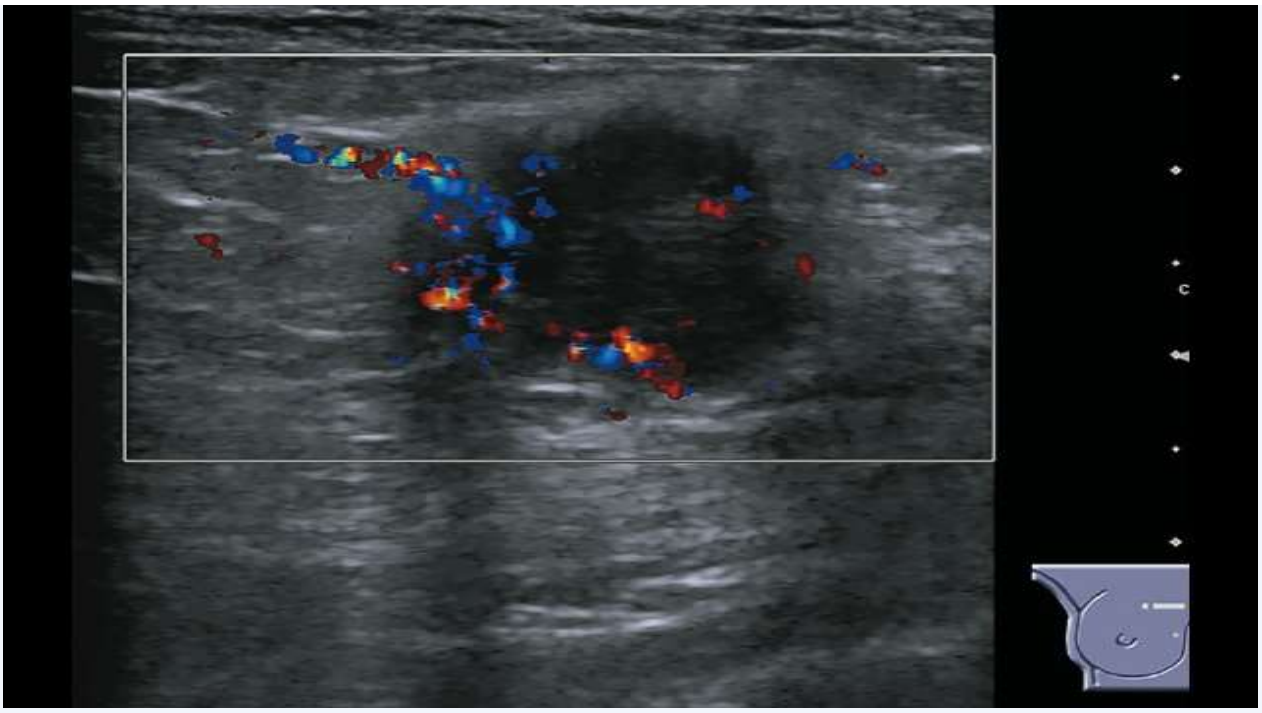
Clinical observation 4

Patient Ch., 49 years old. Ultrasound with elastography (Fig. 10) in the right mammary gland in the upper inner quadrant, corresponding to the palpable compaction, visualizes a formation of reduced echogenicity, heterogeneous, with an even contour, dimensions 2.1 x 1.5 cm, with lateral shadows. In compression elastography mode, it is mapped as a rigid structure, the zone of increased rigidity practically does not extend beyond the boundaries of the formation in the gray scale, the shear wave speed is 3.74 m/s. With CDK (Fig. 11), pronounced chaotic vascularization of the formation is noted. In ABVS (Fig. 12), in the coronal projection during three-dimensional reconstruction, the contour is clear, jagged, without radiance; from the formation towards the nipple, a hyperechoic cord with scattered small anechoic inclusions up to 0.2 cm is visualized; displacement by the formation of fibers of the pectoralis major muscle is visible. Conclusion: ultrasound picture of the formation of the right mammary gland BI-RADS 4. During tomosynthesis (Fig. 13) in the upper inner quadrant near the chest wall, a round-shaped compaction measuring 2.4 x 2.5 cm is visualized, along the anterioinferior contour an area of heaviness measuring 0.8 is visible x 0.9 cm, anterior to which a zone of different-sized polygonal microcalcifications is visualized against the background of cystically dilated ducts. Conclusion: formation of the right breast BI-RADS 4. With MR-MG (Fig. 14), the formation accumulates the contrast agent inhomogeneously, more intensely along the periphery, the formation is closely adjacent to the right pectoralis major muscle, deforming it. In addition, areas of accumulation of the contrast agent anterior to the formation along the ducts are noted - type 2 of accumulation of the contrast agent. Conclusion based on the results of core biopsy: cancer of the right breast (BI-RADS 5) triple negative (ER0, PR0, HER2 0, Ki-67 70%).

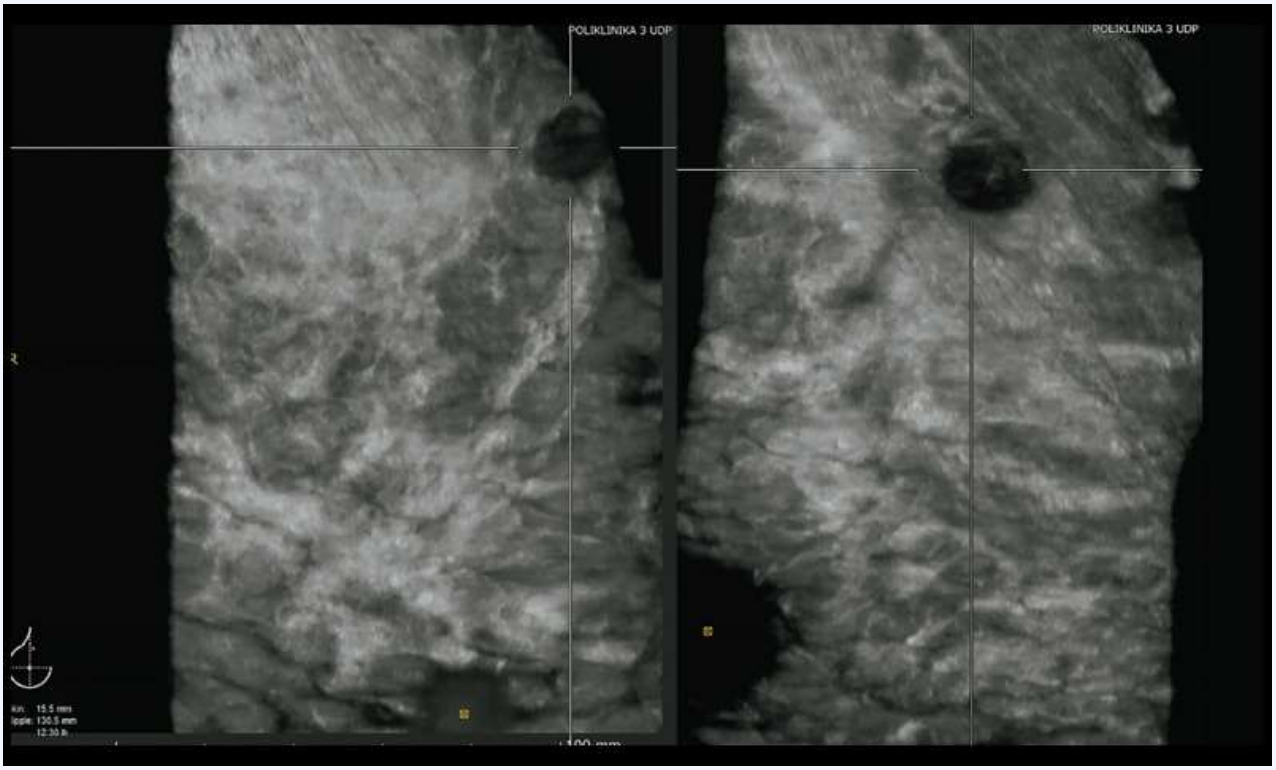


Rice. 10. Ultrasound of patient Ch. Compression elastography mode.

SJIF Impact Factor (2024): 8.675| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 9 | Issue: 5 | May 2024 - Peer Reviewed Journal



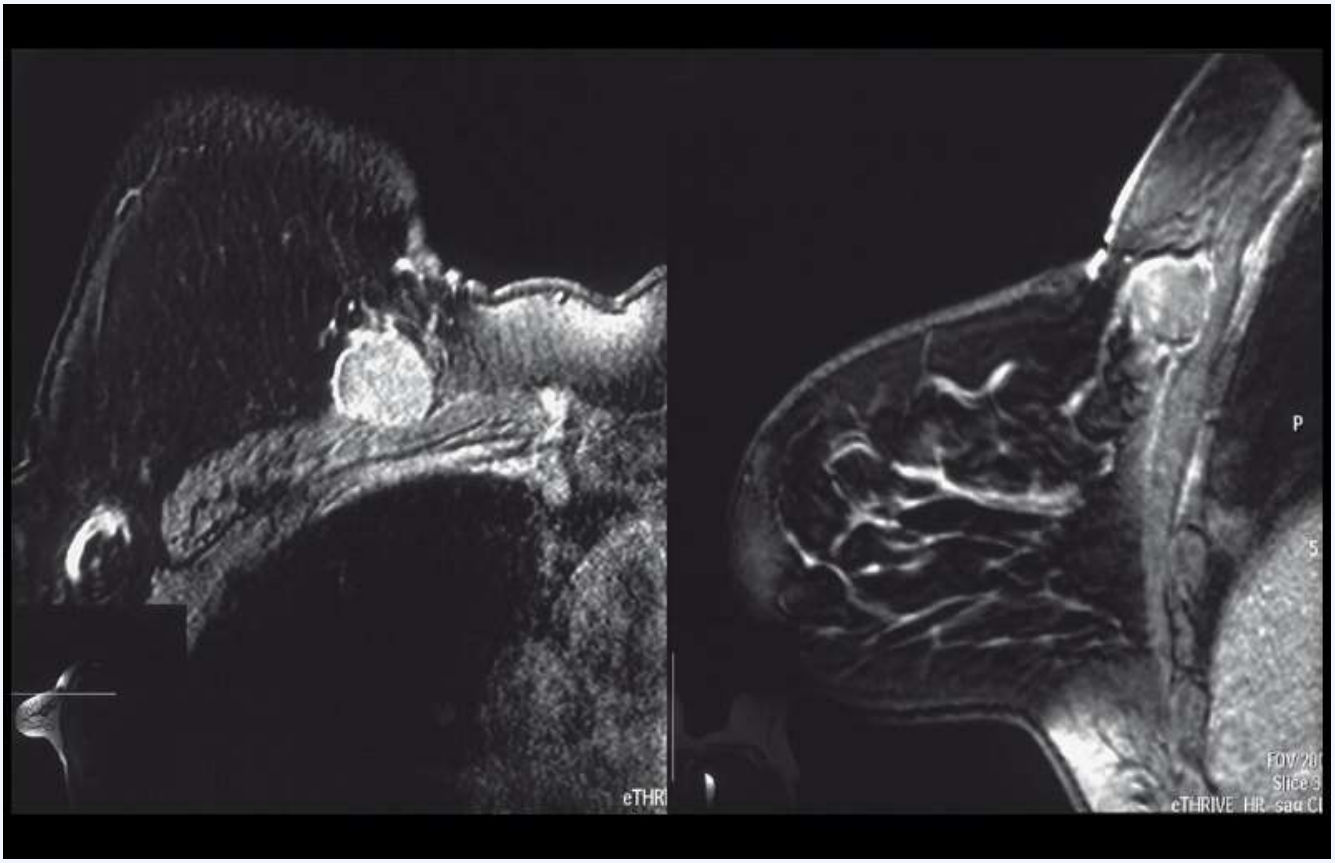
Rice. 11. Ultrasound of patient Ch. Color flow mode.



Rice. 12. Ultrasound of patient Ch. ABVS mode (superior projection, the nipple is visualized along the lower edge of the image and superomedial projection, the nipple is visualized in the lower left corner of the image).

SJIF Impact Factor (2024): 8.675| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 9 | Issue: 5 | May 2024 - Peer Reviewed Journal

Rice. 13. Tomosynthesis of patient Ch.



Rice. 14. MR-MG with contrast enhancement of patient Ch.

In the presented observation, the ultrasound picture in the gray scale and in elastography mode was more typical for fibroadenoma, however, the presence of chaotic vascularization in CDK, jagged contour in ABVS, the presence of a heaviness area and

SJIF Impact Factor (2024): 8.675| ISI I.F. Value: 1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 9 | Issue: 5 | May 2024 - Peer Reviewed Journal

microcalcifications in tomosynthesis made us suspect cancer, which was confirmed by contrast-enhanced MR-MG and core biopsy results.

CONCLUSION

Thus, breast cancer has many faces not only in terms of immunohistochemical parameters, but also in terms of visual characteristics. In this regard, a multimodal approach to its diagnosis using informative innovative technologies, such as elastography and ABVS with ultrasound, tomosynthesis with MG and contrast contrast with MRI is very important. In each specific case, additional imaging methods provide important diagnostic information, forcing the expansion of indications for morphological examination and, ultimately, reducing the time for diagnosis.

LITERATURE

1. *Zakirova L.T., Petrovich Yu.M., Nishanov D.A., Alimkhodzhaeva L.T. Prognostic significance of immunohistochemical markers RE, RP, HER2/neu of breast cancer in young women // Eurasian Journal of Oncology. 2015; 3 (6): 42–47.*
2. *Marchuk I.N., Smolyakova R.M., Shpadaruk E.M., Prokopuk A.I. Immunohistochemical characteristics of molecular biological subtypes of breast cancer // Journal of the Belarusian State University. Ecology. 2019; 3:58–64.*
3. *Molecular Subtypes of Breast Cancer, https://www.komen.org/breast-cancer/diagnosis/molecular-subtypes/*
4. *Rasskazova E.A. Triple negative breast cancer // Oncology. Journal named after P.A. Herzen. 2014; 3 (5): 65–70.*
5. *NCCN Clinical Practice Guidelines in Oncology. Version 2.2017, www.nccn.org.*
6. *Diagnosis and Treatment of patients with Primary and Metastatic Breast Cancer Guidelines Breast. Version 2016.1, www.ago-online.de.*
7. *Cardoso F., Costa A., Senkus E. et al. 3rd ESO – ESMO International Consensus Guidelines for Advanced Breast Cancer (ABC 3), Annals of Oncology, 2017, Vol. 28, pp. 16–33. DOI: 10.1093/annonc/mdw544.*
8. *RUSSCO practical recommendations for drug treatment of invasive breast cancer. 2016. URL: www.rosoncoweb.ru. DOI: 10.18027/2224-5057-2016-4s2-97-122. [Prakticheskie rekomendatsii RUSSCO po lekarstvennomu lecheniyu invazivnogo raka molochnoi zhelezy, 2016, www.rosoncoweb.ru. DOI: 10.18027/2224-5057-2016-4s2-97-122].*
9. *Altinkaya M., Altinkaya N., Hazar B. et al. Sarcoidosis mimicking metastatic breast cancer in a patient with early-stage breast cancer, Ulus. Cerrahi Derg., 2015 July, Vol. 32 (1), pp. 71–74. DOI: 10.5152/UCD. 2015.2989.*
10. *Kim HS, Lee SY, Oh SC et al. Case Report of Pulmonary Sarcoidosis Suspected to be Pulmonary Metastasis in a Patient with Breast Cancer, Cancer Res. Treat., 2014 July, Vol. 46 (3), pp. 317–321. DOI: 10.4143/crt. 2014.46.3.317.*