

MOLECULAR SUBTYPES AND IMAGING PHENOTYPES OF BREAST CANCER: MRI

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Background: When assessing the oncological process of breast cancer, the degree of tumor differentiation is an important indicator that can be used to assess malignant behavior and prognosis of breast cancer. However, a histopathologic grade is often only obtained after surgery, with limiting its role in breast cancer treatment options are crucial. In this regard, the research for non-invasive criteria for assessing the degree of aggressiveness of breast cancer is relevant. In the early 2000s, several authors demonstrated that factors such as the histological grade of the tumor and hormone receptors (estrogen and progesterone) affect the appearance of the radiological images are obtained.

Purpose of the study: To study of the correlation between MR signs, the degree of cell differentiation and molecular classification of breast cancer

Material and methods. The study was conducted in 70 women with a verified diagnosis of breast cancer who were examined and treated at the RSSPMCO&R between 2017-2019 years.

Conclusion: Our studies have shown that the pathologically determined degree of differentiation of breast cancer and molecular types and subtypes affect the visualized morphological characteristics and its functional features, assessed by magnetic resonance imaging with dynamic contrast enhancement.

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Results: The correct rounded/oval or lobular form of the formation on the MRI, is more characterized of benign tumors, in our studies were observed in 77.7% of patients with highly differentiated G₁ of breast cancer. Well, in 66.7% of these patients type II ("plateau") was noted and in 33.3% of type III curves according to MRI with DCE, which confirmed the presence of breast cancer. The combination of II and III types of dynamic MRI curves with the correct form of formation according to the anatomical MRI data testified in favor of highly differentiated type G₁ breast cancer. In patients with medium- differentiated (G₂) of breast cancer on MRI, the irregular shape prevailed, in 77.8%, unevenness or spiculated contours were noted in 70.3%. According to MRI with DCE, type III ("washout") was detected in 88.9%. In undifferentiated cancer (G₃), in all patients, without exception on MRI, the lesions had an irregular shape, uneven or spiculated contours and type III intensity-time curve according to MRI with DCE. The luminal A subtype was observed in the majority of patients (22 out of 70 cases; 31.4%). For luminal A type, the following MR signs were revealed: nodular formations more often had an irregular shape - 21 (95.5%), uneven (59.1%), less often speculated contours (27.3%). In 16 out of 22 cases, the contrasting was annular. Type III intensity-time curve at MRI with DCE was found in all 22 patients with luminal A subtype of breast cancer. It should be noted that all additional MR signs (thickening and deformities of the skin over the formation) were also found in luminal subtype A. The luminal B-subtype was detected in 20 patients (28.6%), and in 12 patients Her2/neu positive luminal B-subtype and in 8 cases - Her2/neu negative subtype. These two subtypes of the lesions visualized on MRI images were characteristic (irregular shape with fuzzy contours and annular contrasting), but 4 out of 12 patients with luminal Her2/neu positive subtype showed type II ("plateau") on MRI with DCE. The same type of curve was observed in 5 out of 11 patients (45.5%) with Her2/neu positive breast cancer. At the same time, with luminal A subtype, luminal B Her2/neu negative subtype and triple negative breast cancer, type III (washout) of the dynamic contrasting curve was always observed. Consequently, the II type of curve could be observed only with Her2/neu positive types of breast cancer, and was not found with Her2/neu negative types. Even such an aggressive form as triple negative breast cancer, unlike other types, did not always appear on MRI images with an irregular shape and uneven or spiculated contours. In our studies, in 53% of triple negative of breast cancer was showed on MRI with a round-oval or lobular shape, and in 17.6% with smooth contours.