UDC: 616-006.66:618.19:073.43

DOI: 110.52532/2663-4864-2022-4-66-24-32

S-DETECT FUNCTION AS THE LATEST METHOD OF ULTRASOUND EXAMINATION OF MAMMARY GLAND FORMATIONS: COMPARATIVE CHARACTERISTICS

A.S. KULTAEV[1], I.A. ZAKIRYAROV[2]

[1]«Kazakh Institute of Oncology and Radiology» JSC, Almaty, the Republic of Kazakhstan;
[2]«Asfendiyarov Kazakh National Medical University» NCJSC, Almaty, the Republic of Kazakhstan

ABSTRACT

Relevance: *Worldwide, mammary gland formations remain a public health dilemma. Breast cancer (BC) is one of the leading causes of cancer mortality. Breast cancer ranked 3rd with 8.7-8.1% in the structure of malignant disease mortality in Kazakhstan in 2018-2019.*

Female breast cancer is the most common cancer. Over 2.2 million cases of breast cancer were registered in 2020, according to the WHO. Worldwide, breast cancer ranks fifth among the causes of mortality (685,000 deaths per year).

On average, about 3,000 breast cancer cases are detected yearly in the Republic of Kazakhstan, and more than 1,380 women die from this disease. The high increment rate of breast cancer incidence and mortality, which is ahead of most other cancers, puts breast cancer at the top of the list.

Technological developments in medicine have positively influenced the diagnosis of mammary gland formations. The S-Detect function for the mammary gland formations had been introduced by Samsung Medison, which helps to determine the formation and characterize the affected area. The sonoelastography methods were used for reliable assessment in the early days.

The study aimed to *determine the role of the S-Detect function in the differential diagnosis of mammary gland formations.*

Methods: *A comparative analysis of images taken with the S-Detect function and by the sonoelastography process was carried out in 50 patients.*

Results: *S-Detect program showed correct diagnosis in 92% of cases (46 out of 50 people), confirmed by the results of morphological verification (histology, cytology). The sonoelastography method showed correct results in 80% of cases (40 out of 50 people).*

Conclusion: *The use of S-Detect technology in analyzing mammary gland formations showed good consistency with B-mode, color, and power Doppler mapping. S-Detect technology can effectively help novice radiologists in writing conclusions.*

Keywords: *S-Detect Breast, BI-RADS, breast ultrasound, breast cancer, elastography.*

Introduction: Breast cancer is one of the leading causes of cancer mortality. In 2018-2019, breast cancer ranked third in the Kazakhstani structure of cancer mortality, with a share of 8.7-8.1% [1].

Breast cancer is the most common female cancer. WHO reported over 2.2 million cases of breast cancer registered in 2020. Breast cancer ranks fifth among the causes of mortality in the world (685,000 deaths per year) [2, 3].

About 3,000 breast cancer cases are registered yearly in the Republic of Kazakhstan, and more than 1,380 women die from this disease each year. The annual breast cancer incidence in the Republic of Kazakhstan is growing by 26.6% or more. The high increment rate of breast cancer incidence and mortality, which is ahead of most other cancers, puts the problem of breast cancer at the top of the list [4-6].

Ultrasound examination plays a vital role in the determination of mammary gland formations. Ultrasound is used to analyze palpable formations that are not visualized mammographically and differentiate mammary gland formations in women below 30. Ultrasound is an inexpensive and effective method for distinguishing between cystic and solid mammary gland formations. Ultrasound makes it possible to describe the formation of the mammary gland without exposing the patient to ionizing radiation, which is especially important for pregnant and young patients since mammary glands are more sensitive to radiation in these patients. Mammography is associated with a slightly higher risk of acquiring a radiation-induced neoplasm than ultrasound. The introduction of additional modes of breast formation differentiation contributes to improving ultrasound diagnostics [7].

Recent innovations in breast ultrasound, including S-Detect artificial intelligence technology, have increased the sensitivity and specificity of diagnosing mammary gland formations.

The idea of creating a unified system for assessing the risks of malignancy of focal changes in the mammary gland came up at the end of the 20th century. The system was named BI-RADS by the initial letters of the

Breast Imaging Radiology Data System (Breast Imaging Reporting and Data System is an international system for describing and processing breast ultrasound data). The analysis of focal pathology was based on the criteria of shape, spatial orientation, contours, echogenicity, distal acoustic effects, and additional characteristics of Doppler mapping and elastography [8]. It is known that in ultrasound examination, malignant tumors of the mammary gland can look like a separate formation or just an area with an altered structure of surrounding tissues. The most significant difficulties arise in assessing the tumor focus contours and determining its boundaries with surrounding tissues [8].

On November 25, 2018, at the annual meeting of the Radiological Society of North America (RSNA) in Chicago, Samsung Medison, a leader in medical imaging technology, unveiled the latest development in ultrasound diagnostics: the AI-based S-Detect software. This software analyzes breast lesions and classifies them according to the BI-RADS system.

The U.S. BI-RADS system offers five gradations to assess focal changes in mammary glands. Category BI-RADS 1 – no changes, category BI-RADS 2 – no risk of malignancy, category BI-RADS 3 – the risk of malignancy up to 2%, category BI-RADS 4 – the risk ranges from 3 to 94%, category BI-RADS 5 – the malignancy probability is more than 95%. Two categories of risk of malignancy (4 and 5) require cytological confirmation and a mandatory biopsy [8-10].

Ultrasound sonoelastography is another method for differential diagnosis of mammary gland formations. Elastography, invented in the 1990s, allows tissue stiffness mapping but has just recently gained clinical relevance [11, 12].

Elastography is a non-invasive method that characterizes tissue changes by determining their elasticity (stiffness). Elasticity indicates the degree of a tissue or substance deformation by an external force and at the end of such impact when elasticity allows restoring the original shape and size of the tissue or substance. Different fabrics have different elasticity. Adipose tissue is more easily deformed, and fibrous tissue returns to its original state more slowly than adipose or muscle tissue [12].

The use of elastography with S-Detect technology helps characterize breast formations and distinguish between malignant and benign breast tumors. The stiffness of malignant tumors can be influenced by factors such as fibrotic degeneration, tumor infiltration of the interstitial tissue, or infiltration of the intraductal component [12].

Benign tumors have high elasticity, in contrast to malignant tumors, which have low elasticity. During elastography, ultrasonic beams emitted and perceived by a particular sensor "touch" the tissues of the organ under study like a doctor and evaluate their elasticity (stiffness) using a specific program [13, 14]. Due to its high accuracy, in most cases, S-Detect allows unambiguous and correct diagnosis. However, this technique is still relatively new, and its role in clinical practice has yet to be determined.

The study aimed to determine the role of the S-Detect function in the differential diagnosis of breast tumors.

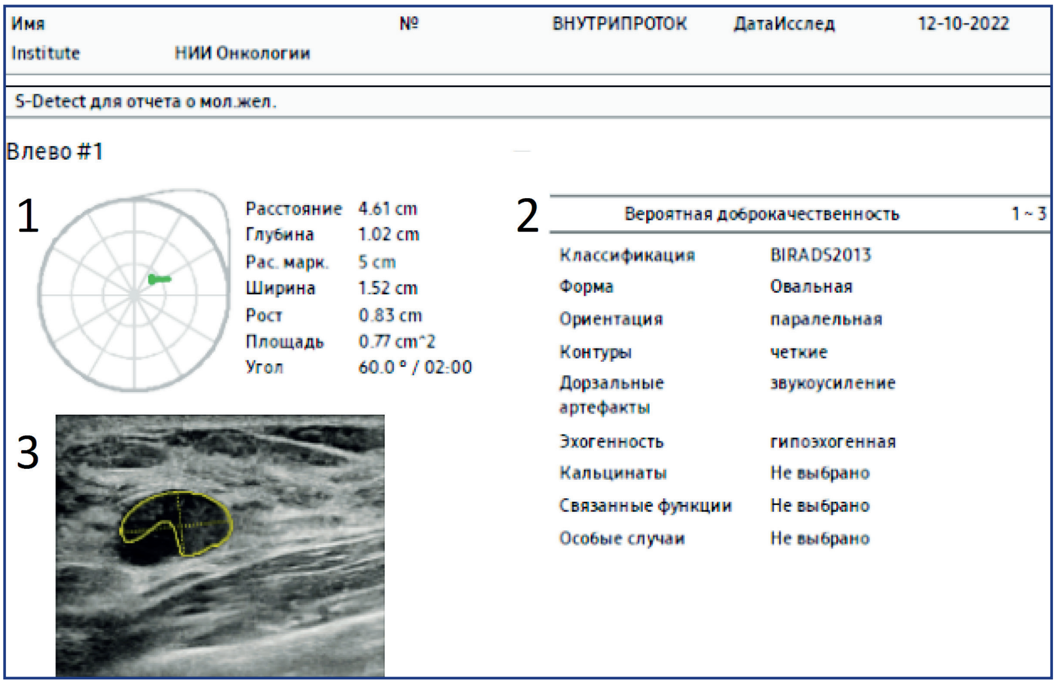


Figure 1 – Evaluation using S-Detect: 1 – position information area, 2 – BI-RADS classification area, 3 – *B*-mode

Materials and methods: This study was conducted at "Kazakh Institute of Oncology and Radiology" JSC (Almaty, Kazakhstan) on an ultrasound machine Samsung Medison RS85 (2022, South Korea). In addition to B-mode, color Doppler mapping (CDM), and power Doppler mapping (PDM), the S-Detect artificial intelligence software and sonoelastography were used to analyze the formations. In any discrepancies in the conclusions, the final diagnosis was established based on morphological verification.

The study included ultrasound data of breast neoplasms in 50 women. The S-Detect program evaluated the image in the transverse and sagittal planes. The procedure was to obtain an image in B-mode, press the Freeze Frame button, turn on the S-Detect program and select the affected area manually or automatically. Further, the program automatically classified the formation under the BI-RADS system [8, 15]. The BI-RADS system contains recommendations regarding the likely goodness or malignancy of the mass. Upon completion of the analysis, the result was printed as a report for the patient, including patient data, lesion location, version, classification, BI-RADS score, and the breast from the S-Detect screen (Figure 1).

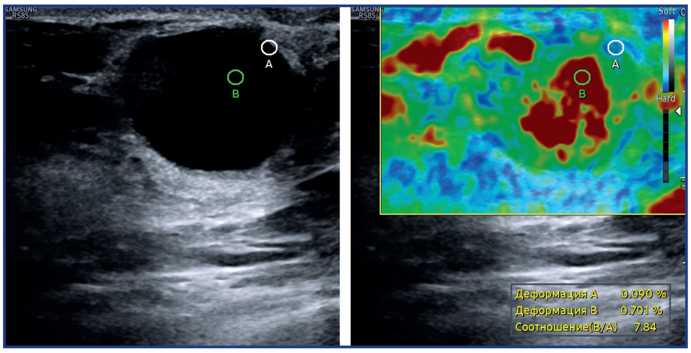
Accuracy, sensitivity, and specificity were calculated assuming all neoplasms classified in categories 4 and 5 were considered malignant, and those classified in categories 2 and 3 were regarded as benign.

In the B-mode, an elastographic image represented a color map obtained with moderate compression of the region under study.

The size of nodes on elastography and in B-mode differed due to tissue fibrosis in the affected area. B-mode and elastography's size differences might indicate a malignancy. The color scale represented relative hardness. On the resulting color map, tissues with greater rigidity were shown in blue, and tissues with less rigidity – in red (Figure 2).

The Tsukuba elasticity score (TES) [16] was used to qualitatively analyze breast formations detected by elastography.

According to the 5-point Tsukuba color scale, incompressible dense areas were displayed in blue (Figure 3). Elastograms of the first three types were benign (Figure 3, types 1-3), and the next 2 were malignant (Figure 3, types 4-5). The figure also showed an RGB (red, green, blue) sign related to benign cysts.



Legend: Деформация А - Deformation A, Деформация В - Deformation B, Соотношение В/А - B/A ratio

Figure 2 – Sonoelastography method

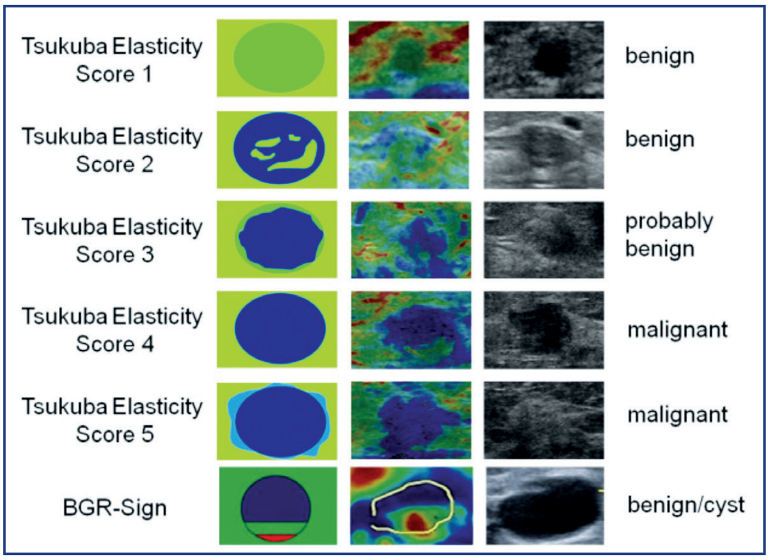
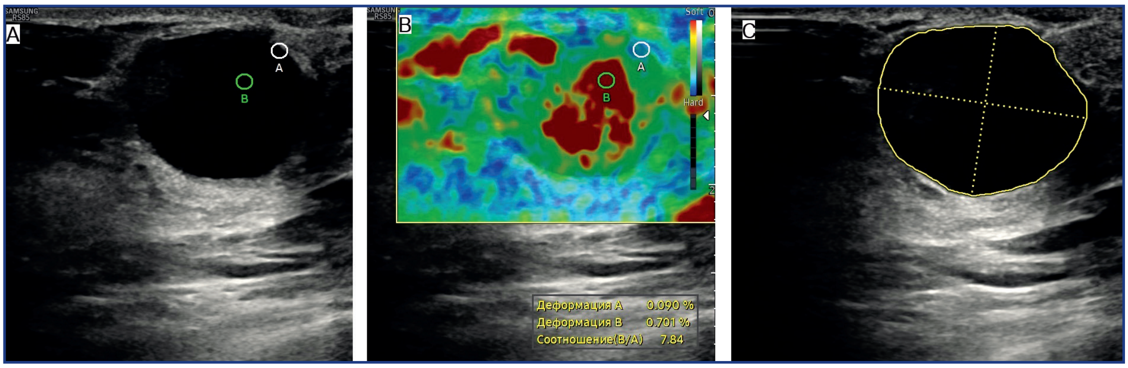


Figure 3 – Tsukuba scale (Wojcinski et al., 2013)

Quantitative analysis of mammary gland elastography utilizes the Strain Ratio of the formation and the Fat Lesion Ratio (FLR). The stiffness of the selected zone is calculated automatically, using the fat lesion deformation of the examined breast as a standard value [12, 17].

Results: The final diagnoses established using the S-Detect program and the sonoelastography method for neoplasms were as follows: fibroadenoma – 3, lipoma – 5, breast cancer – 3, recurrent breast cancer – 3, intraductal papilloma – 2, simple cyst – 5, inflamed cyst – 5, hormonal changes in the glandular tissue – 2, lobular hyperplasia – 3, lactostasis – 2, hematoma – 3, and hidradenoma – 2.

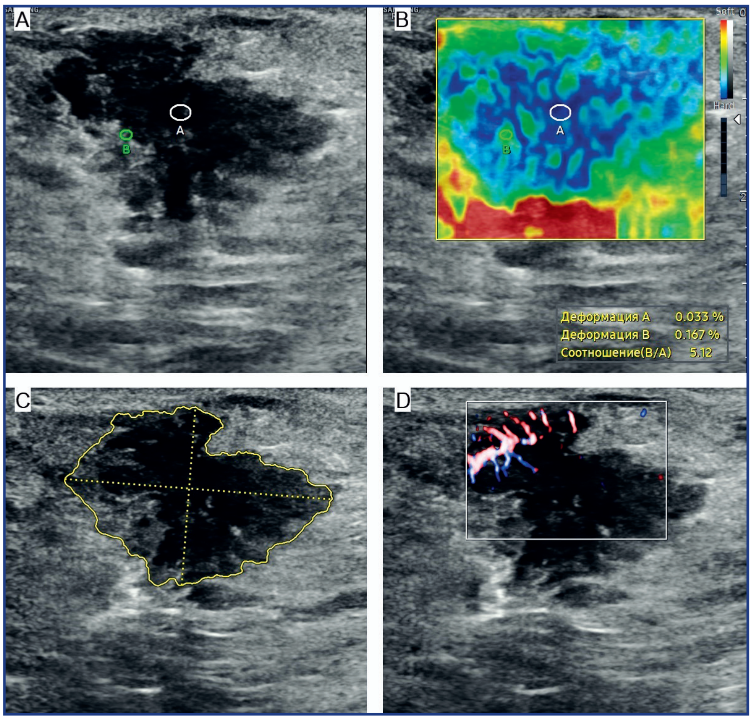
S-Detect allowed the correct diagnosis in 92% (46 out of 50 people) of cases, confirmed by the results of morphological verification (histology, cytology). The sonoelastography method showed correct results in 80% (40 out of 50 people) of cases.



Legend: Деформация A – Deformation A, Деформация B – Deformation B, Соотношение B/A - B/A ratio

Figure 4 - Breast cyst (cross-section): A – *B*-mode, B – elastography, C – S-Detect

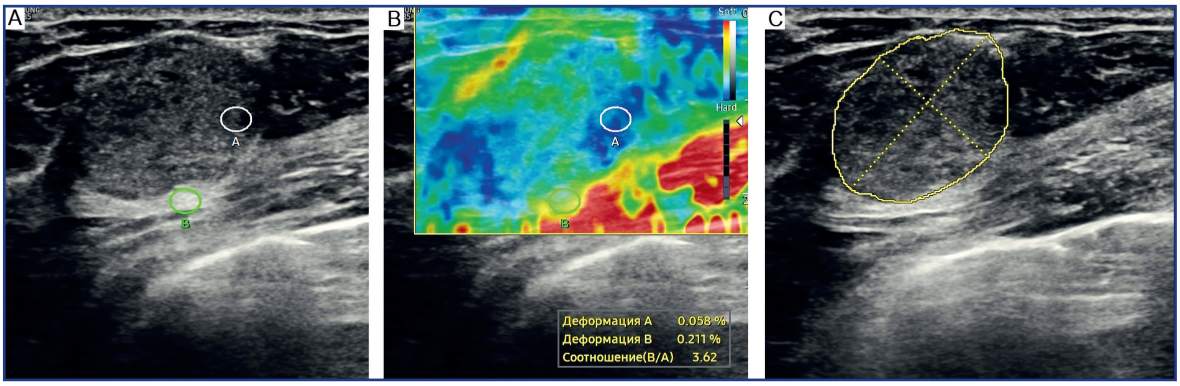
The B-mode (A) and S-Detect (B) images presented in Figure 4 showed the presence of anechoic formations of a round shape, and the contours were precise and even. According to S-Detect, the formation corresponded to BI-RADS 1.2 – a benign formation. The patient was diagnosed with a unilocular cyst. Elastography on the Tsukuba scale (B) showed type 2 and an RGB sign characteristic of benign formations, namely, breast cysts.



Legend: Деформация A – Deformation A, Деформация B – Deformation B, Соотношение B/A – B/A ratio

Figure 5 - Breast cancer (cross-section): A – *B*-mode, B – elastography, C – S-Detect, D – CDM

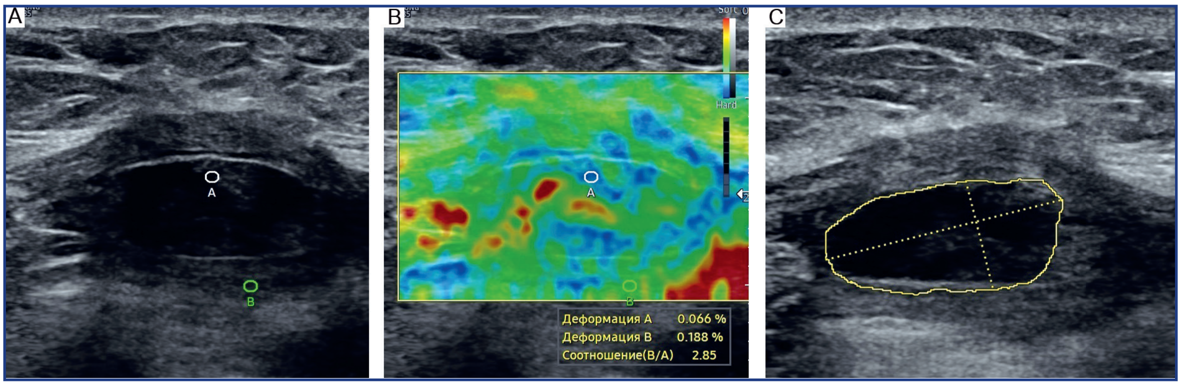
Figure 5 shows irregularly shaped hypoechoic formations with indistinct nerve contours containing calcifications visible in the B-mode (A) and the S-Detect (B) mode. The S-Detect image corresponded to BI-RADS 4.5 – a malignant formation. Elastography (B) showed an area of increased stiffness; according to the Tsukuba scale, it was type 4.5 – a malignant formation; CDM (D) showed a formation with own feeding vessels.



Legend: Деформация А – Deformation A, Деформация В – Deformation B, Соотношение B/A – B/A ratio

Figure 6 – Breast fibroadenoma (cross-section): A – *B*-mode, B – elastography, C – S-Detect

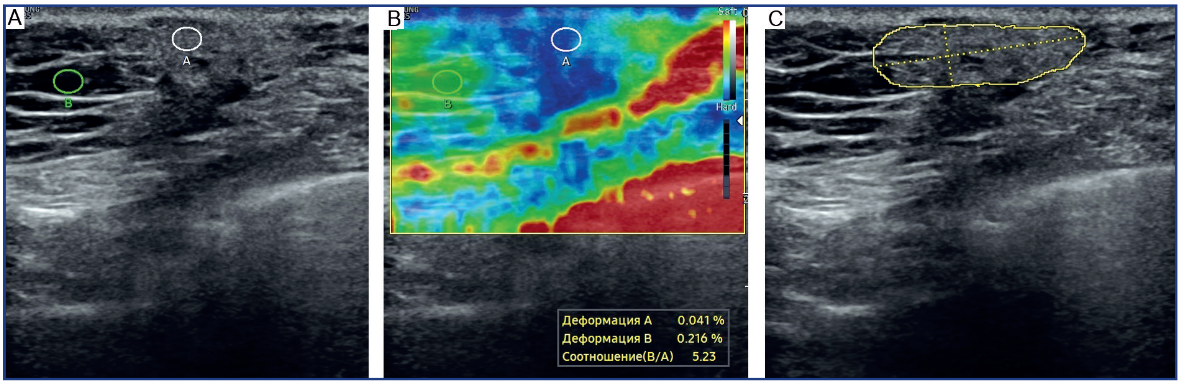
In Figure 6, B-mode (A) and S-Detect mode (B) showed a regular-shaped isoechoic formation with precise, even contours. According to S-Detect, the formation corresponded to BI-RADS 1, 2 – a benign formation. Elastography (B) showed an area of medium hardness; according to the Tsukuba scale, it was type 2 – a benign formation.



Legend: Деформация А – Deformation A, Деформация В – Deformation B, Соотношение B/A – B/A ratio

Figure 7 – Breast hematoma (cross-section): A – *B*-mode, B – elastography, C – S-Detect

Figure 7, B-mode (A) and S-Detect mode (B), shows a regular-shaped hypoechoic mass with precise, even contours. According to S-Detect, the formation corresponded to BI-RADS 1.2 – a benign formation. The Tsukuba scale (B) showed type 2 and an RGB sign, characteristic of benign formations.

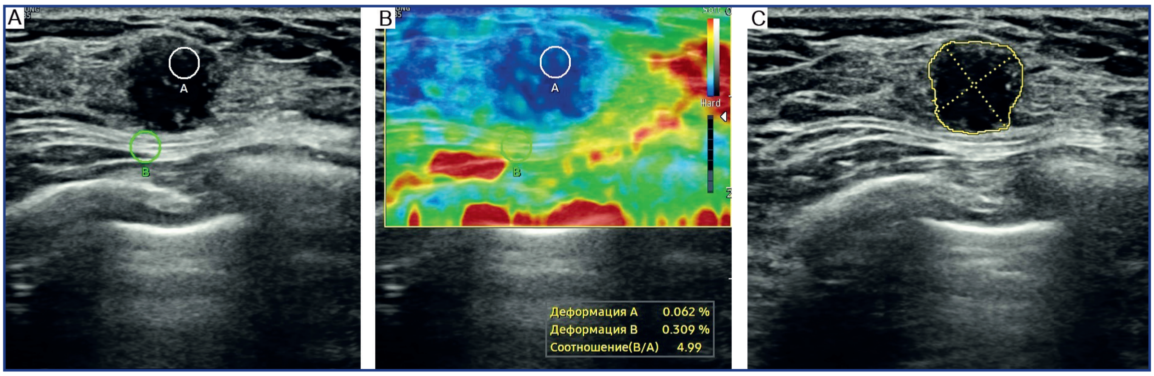


Legend: Деформация А – Deformation A, Деформация В – Deformation B, Соотношение B/A – B/A ratio

Figure 8 – Breast granuloma (cross-section): A – *B*-mode, B – elastography, C – S-Detect

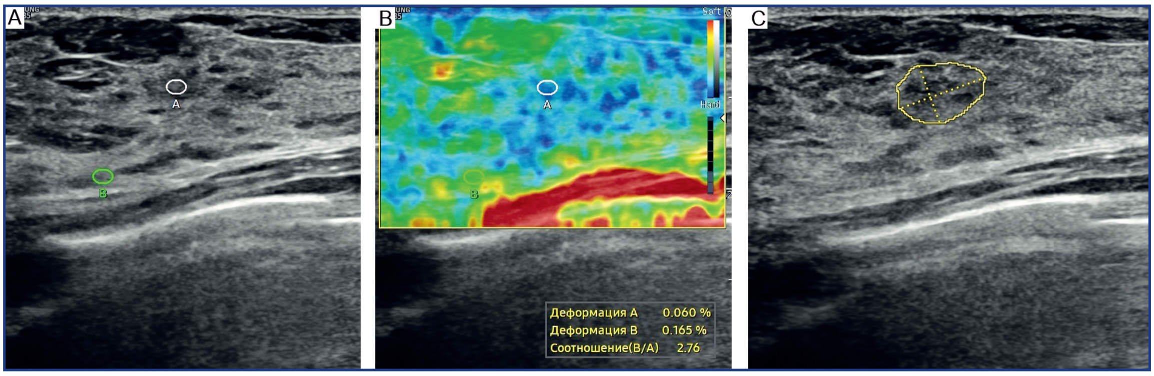
In Figure 8, B-mode (A) and S-Detect mode (B) show a regular-shaped isoechoic mass with precise, even contours. According to S-Detect, the formation corresponded to BI-RADS 1.2 – a benign formation. Elastography mode (B) showed an RGB sign; the Tsukuba score corresponded to type 4 – malignancy. The conducted biopsy confirmed a granuloma.

Figure 9, B-mode (A) and S-Detect mode (B), shows an irregularly shaped hypoechoic mass with precise, uneven contours. According to S-Detect, the formation corresponds to BI-RADS 4.5 – a malignant tumor. Elastography (B) showed a high-density (stiff) formation, type 4.5 on the Tsukuba scale – a malignant formation. The biopsy showed lactostasis (milk cells). In this case, morphological studies were the most informative.



Legend: Деформация А – Deformation A, Деформация В – Deformation B, Соотношение В/А – B/A ratio

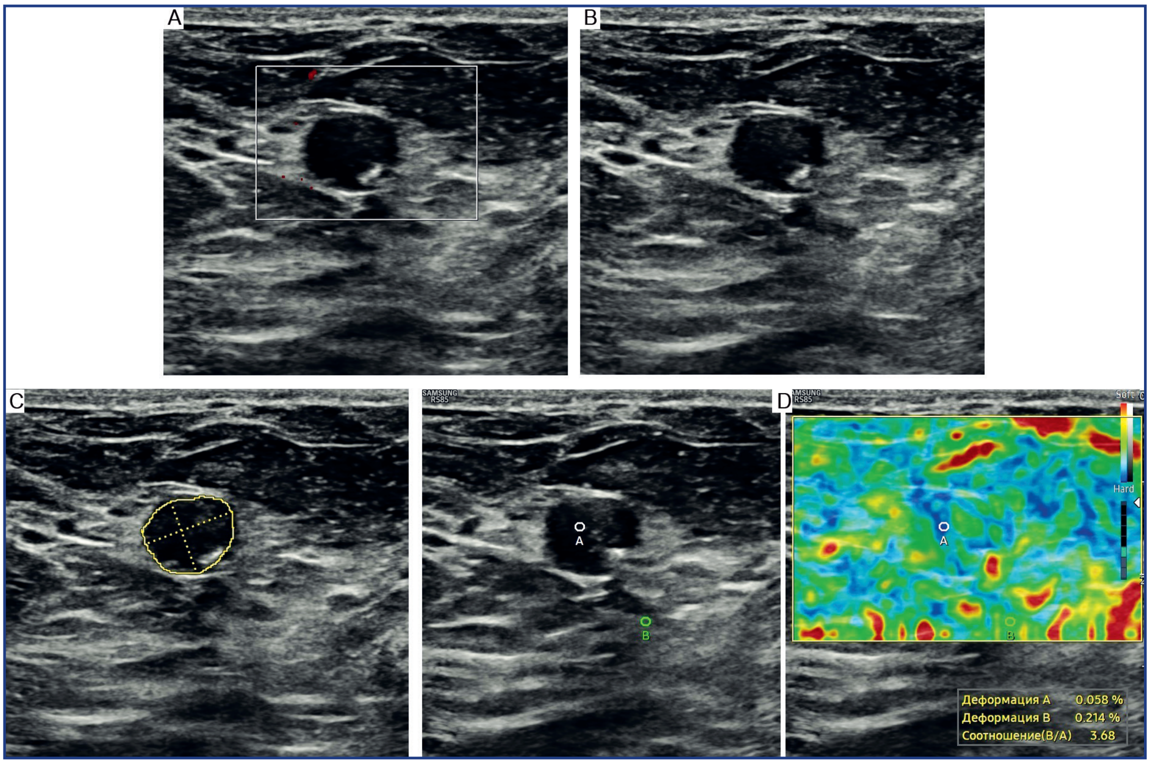
Figure 9 – Lactostasis in the mammary gland (cross-section): A – *B*-mode, B – elastography, C – S-Detect



Legend: Деформация А – Deformation A, Деформация В – Deformation B, Соотношение В/А – B/A ratio

Figure 10 – Breast fibroadenoma (cross-section): A – *B*-mode, B – elastography, C – S-Detect

As shown in Figure 10, B-mode (A) and S-Detect (B) illustrated a hypoechoic formation with precise, uneven contours. The S-Detect image corresponded to BI-RADS 1.2 – a benign formation. Elastography (B) showed a formation of medium density (stiffness); according to the Tsukuba scale, it was type 3 – a probably benign formation. The biopsy confirmed fibroadenoma.



Legend: Деформация А – Deformation A, Деформация В – Deformation B, Соотношение В/А – B/A ratio

Figure 11 – Cystadenoma of the breast (cross-section): A – CDI, B – *B*-mode, C – S-Detect, D – elastography

In Figure 11, B-mode (B) and S-Detect (C) show a well-shaped hypoechoic mass with precise, even contours. The S-Detect image corresponded to BI-RADS 1.2 – a benign formation. The elastography (D) results corresponded to an RGB sign characteristic of benign formations, type 2 on the Tsukuba scale – a benign formation. CDM (A) showed an avascular formation. Final diagnosis: breast cystadenoma.

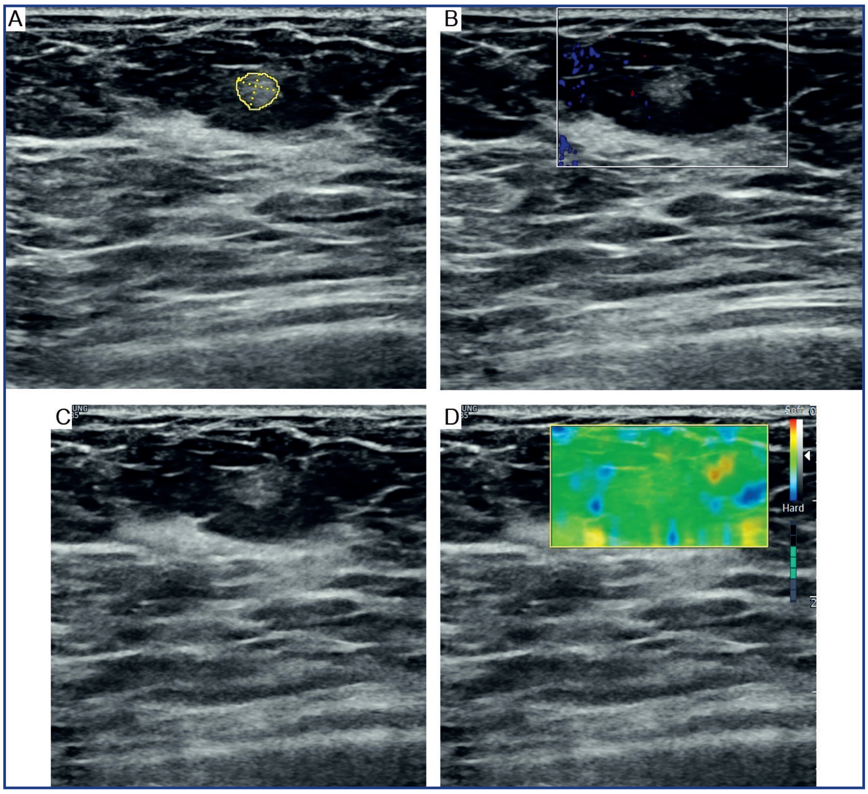


Figure 12 – Breast lipoma (cross-section): A – S-Detect, B – CDM, C – *B*-mode, D – elastography

Figure 12 shows S-Detect (A) and B-mode (B) images of a well-shaped hyperechoic mass with precise, even contours. The S-Detect image corresponded to BI-RADS 1.2 – a benign formation. Image (B) showed an avascular mass (CDM). Tsukuba scale type 2 – a benign formation. Elastography (D) showed low-density formation.

Discussion: In our study, S-Detect was more effective in diagnosing malignant and benign formations than Doppler or non-Doppler ultrasound examinations.

Comparative assessment of S-Detect and sonoelastography in the differential diagnosis of breast formations showed that S-Detect provided a correct, morphologically verified (histology, cytology) tumor diagnosis in 92% (46/50) of cases. Thus, S-Detect had a sensitivity of 92%, an accuracy of 90%, and a specificity of 91%. Sonoelastography showed a diagnostic accuracy of 80% (40/50), a sensitivity of 86.5%, a specificity of 89.8%, and an accuracy of 88.3%.

S-Detect characterizes neoplasms by differentiating them according to the BI-RADS system. Unfortunately, S-Detect is not always precise in classifying structural changes. Despite this, the S-Detect Breast system is an effective tool for processing and analyzing ultrasound images of breast neoplasms. S-Detect can be used as an additional diagnostic tool to improve breast ultrasound's specificity, accuracy, and sensitivity in clinical practice and guide decisions regarding US-detected breast masses. The S-Detect system has significantly improved the BI-RADS classification accuracy. Elastography is used for differential diagnosis of dubious formations. Images taken in B-mode, CDM, and PDM do not always allow for an unambiguous diagnosis. This requires utilizing all available additional ultrasound methods, including elastography. Such an approach ensures success and clearly improves the efficiency of primary US examination results. Assessing stiffness using elastography allows a more objective differentiation of both benign volumetric formations and malignant formations in the mammary gland. When the vertical axis of the tumor cannot be measured due to dorsal echo attenuation or acoustic shadowing, elastography defines the margin by tissue stiffness.

The S-Detect function enhances US diagnostic value by analyzing the image displayed regardless of the tumor depth and localization in the gland. Using the S-Detect function in breast ultrasound examinations can reduce the number of unnecessary interventions.

Conclusion:

Conventional B-mode 2D imaging will continue to serve as the main mode for breast ultrasound. However, several other modern ultrasound technologies can be used for differential diagnosis. 3D ultrasound allows holistic and reproducible tumor imaging, particularly in the frontal plane, which is impossible with conventional methods. Doppler ultrasound provides information about tumor vascularization. The S-Detect function expands the range of diagnostics by adding another level of perception that characterizes the lesion itself and its contact with surrounding tissues [10]. The S-Detect technology is especially valuable for radiologists since it provides a conclusion protocol with criteria for assessing the degree of malignancy.

Using the S-Detect function positively affects the results of primary breast ultrasound examinations.

References:

1. Goncharova T.G., Kaidarova D.R., Omarbaeva N.A., Askandirova A.B., Orazgalieva M.G., Adilbay D.G., Cheishvili D., Vaisheva F., Szyf M. Development method of early diagnosis of breast cancer based on epigenetic markers // Oncology and radiology of Kazakhstan. - 2020. – No. 4 (58). – P. 29-35 [Goncharova T.G., Kaidarova D.R., Omarbayeva N.A., Askandirova A.B., Orazgaliyeva M.G., Adilbay D.G., Cheishvili D., Vaisheva F., Szyf M. Razrabotka metoda ranney diagnostics raka molochnoj zhelezy na foundation e'pigeneticheskix markerov // Onkologiya i radiologiya Kazakhstan. – 2020. – No. 4 (58). – S. 29-35 (in Russ.)] https://doi.org/10.52532/2521-6414-2020-4-58-29-35.

2. DeSantis Carol E., Bray F., Ferlay J., Lortet-Tieulent J., Anderson B.O., Jemal A. International variation in female breast cancer incidence and mortality rates // Cancer Epidemiol Biomarkers Prev. – 2015. – Vol. 24(10). – P. 1495-1506. https://doi.org/10.1158/1055-9965.EPI-15-0535.

3. Chertishcheva I.L., Li V.E., Bekezhan A.B., Masadykov A.S., Shalgumbaeva G.M., Saidualiev D.N. Incidence and mortality from breast cancer in Kazakhstan for 2015-2019 // Science and Health. – 2021. – No. 2 (23). – S. 148-154. [Chertishheva I.L., Li V.E., Bekezhan A.B., Masadykov AS, Shalgumbaeva GM, Sajdualiev DN Zabolevaemost ' i smertnost ' ot raka molochnoj zhelezy v Kazakhstan za 2015-2019 gody // Science and Zdravooxranenie – 2021. – No. 2 (23). – S. 148-154. (in Russ.)]. https://doi.org/10.34689/SH.2021.23.2.016.

4. Beisebaev E.N. Evaluation of the role of social determinants in screening studies and 5-year survival of women with breast cancer: dis. … doc. Philosophy: 6D110200. – Almaty: S.D. Asfendiyarov KazNMU, 2015. – P. 91. [Bejsebaev EN Ocenka roles social'nyx determinantov v screeningovyx issledovaniyax i pyatiletney vyzhivaemosti zhenshhin's disease raka molochnoj zhelezy: dis. … doc. filosofii : 6D110200. – Almaty: S.D. Asfendiyarov KazNMU, 2015. - 91 s. (in Russ.)]. https://kaznmu.edu.kz/rus/wp-content/uploads/2015/11/ THESIS - Beisebayeva - E . H.1.pdf.

5. Clinical protocol for the diagnosis of treatment. Breast cancer: recommended. Expert Council of the RCHD of the MHSD of the Republic of Kazakhstan dated November 27, 2015, protocol No. 17 [Klinicheskij protocol diagnostics treatment. Rak molochnoj zhelezy : rekomend . E'kspertnym sovetom RCRZ MZSR RK ot 27.11.2015, protocol No. 17 (in Russ.)]. https://onco.kz/wp-content/uploads/2017/12/23.pdf.

6. World Health Organization. Mammary cancer. Basic facts. 03/26/2021 [Vsemirnaya organization zdravoxraneniya. Rak molochnoj zhelezy . Fundamentals facts. 03/26/2021 (in Russ.)]. https://www.who.int/ru/news-room/fact-sheets/detail/breast-cancer.

7. Fisher P.R. Ultrasound in breast cancer. 05/15/2019 [Fisher PR UZI pri rake molochnoj zhelezy. May 15, 2019 (in Russ.)]. https://rh.org.ru/statti/uzi-pri-rake-molochnoj-zhelezy/.

8. Zabolotskaya N. B. Grade risks malignancy US BI-RADS using auto classifier S-Detect, dopplerography, and elastography on the Ultrasound scanners Samsung Medison // SonoAce Ultrasound. – 2020. – No. 32. – S. 91-98. [Zabolotskaya N.V. Ocenka riskov zlokachestvennosti US BI-RADS s ispol'zovaniem autoclassificatora S-Detect, dopplerografiii i e'lastografii na UZ- skanerax Samsung Medison // SonoAce Ultrasound. – 2020. – No. 32. – S. 91-98. (in Russ.)] https://www.medison.ru/si/art477.htm

9. Samsung Newsroom. Samsung Brings Together Medical Imaging and AI for Radiologists at RSNA 2018. – USA. – 11/26/2018. https://news.samsung.com/global/samsung-brings-together-medical-imaging-and-ai-for-radiologists-at-rsna-2018

10. Duda V., Kohler C., Stamm A., Storch A. Technology ElastoScan in diagnostics diseases dairy glands: top 10 discussed questions // SonoAce Ultrasound. – 2016. – C. 88-93 [Duda V., Kohler C., Stamm A., Storch A. Texnologiya e'lastografii ElastoScan ™ v diagnostics disease milkyx zhelez: 10 samyx obsuzhdaemyx voprosov // SonoAce Ultrasound. – 2016. – S. 88-93 (in Russ.)]. https://www.medison.ru/si/art433.htm

11. Barr RG Future of breast elastography // Ultrasonography. – 2019. – Vol. 38(2). – P. 93-105. https://doi.org/10.14366/usg.18053

12.R.H. Elastography dairy glands, review Literature 11.04.2014 [RH.E'lastografiya molochnoj zhelezy , obzor literature . 04/11/2014 (in Russ.)]. https://rh.org.ru/statti/elastografiya-molochnoj-zhelezy-obzor-literatury

13. Chen Y., Gao Y., Chang C., Wang F., Zeng W., Chen J. Ultrasound shear wave elastography of breast lesions: correlation of anisotropy with clinical and histopathological findings // BMC Medical Imaging. – 2018. – Vol. 11. https://cancerimagingjournal.biomedcentral.com/articles/10.1186/s40644-018-0144-x

14. Zheng X., Li F., Xuan Z.D., Wang Y., Zhang L. Combination of shear wave elastography and BI-RADS in the identification of solid breast masses // BMC Med. Image. - 2021. - Vol. 21(1). – Art. ID 183. https://doi.org/10.1186/s12880-021-00702-4.

15. Dällenbach RZ, Plodinec M., Oertle P., Redling K., Obermann EC, Lim RYH, Schoenenberger CA Length Scale Matters: Real-Time Elastography versus Nanomechanical Profiling by Atomic Force Microscopy for the Diagnosis of Breast Lesions // BioMed. Res. Int. – 2018. – Vol. 2018. – Art. ID 3840597. https://doi.org/10.1155/2018/3840597.

16. Busko E.A., Semiglazov B.V., Mishchenko A.V., Black A.V., Kostromina E.V., Semiglazova T.Yu., Zaitsev A.N., Kurganskaya I.Kh., Rogachev M. V., Borsukov A. V., Safronova M. A. Compression sonoelastography dairy glands: Educational allowance for doctors' ultrasonic diagnostics. N.N. Petrov Research Institute of Oncology // St. Petersburg-2015.

17. R.H. Clinical application of breast elastography: recent advances. 12/15/2014 [RH. Klinicheskoe primenenie e'lastografii molochnoj zhelezy: poslednie dostizheniya. 12/15/2014. (in Russ.)]. https://rh.org.ru/statti/klinicheskoe-primenenie-elastografii-molochnoj-zhelezy-poslednie-dostizheniya/

АҢДАТПА

СҮТ БЕЗІ ТҮЗІЛІМДЕРІН УЛЬТРАДЫБЫСТЫҚ ЗЕРТТЕУДІҢ ЕҢ СОҢҒЫ ӘДІСІ РЕТІНДЕ S-DETECT ФУНКЦИЯСЫ: САЛЫСТЫРМАЛЫ СИПАТТАМА

А.С. Култаев[1], И.А. Закирянов[2]

[1]«Қазақ онкология және радиология ғылыми-зерттеу институты» АҚ, Алматы, Қазақстан Республикасы;
[2]«С.Ж. Асфендияров атындағы Қазақ ұлттық медицина университеті» КеАҚ, Алматы, Қазақстан Республикасы

Өзектілігі: *Сүт бездерінің қатерлі ісігі (СБҚІ) бүкіл әлемдік қоғамдық денсаулық мәселесі болып қалыптасқан. Барлық сүт бездерінің қатерлі ісігі өлім себебі болып табылады. Соңғы мәлімдеген бойынша сүт бездерінің қатерлі ісігі 3 орында болып 8,7-8,1% 2018-2019ж. көрсеткішке ие болған.СБҚІ әйелдер арасындағы жиі таратылатын ауру болып саналады. Дүниежүздік денсаулық сақтау ұйымының мәлімдемесі бойынша 2020 ж. СБҚІ-не 2,2 млн ісік аурулары тіркеліп бесінші орында тұр. Қазақстан Республикасында жыл сайын 3000 астам СБҚІ түртеп, оның ішінде,1380 аса әйелдер өлім себебі болып табылады. Диагностика СБҚІ компания Samsung Medison S-Detect тексерілу мүмкіндігін тереңдетіп қамтамасыу етті, сондай-ақ соноэластография әдісін жүргізді.*

Зерттеудің мақсаты: *СБҚІ S-Detect функциясымен дифференциалды диагностикалы тексеру*
Әдістері: *Орындалған талдауларды салыстыру барысында СБҚІ диагностикасын S-Detect функциясымен және соноэластография-мен асырдық.*
Нәтижелері: *S-Detect программасы 87-93% (50-ден 46дәлілде) диагноз қойылды, зерттеу морфологиялык (гистология, цитология) тұжырымына сәйкес келді, соноэластография әдесі 75-80% (50-ден 40 дәлелде) сәйкестік болып табылды.*
Қорытынды: *S-Detect технологиясын және соноэластография әдісі арқылы СБҚІ диагностикасы тамаша болып табылды. S-Detect жаңадан радиология салысындағы маммология мамандарына жақсы көмекші болып табылады.*
Түйінді сөздер: *S-Detect Breast , BI-RADS , сүт безінің ультрадыбыстық зерттеу, сүт безінің ісігі, соноэластография.*

ABSTRACT

ФУНКЦИЯ S-DETECT КАК НОВЕЙШИЙ МЕТОД УЛЬТРАЗВУКОВОГО ИССЛЕДОВАНИЯ ОБРАЗОВАНИЙ МОЛОЧНЫХ ЖЕЛЕЗ: СРАВНИТЕЛЬНАЯ ХАРАКТЕРИСТИКА

А.С. Култаев[1], И.А. Закиряров[2]

[1]АО «Казахский научно-исследовательский институт онкологии и радиологии», Алматы, Республика Казахстан;
[2]НАО «Казахский Национальный Медицинский Университет имени С.Д. Асфендиярова», Алматы, Республика Казахстан

Актуальность: *Образования молочной железы остаются дилеммой общественного здравоохранения во всем мире. Рак молочной железы (РМЖ) является одной из ведущих причин онкосмертности. Так, в Казахстане в 2018-2019 гг. РМЖ занимал 3 место в структуре смертности от злокачественных заболеваний с долей 8,7-8,1%.*
РМЖ – самое распространенное онкологическое заболевание среди женщин. По данным ВОЗ в 2020 г. было зарегистрировано свыше 2,2 млн. случаев РМЖ. В мире РМЖ занимает пятое место среди причин смертности (685 000 смертей в год).
В среднем в Республике Казахстан каждый год выявляют порядка 3000 случаев РМЖ, и более 1380 женщин умирают от данного заболевания. Высокий темп прироста заболеваемости и смертности, опережающий большинство других опухолей, выдвигает проблему РМЖ на ведущее место.
Стремительный прогресс технологических разработок в области медицины положительно повлиял на диагностику образований молочной железы. Компания Samsung Medison представила функцию S-Detect для молочной железы, которая позволяет выделить образование и дать характеристику зоне поражения. Ранее достоверные оценки проводились методами соноэластографии.
Цель исследования *– определить роль функции S-Detect в дифференциальной диагностике образований молочной железы.*
Методы: *Проведен сравнительный анализ снимков, снятых с функцией S-Detect и методом соноэластографии у 50 пациентов.*
Результаты: *Программа S-Detect позволила, верно, поставить диагноз в 92% (46 из 50 человек) случаев, что было подтверждено результатами морфологической верификации (гистология, цитология). Метод соноэластографии показал верные результаты в 80% (40 из 50 человек) случаев.*
Заключение: *Применение технология S-Detect при анализе характера образований в молочных железах показал хорошую согласованность с В-режимом, цветовым и энергетическим допплеровским картированием. Технология S-Detect может эффективно использоваться начинающими врачами-радиологами при написании заключений.*
Ключевые слова: *S-Detect Breast, BI-RADS, УЗИ молочной железы, рак молочной железы, эластография.*

Transparency of the study: *Authors take full responsibility for the content of this manuscript.*
Conflict of interest: *Authors declare no conflict of interest.*
Financing: *The study was carried out at "KAZIOR" JSC and "Asfendiyarov Kazakh National Medical University" NCJSC.*
Authors' input: *contribution to the study concept – Kultaev A.S., Zakiryarov I.A.; study design – Kultaev A.S., Zakiryarov I.A.; execution of the study – Kultaev A.S., Zakiryarov I.A.; interpretation of the study – Kultaev A.S., Zakiryarov I.A.; preparation of the manuscript – Kultaev A.S., Zakiryarov I.A.*
Authors' data:
Kultaev Askhat Seytkhanovich – Ph.D., doctor of the highest category, ultrasound doctor, "KAZIOR" JSC, Almaty, the Republic of Kazakhstan, tel. +7772476103, e-mail: kultaevaskhat@mail.ru, ORCID ID: https://orcid.org/0000-0003-0306-3616;
Zakiryarov Ilia Abdumagametovich (**corresponding author**) – 2nd year resident in Radiology, "Asfendiyarov Kazakh National Medical University" NCJSC, **Almaty, Palladin St. 190A, the Republic of Kazakhstan**, tel. +77758123000, e-mail: iliya_barsa@mail.ru, ORCID ID: https://orcid.org/0000-0002-9312-9772.