Radiogenomic Analysis of Breast Cancer: Luminal B Molecular Subtype Is Associated with Enhancement Dynamics at MR Imaging (LuminalB-Breast-MR-Enhancement)

Description

Purpose

To investigate associations between breast cancer molecular subtype and semiautomatically extracted magnetic resonance (MR) imaging features.

Materials and Methods

Imaging and genomic data from the Cancer Genome Atlas and the Cancer Imaging Archive for 48 patients with breast cancer from four institutions in the United States were used in this institutional review board approval-exempt study. Computer vision algorithms were applied to extract 23 imaging features from lesions indicated by a breast radiologist on MR images. Morphologic, textural, and dynamic features were extracted. Molecular subtype was determined on the basis of genomic analysis. Associations between the imaging features and molecular subtype were evaluated by using logistic regression and likelihood ratio tests. The analysis controlled for the age of the patients, their menopausal status, and the orientation of the MR images (sagittal vs axial).

Results

There is an association (P = .0015) between the luminal B subtype and a dynamic contrast material-enhancement feature that quantifies the relationship between lesion enhancement and background parenchymal enhancement. Cancers with a higher ratio of lesion enhancement rate to background parenchymal enhancement rate are more likely to be luminal B subtype.

Conclusion

The luminal B subtype of breast cancer is associated with MR imaging features that relate the enhancement dynamics of the tumor and the background parenchyma.

Online supplemental material is available for this article.

Data Access

Data Access

Collections Used in this Third Party Analysis

Below is a list of the Collections used in these analyses:

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Original Image Data from TCGA-BRCA (DICOM, 48 subjects, 51 studies, 528 series, 55953 images, 15.27 GB)	*Download* (Download requires the NBIA Data Retriever)	CC BY 3.0

- The Cancer Genome Atlas Breast Invasive Carcinoma Collection (TCGA-BRCA)

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Data Citation

Mazurowski MA, Zhang J, Grimm LJ, Yoon SC, and Silber JI. (2014). **Radiogenomic Analysis of Breast Cancer: Luminal B Molecular Subtype Is Associated with Enhancement Dynamics at MR Imaging (LuminalB-Breast-MR-Enhancement)**. The Cancer Imaging Archive. DOI: 10.7937/K9/TCIA.2014.IIRMBUNX

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