

APPLICATIONS

The EPI package is an optional package for the Toshiba magnetic resonance imaging (MRI) system. This package provides new pulse sequences for diffusion imaging, perfusion imaging, and fMRI (BOLD effect) as well as new imaging functions in order to expand the range of clinical applications.

DEFINITION OF TERMS

- ASL technique:
Arterial Spin Labeling technique
This is an imaging technique for obtaining vascular images or perfusion-weighted images without contrast medium by labeling water inside the blood with the RF pulse.
- ADC image:
Apparent Diffusion Coefficient image

COMPOSITION

Software (License)..... 1 set

This package does not include an operation manual. Refer to the operation manual supplied with the MRI system. Some additional Body Diffusion sequences are included in the separate DTI package.

APPLICABLE COMBINATIONS

This package is applicable to the following systems.

- Vantage Titan™ 3T

PERFORMANCE SPECIFICATIONS

This package provides the following functions.

Diffusion

Images can be acquired with enhanced diffusion of water molecules in the body.

EPI Diffusion

Isotropic diffusion-weighted images can be generated through calculation based on images acquired with MPG applied in the slice direction, readout direction, or phase encode direction.

Using two or more images acquired with different MPG levels, apparent diffusion coefficient images can be generated by calculation. It is also possible to specify this method before the start of the scan.

[Application]

Diagnosing cerebral ischemia

Perfusion imaging (ASL)

Using the ASL (Arterial Spin Labeling) method, perfusion-weighted images can be generated without contrast medium. The ASL method labels the blood itself with the RF pulse and uses the magnetically labeled blood as a tracer to obtain vascular images or perfusion-weighted images in a relatively simple manner.

When ASL is used, images only of the flow components flowing into the imaging slice can be obtained. This is done by eliminating the stationary tissues by subtracting the tag image (which includes the contribution of the labeled flow) from the control image (which does not include the contribution of the labeled flow).

[Application]

Head region

BOLD imaging

In BOLD Imaging, time-series image data is acquired when stimulation is applied to the patient and when the patient is resting. From the acquired image data, images of local areas in which the signal intensity increases when the patient is stimulated due to the BOLD effect and inflow effect are generated.

Since hemoglobin in the blood is used as a native contrast medium and cerebral function information is assumed from the changes in signal intensity for MR images, it is not necessary to inject contrast medium.

Multishot FE EPI

General versatility is increased by modifying single-shot EPI into multishot EPI, and images with a quality equivalent to that of the standard FE technique can be produced. To ensure the spatial resolution and SNR required for standard FE imaging, ETS is extended relative to that in single-shot EPI.

[Application]

Multishot EPI reduces the time required for T1W imaging for the abdomen. T1W images for the entire liver and the pancreas can be acquired with high image contrast and high spatial and temporal resolutions.

High b value

The maximum b value is higher than in the previous version. A higher b value increases the contrast in diffusion-weighted images. The permissible maximum b value is 10000. In addition, in order to improve image quality, the sampling time is longer than in the previous version.

Diffusion sequences for tissues with short T2

Use SE_EPI sequences with TE = 105 ms or less in diffusion for tissues with short T2.

There are two types of MPG pulse application methods; "3-Axis" and "Tensor". Note, however, that a DTI license is required for use of the "Tensor" type.

Fat suppression

The PASTA, FatSAT, and IR fat suppression techniques can be used with EPI.

FatSAT is recommended for head diffusion-weighted imaging.

SPEEDER

SPEEDER is available. Image distortion can be reduced in BOLD imaging. (However, FE-EPI sequences are not possible with SPEEDER.)

T1-weighted imaging for the abdomen

A new sequence using the 3DFT-EPI technique is added to complement the conventional FE sequences in abdominal imaging. Compared with conventional FE sequences, this sequence features higher data acquisition efficiency and is effective for reducing breath-holding time or for increasing the number of phases for dynamic imaging. The 3DFT technique achieves resolution in the slice direction as high as 1 mm.

POWER AND ENVIRONMENTAL REQUIREMENTS

The power and environmental conditions are the same as for the MRI system.

COMPLIANCE WITH STANDARDS

This package complies with the same standards as the MRI system.

MASS

Unit	Mass (kg)
EPI package	Approx. 0.5



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