

Correlation between Apparent Diffusion Coefficient Values in Breast Magnetic Resonance Imaging and Prognostic Factors of Breast Invasive Ductal Carcinoma

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ABSTRACT

Background: We wanted to examine whether the apparent diffusion coefficient values obtained by diffusion-weighted imaging techniques could indicate an early prognostic assessment for patients with invasive ductal carcinoma and therefore, influence the treatment decision making.

Objective: The main objective was to evaluate the correlation between the apparent diffusion coefficient values obtained by diffusion-weighted imaging and the key prognostic factors in breast invasive ductal carcinoma. Secondary objectives were to analyze the eventual correlations between magnetic resonance imaging findings and prognostic factors in breast cancer; and to perform a comparison between results in 1.5 and 3.0 T scanners.

Methods: Breast magnetic resonance imaging with diffusion-weighted imaging sequence was performed on 100 patients, who were proven histopathologically to have breast invasive ductal carcinoma. We compared the apparent diffusion coefficient values, obtained previous to biopsy, with the main prognostic factors in breast cancer: tumor size, histologic grade, hormonal receptors, Ki67 index, human epidermal growth factor receptor type 2 and axillary lymph node status. The Mann-Whitney U test and the Kruskal-Wallis analysis were used to establish these correlations.

Results: The mean apparent diffusion coefficient value was inferior in the estrogen receptor-positive group than in the estrogen receptor-negative group (1.04 vs. 1.1710-3 mm²/s, P=0.004). Higher histologic grade related to larger tumor size (P=0.002). We found association between spiculated margins and positive axillary lymph node status (odds ratio=4.35 (1.49-12.71)). There were no differences in apparent diffusion coefficient measurements between 1.5 and 3.0 T magnetic resonance imaging scanners (P=0.513). **Conclusions:** Low apparent diffusion coefficient values are related with positive expression of estrogen receptor. Larger tumors and spiculated margins are associated to worse prognosis. Rim enhancement is more frequently observed in estrogen receptor-negative tumors. There are no differences in apparent diffusion coefficient measurements between different magnetic resonance imaging scanners.

Keywords: Breast ductal carcinoma, Breast neoplasms, Diffusion magnetic resonance imaging, Magnetic resonance imaging, Prognosis

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