JOANNA GUSTALIK-NOWICKA

PRZYDATNOŚĆ DIAGNOSTYCZNA CZASÓW RELAKSACJI METODĄ REZONANSU MAGNETYCZNEGO ORAZ SKUTECZNOŚĆ TERAPII FOTODYNAMICZNEJ W RAKU PIERSI

Streszczenie w języku angielskim

One of the two research problems is the magnetic resonance imaging of cancer cells in the breast cancer tissue specimen. This examination may contribute to the improvement of the detection of breast malignant neoplasms, which will facilitate the correct assessment of the stage of the disease and will allow to make the right decision as to the planned therapeutic method. The second research problem was the histopathological assessment of the response of breast cancer cells to photodynamic therapy. The response to the treatment assessed in the microscopic slide made it possible to select the optimal dose of the photosensitizer to obtain the desired therapeutic effect.

The research used 1.5 Tesla magnetic resonance imaging model Optima MR360 by General Electric Healthcare. Additionally, dedicated gradient coils were used to perform measurements with the use of a strong magnetic field. The analysis of the obtained data was performed using the licensed MATLAB package.

The studies were carried out on tissue fragments that were not fixed by formalin. In the first stage, the longitudinal and transverse relaxation was determined, which made it possible to characterize the tested samples. Based on the obtained digital signal and image reconstruction, which is created by using the Fourier transform, the data for analysis were obtained. The next stage was data analysis, in which the obtained results were carefully assessed in order to determine the T1 and T2 relaxation times in the tested samples. In the next stage, a histopathological preparation made of the examined breast cancer specimen was assessed under a microscope. The excerpt contained breast cancer cells and non-neoplastic tissue. In the last phase of the experiment, the changes visible in the MR examination were correlated with the histopathological image in order to find possible correlations.

After performing MR imaging and securing the fragment for the paraffin block, the tissues were subjected to phototherapy and then fixed. In the pathology department, the histopathological preparation was assessed and the obtained result will be correlated with the administered dose of photosensitizer. This process allowed to establish the minimum effective therapeutic dose of the photosensitizer.