GE Healthcare

GenIQ

Seeing beyond the anatomy.

Dynamic Contrast-Enhanced MRI (DCE-MRI) can non-invasively measure angiogenesis, and is rapidly becoming the standard method for assessing the vascular properties of lesions. For oncology assessments, this imaging technique can provide additional information on the efficacy of angiogenesis inhibitors to augment evaluations based on the tumor size criteria determined by the World Health Organization (WHO) and Response Evaluation Criteria in Solid Tumors (RECIST).

The ability to process and analyze DCE-MRI series andaccurately assess the vascular properties of lesions provides a biomarker for determining a number of factors. These include drug efficacy, response after chemo- or radiation therapy, non-invasive distinction between benign and malignant pathology or grading of tumors, and a tool to guide lesion biopsy.

Overview

GenIQ, an MR advanced visualization application processes and analyzes DCE-MRI series specifically for the measurement and analysis of vascular lesion properties. As part of the DEXUS workflow, GenIQ is available virtually anywhere – on a PC, laptop, PACS or AW workstation.

What's new

- Guided workflows for DCE-MRI data processing.
- Personalized workflow provides custom protocols and adjustable parameter settings.
- High-Tech framework helps extract more information from generated data.
- Improved productivity through automatic data processing, real-time parametric image thresholding and segmentation, and single click save state.
- Semi-quantitative parameters
- Pharmaco-Kinetic modeling parameters.
- Vascular Input Function Detection modes.
- 3D Motion Registration.
- Preset value for T1 correction.
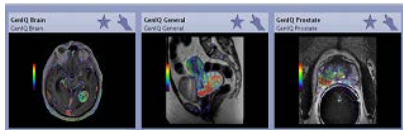- Data Down Sampling.
- Skip Phases option.

Features

- GenIQ provides graphs and functional images to help you analyze differences in pixel values as well as protocolsfor processing brain, prostate, and general DCE-MRI.

- Choose from automatic, semi-automatic or manual Vascular Input Function (VIF).
- Select a model-based VIF curve.
- Automatically convert MR data set signal intensities.
- Automatically set semi-quantitative parameters.
- Automatically set Pharmo-Kinetic modeling parameters.
- Graphical interface displays signal intensity and concentration curves.
- Motion registration minimizes effects of patient motion during acquisition.
- Time points with poor image quality or motion artifacts are ignored.

- Drag and drop method enables the fusion of color parametric images with anatomical 2D or 3D images.
- Streamlined workflow saves time.
- Real-Time functional map segmentation.
- Save and export images in a variety of formats and perform, save and export measurements
- Save the processed image at any stage with save state.
- Contextual help provides assistance with image processing algorithms.

Indications for Use

GenIQ is an automated post-processing software option that is indicated for use on dynamic magnetic resonance imaging data sets to generate parametric images from the image intensity variations over time. This dynamic change in signal intensity is used to calculate functional parameters related to tissue flow and leakage of the contrast agent from the intravascular to the extracellular space.
GenIQ provides information that when interpreted by a trained physician, can be useful for assessing tumor vascular properties for initial as well as follow-up examinations.

System Requirements
Software
- Volume Share 5 or above
- READY View is a prerequisite.
Hardware
- One or two display monitors
- HP Z800 with 12GB RAM or above
- HP XW8600 with 12 GB RAM or above
- HP XW8400 with 12 GB RAM or above

Standards and Regulations
This product is not available for sale in all markets. Not cleared or approved by the US FDA.
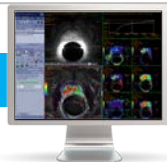
Regulatory Compliance

This product complies with the European Council Directive 93/42/EEC Medical Device Directive as amended by European Council Directive 2007/47/EC.

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GenIQ

Features Detail

Concept

GenIQ provides two tools to help analyze differences in pixel values among images in a given sequence of a particular ROI:

- **Graphs** show plots of pixels and/or concentration values at a given location. Graphs can be represented by pixel values over the image or over time.
- **Functional images** are computed using pixel values to show characteristic function parameters. A functional map or parametric image displays parameter value for each pixel location.
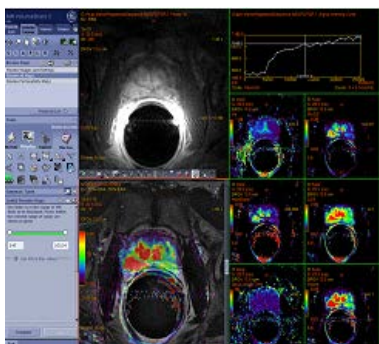

Application work area showing source images, Functional images and graph view.

Key Features

- Automatically convert MR data set signal intensities SI(t) to [Gd](t).
- Automatically sets semi-quantitative parameters:
  - Initial Area Under Gadolinium Concentration (IAUGC) curve
  - Maximum Slope of Increase (MaxSlope)
  - Bolus Arrival Time (BAT)
- Automatically sets Pharmo-Kinetic modeling parameters:
  - Transfer constant (K^{trans}) from intravascular to extravascular extracellular space
  - Extravascular extracellular space volume (V_e)
  - Transfer constant (K_{ep}) from extravascular extracellular to the intravascular space
  - Fractional plasma volume (fPV)
- Graphic interface shows signal intensity and concentration curves.
- GenIQ provides three protocols with which to process DCE-MRI data (brain, prostate, general) and provides optimal default settings for all three, with a flexible setting for the general protocol.
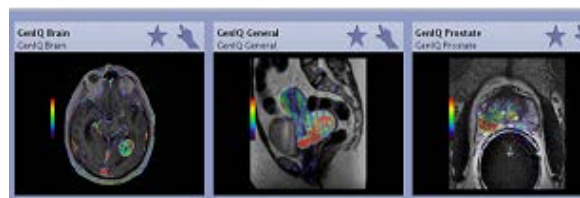

- Three clicks allows the viewing of all image maps.
- Auto Vascular Input Function Mode enables an easy switch to semi-automatic or manual mode.
- 3D (x, y, z) motion registration minimizes the effect of patient motion during acquisition.
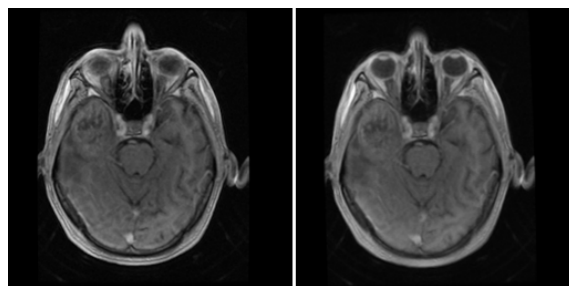

*Before (left) and after (right) motion correction.*

- Incorporates preset value for T1 correction.
- Performs real-time segmentation of functional maps.
- Skip phases ignores points with poor image quality or motion artifacts.
- Provides a look up table for T1 correction.
- Provides data down sampling capability.
- Color parametric images calculated from specified processing algorithms.
- Real time calculation and display of specified parameters at each pixel location simply by moving the cursor over the functional map.
- Graphical interface enables the display of time curves, functional curves, or a spectrum.
- Real time noise thresholding of color parametric images.
- Drag and drop method allows for the fusing of color parametric images with anatomical 2D or 3D images.
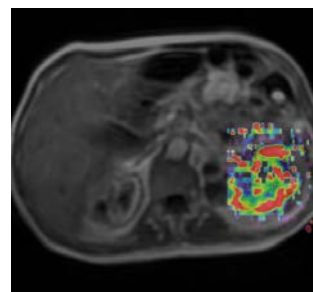
Fused native image and T1w/K^{trans} map.
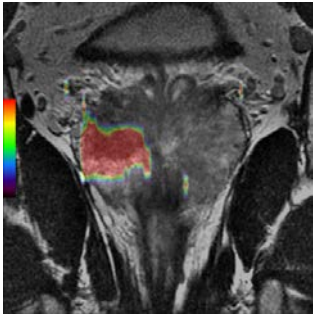
Fused native image with T2w/IAUGC map.
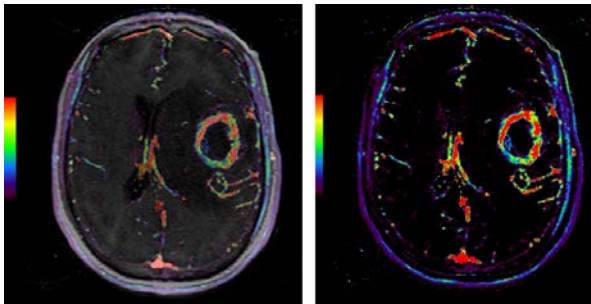
*Native brain DCE-MRI data (left)
and K^trans derived map (right).*

- Clip min. and max. values to segment functional maps simply in real time.
- Auto-contour regions based on the highest pixel value defined by applying a 3D box onto a color parametric image.
- Convert segmented volumes to regions of interest or convert regions of interest to segmented volumes to arrive at the best curve and statistics for a specific segmented area.
- Summary table allows the export of ROI statistics.

Workflow Capabilities
- Streamlined workflow requires no more than three clicks to compute color parametric images, access complete image algorithm guide, and access a guided workflow to:
  - Load DCE-MRI data series and other anatomical or functional data series
  - Review DCE-MRI data, settings, and advanced settings.
  - Review GenIQ parametric settings such as real time noise thresholding and real time display of parametric values at each pixel location by moving the cursor over the functional map
- Perform measurements and view statistics relating to an ROI with results displayed in a summary table that can be saved and exported.
- Clip min. and max. values to analyze real time segmentation of functional maps.
- Save and export images as DICOM, secondary screen capture, or jpeg/mpeg formats.

- Save the processed image at any stage with save state.
- Contextual help pages provide assistance with image processing algorithms.

Summary
GenIQ's comprehensive analysis capability enables multi parametric assessment in a single session of DCE-MRI acquired images. For oncological review, GenIQ allows for the combination of WHO/RECIST criteria with angiogenesis parameters.

GenIQ is a READY View application that makes it available virtually anywhere – on a PC, laptop, PACS or AW workstation.

Indications for Use
GenIQ is an automated post-processing software option that is indicated for use on dynamic magnetic resonance imaging data sets to generate parametric images from the image intensity variations over time. This dynamic change in signal intensity is used to calculate functional parameters related to tissue flow and leakage of the contrast agent from the intravascular to the extracellular space.

GenIQ provides information that when interpreted by a trained physician, can be useful for assessing tumor vascular properties for initial as well as follow-up examinations

System Requirements
- Volume Share 5 or above
- One or two display monitors
- Certain functions require BodyView and BrainView, MR Standards, and SER**
- IR fusion is a prerequisite

Minimum hardware required:
- HP Z800: 12 GB RAM or above
- HP XW8600: 12 GB RAM or above
- HP XW8400: 12 GB RAM or above

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