RIDER Breast MRI

Summary

Ideally a patient's response to neoadjuvant chemotherapy could be observed noninvasively, in the first 2-3 weeks of treatment using an imaging to provide feedback related to the effectiveness of the chosen chemotherapy regimen. This capability would permit individuation of patient care by supporting the opportunity to tailor chemotherapy to a each patient' s response. Functional diffusion mapping (fDM), now called Parametric Response Mapping (PRM) has been proposed as an MRI imaging biomarker for quantifying early brain tumor response to therapy [1-3]. This approach quantifies local apparent diffusion coefficient (ADC) changes in tumors using a voxel-based analysis implemented by rigid registration of the patient's head between interval exams. The RIDER Breast MRI data set extended this approach by demonstrating ADC changes in 3 of 5 primary breast cancer patients measured in response to onset of neoadjuvant chemotherapy from interval exams separated by only 8-11 days.

This ISMRM 2009 poster demonstrates how each of the "coffee break" exams were used as an estimate of each patient's null hypothesis, i.e. distribution associated with no change, and thus supports the estimate of the nulls 97.5 percentile for subsequent estimation of early response to neoadjuvant chemotherapy on an individual patient basis.

About the RIDER project

The Reference Image Database to Evaluate Therapy Response (RIDER) is a targeted data collection used to generate an initial consensus on how to harmonize data collection and analysis for quantitative imaging methods applied to measure the response to drug or radiation therapy. The National Cancer Institute (NCI) has exercised a series of contracts with specific academic sites for collection of repeat "coffee break," longitudinal phantom, and patient data for a range of imaging modalities (currently computed tomography [CT] positron emission tomography [PET] CT, dynamic contrast-enhanced magnetic resonance imaging [DCE MRI], diffusion-weighted [DW] MRI) and organ sites (currently lung, breast, and neuro). The methods for data collection, analysis, and results are described in the new Combined RIDER White Paper Report (Sept 2008):

- RIDER White Paper: Combined contracts report (Sept 2008) PDF

The long term goal is to provide a resource to permit harmonized methods for data collection and analysis across different commercial imaging platforms to support multi-site clinical trials, using imaging as a biomarker for therapy response. Thus, the database should permit an objective comparison of methods for data collection and analysis as a national and international resource as described in the first RIDER white paper report (2006):

- **RIDER White Paper: Executive Summary PDF**
- **RIDER White Paper: Editorial in Nature.com**

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Data Access

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Detailed Description

Detailed Description

Collection Statistics	
Modalities	MR
Number of Participants	5
Number of Studies	10
Number of Series	40
Number of Images	1,500
Image Size (MB)	401.61

A detailed description of the data set is contained in this ISMRM 2009 poster.

Citations & Data Usage Policy

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Meyer CR, Chenevert TL, Galbán CJ, Johnson TD, Hamstra DA, Rehemtulla A, & Ross BD. (2015). **Data From RIDER_Breast_MRI.** The Cancer Imaging Archive. https://doi.org/10.7937/K9/TCIA.2015.H1SXNUXL

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