

## Magnetic Resonance Imaging and Positron-Emission Tomography with $^{18}\text{F}$ -Fluorodeoxyglucose Application for Breast Cancer Diagnosis (Literature Review with Case Reports)

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### Abstract

Breast cancer is a socially significant medical problem all over the world. Optimal treatment plan requires precise staging. Magnetic resonance imaging (MRI) and positron emission tomography (PET) have made significant progress in recent decades, being clinically significant for various stages of the oncological process. MRI of the breast provides high diagnostic accuracy for local tumor evaluation. Whole-body DWI allows to identify distant metastases. On the other hand, PET with  $^{18}\text{F}$ -FDG, combined with computed tomography (CT), also has high diagnostic properties in the detection of distant metastases. PET/MRI is a rapidly developing technology, the use of which is justified when it is necessary to simultaneously obtain data on the local status of the tumor and its metabolic activity. However, more clinical data is now required to demonstrate the benefits of simultaneous data collection. The optimization of the PET/MRI protocols in breast cancer continues, which will increase the diagnostic accuracy. This review focuses on the current state of art in the field of using MRI and  $^{18}\text{F}$ -FDG PET in the diagnosis of breast cancer, ways to develop the method and potential applications in the future.

**Key words:** Breast Cancer, Breast Magnetic Resonance Imaging, Positron-Emission Tomography, Combined with Computer Tomography,  $^{18}\text{F}$ -fluorodeoxyglucose, Positron-Emission Tomography, Combined with Magnetic Resonance Imaging.

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