FDA 510(k)-cleared

CE 2460

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MD 748864

Swift Imaging
Reliable Reading

SwiftMR™
Case Report | Brain

Introduction

Magnetic Resonance Imaging (MRI) is an important part of radiologic exam which provides excellent soft tissue contrast under diverse contrast mechanisms. Despite this benefit and the lack of ionizing radiation, MR exams typically take long time to complete and causes patient discomfort in many aspects.

SwiftMR™ is FDA 510(k)-cleared* deep learning (DL)-based software medical device developed by AIRS Medical. SwiftMR™ reduces image noise and increases sharpness of MR images based on its vast training dataset of high-quality MR images.

The following clinical cases were collected from two different research collaborations with Seoul National University Hospital (Seoul, Korea) and Seoul Asan Medical Center (Seoul, Korea). Both studies were approved by the respective institutional review board (IRB). The purpose of these studies was to clinically evaluate the quality of brain MR images processed with SwiftMR™ against the clinical conventional images.

* FDA 510(k)-cleared for Standard of Care (SOC) and reduced scan time MR images for all body parts. Supported field strength may vary by country.

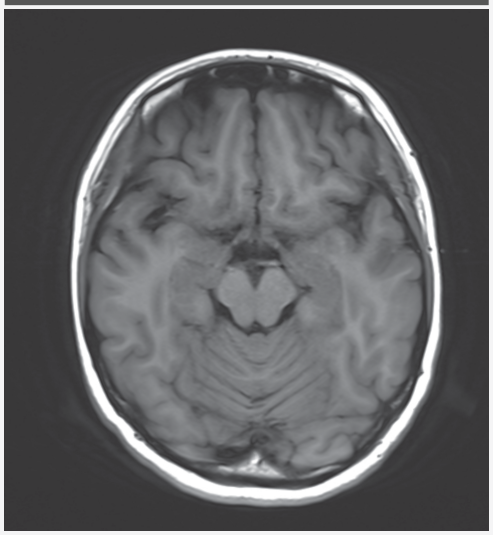
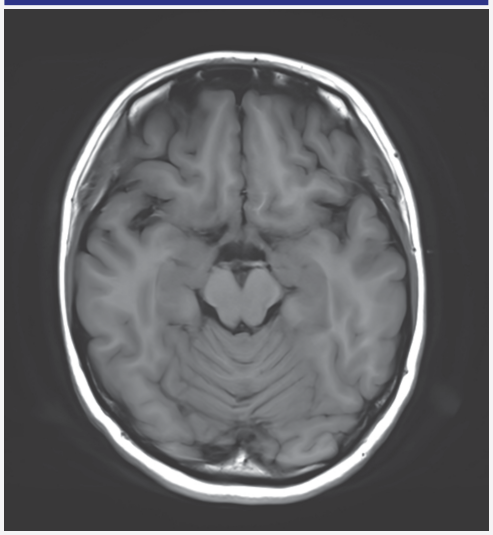
Koung Mi Kang, MD, Ph.D
Department of Radiology, Seoul National University Hospital
Image qualities between the conventional images and accelerated images processed with SwiftMR™ were compared in a prospective study.

Case #1

33y/o | Female

Brain
AX T1WI

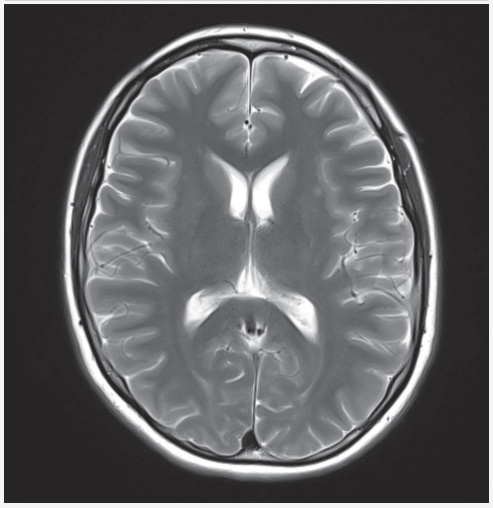
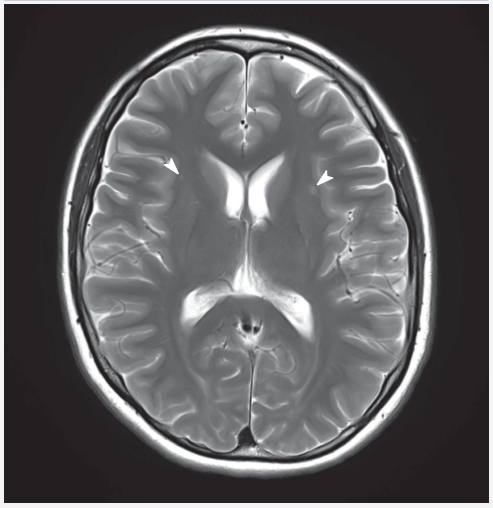
2D TSE
Acquisition voxel size:
Ⓛ 0.7×0.9×5.0 mm
Ⓡ 0.7×0.9×5.0 mm

Conventional	SwiftMR™*
	
Scan time 02:15	Scan time 01:21

SwiftMR-processed image has shown reduced images noise and artifacts across the whole image. The motion-induced artifact shown near middle cerebral artery and the frontal lobe in the conventional image is not observed in the SwiftMR-processed image, along with reduced noise and artifacts near the sylvian fissure. Also, SwiftMR image showed noticeably improved spatial resolution and contrast allowing clear distinction between gray-white matter, the hippocampus and adjacent regions.

Brain
AX T2WI

2D TSE
Acquisition voxel size:
Ⓛ 0.4×0.4×5.0 mm
Ⓡ 0.4×0.4×5.0 mm

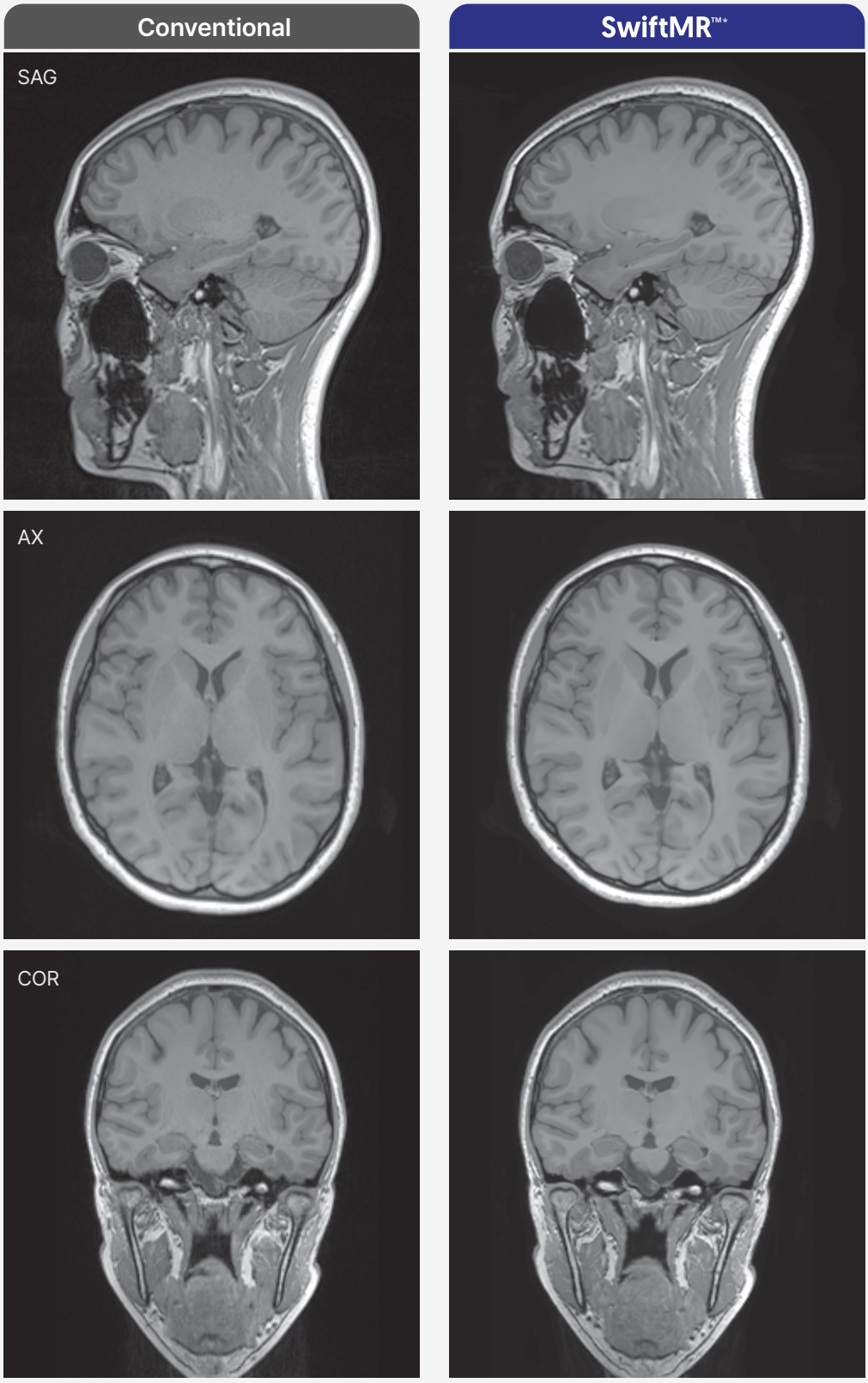
Conventional	SwiftMR™*
	
Scan time 02:22	Scan time 01:09

SwiftMR-processed image shows reduced noise and small improvement in the spatial resolution and contrast compared to the conventional image. This results in easy distinction of gray-white matter and the basal ganglia, along with small focal high T2 signal intensities observed in the subinsular region in the SwiftMR image.

* For investigational purpose only

Brain
T1WI

3D MPRAGE
Acquisition voxel size:
Ⓛ 1.0×1.0×1.0 mm
Ⓡ 1.0×1.3×1.0 mm
MPR thickness: 1.0 mm



Scan time 04:51

Scan time 02:45

Sagittal source 3D image and both axial and coronal reformatted images show reduced noise and improved spatial resolution and contrast with SwiftMR. Gray-white matter contrast along with clearly discernable hippocampus can be seen in the SwifMR-processed sagittal image. Skull, spine and para-spinal soft tissue signals are equally displayed in both images. Axial- and coronal-reformatted images processed SwiftMR images also display improved image qualities, allowing clear observation of fine structures of the basal ganglia and the hippocampus.

* For investigational purpose only

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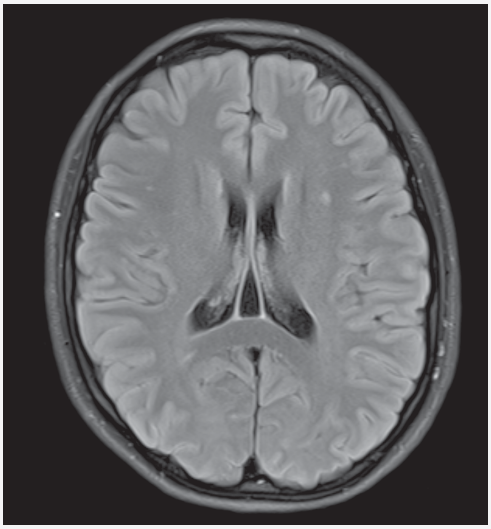
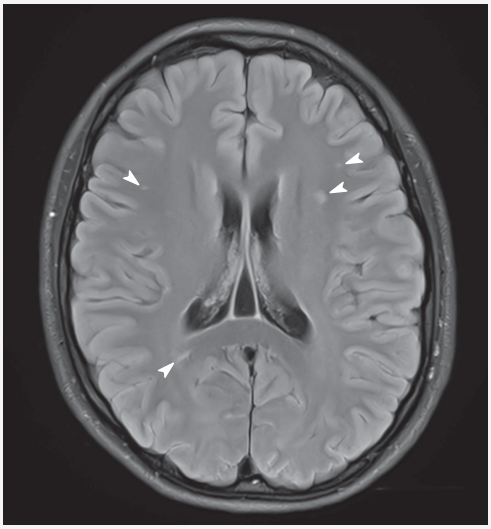
Brain
AX FLAIR

2D TSE
Acquisition voxel size:
Ⓛ 0.6×0.8×5.0 mm
Ⓡ 0.6×0.8×5.0 mm

Conventional	SwiftMR™*
	
Scan time 02:25	Scan time 01:37

SwiftMR™ images displays reduced image noise and improved spatial resolution and contrast, allowing clearer gray-white matter and the basal ganglia distinction. Also, small focal white matter hyperintensities in the frontal lobe and splenium of the corpus callosum are clearly shown as well.

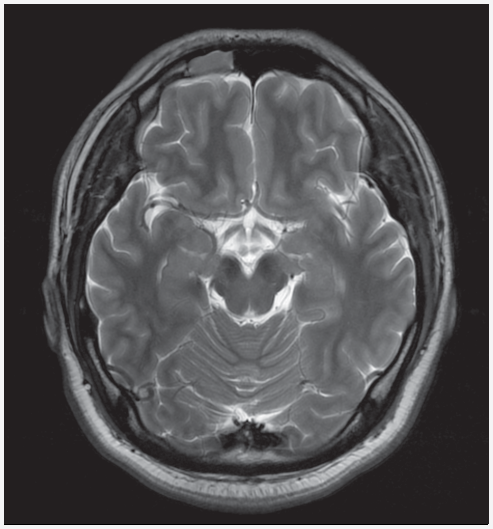
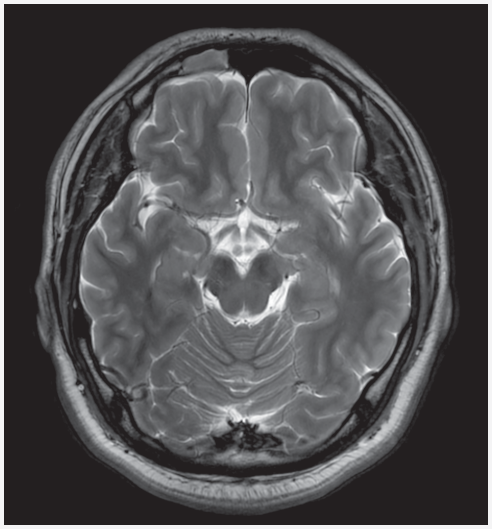
* For investigational purpose only

Case #2

47y/o | Male

Brain
AX T2WI

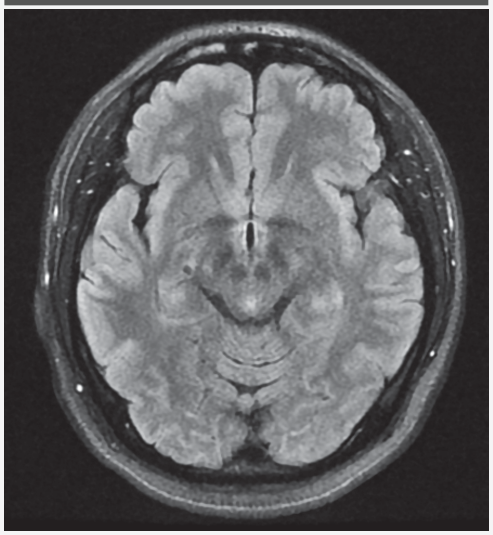
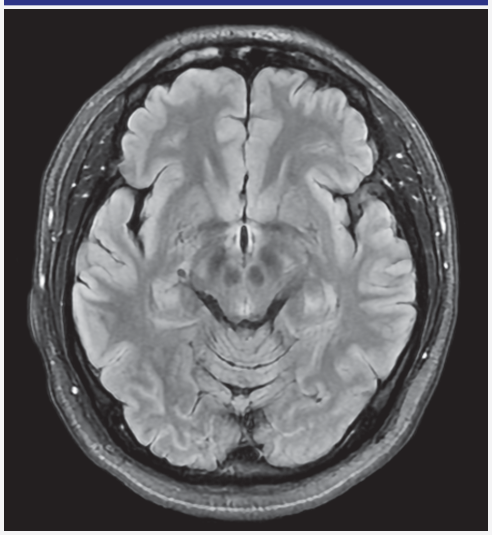
2D FSE
Acquisition voxel size:
Ⓛ 0.5×0.5×5.0 mm
Ⓡ 0.5×0.5×5.0 mm

Conventional	SwiftMR™*
	
Scan time 03:22	Scan time 01:59

Reduced image noise can be seen in SwiftMR-processed image. Spatial resolution and contrast are equal in both images, showing clear gray-white matter contrasts.

Brain
AX FLAIR

2D FSE
Acquisition voxel size:
Ⓛ 0.7×0.9×5.0 mm
Ⓡ 0.7×1.0×5.0 mm

Conventional	SwiftMR™*
	
Scan time 02:33	Scan time 01:57

SwiftMR™ has noticeably reduced the amount of noise in the image and improved the spatial resolution and contrast. This allows clear distinction of gray-white matter and the basal ganglia, along with detailed structures such as red nucleus and substantia nigra in the midbrain.

* For investigational purpose only

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Department of Radiology, Seoul Asan Medical Center

In a retrospective study, the image qualities between 3mm conventional images and 1.5mm accelerated thin-section T2-weighted images processed with SwiftMR™ were compared.

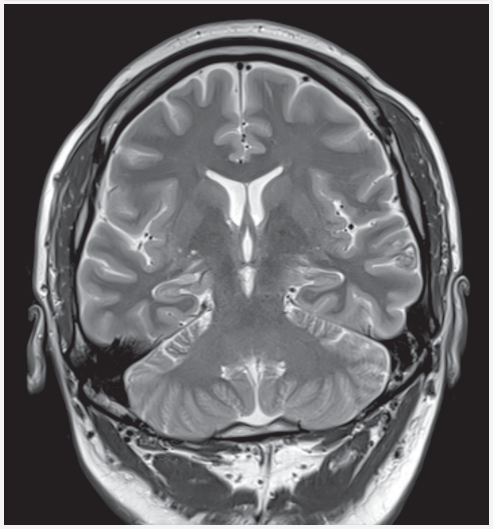
Case #3

31y/o | Male

Brain
OBL COR T2WI

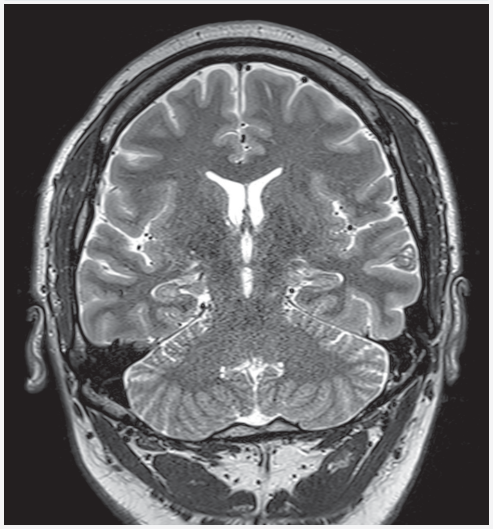
2D TSE
Acquisition voxel size:
Ⓛ 0.6×0.7×3.0 mm
Ⓡ 0.6×0.9×1.5 mm
Ⓢ 0.6×0.9×1.5 mm

Conventional(3mm)



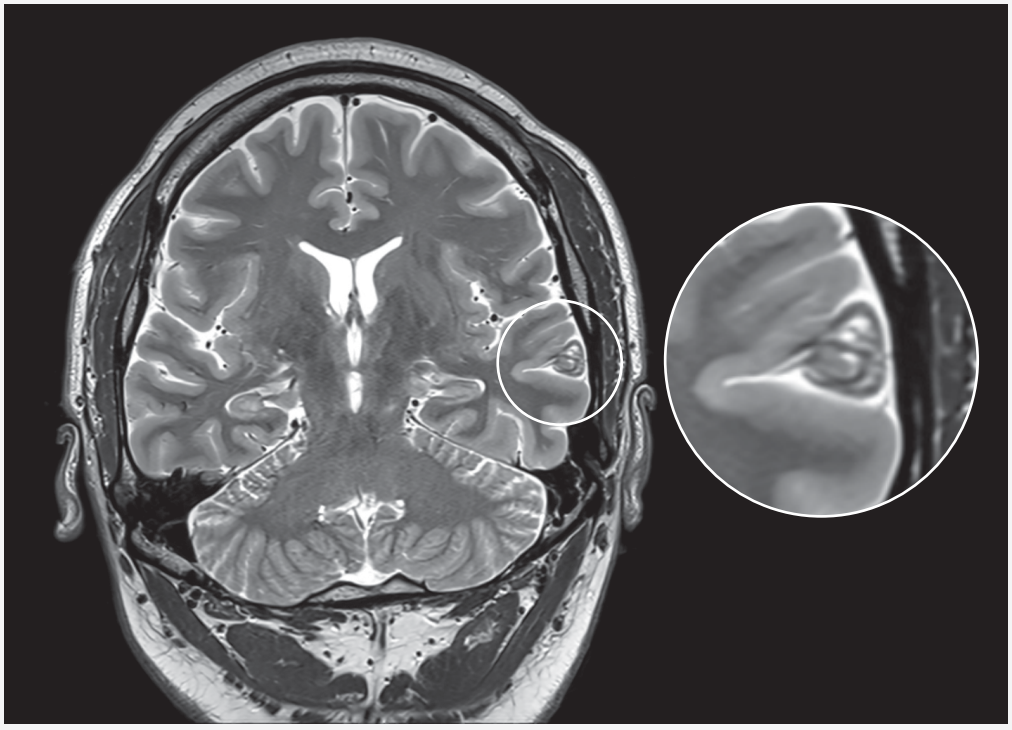
Scan time 02:42

Fast·thin-section scan(1.5mm)



Scan time 01:34

Fast·thin-section scan enhanced by SwiftMR™*



Scan time 01:34

Excellent image quality, sharpness, and structural conspicuity is exhibited with SwiftMR-reconstructed thin-section image, while noise and coarse image is shown in the input image. Also, cavernous malformation with a developmental venous anomaly in the left temporal lobe is well visualized.

* For investigational purpose only

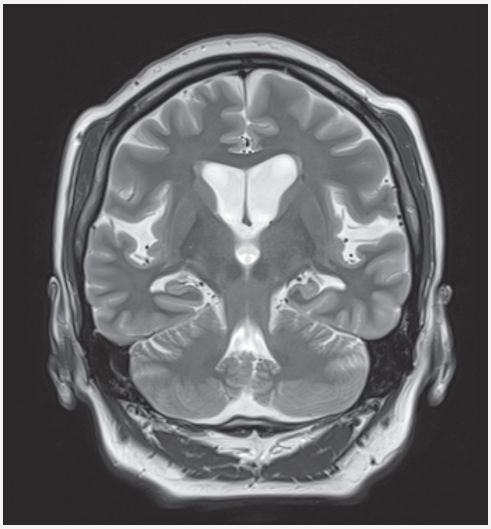
Case #4

39y/o | Female

Brain
OBL COR T2WI

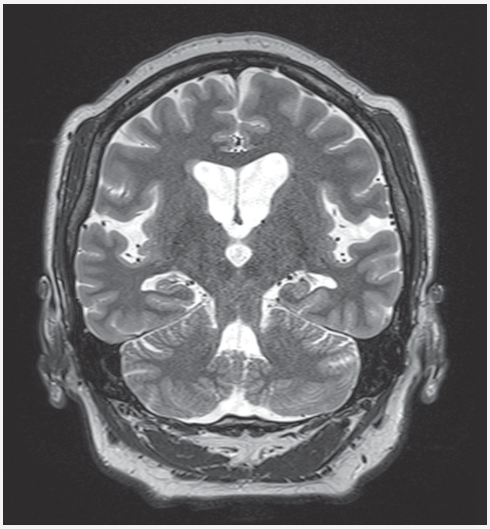
2D TSE
Acquisition voxel size:
Ⓛ 0.6×0.7×3.0 mm
Ⓡ 0.6×0.9×1.5 mm
Ⓢ 0.6×0.9×1.5 mm

Conventional(3 mm)



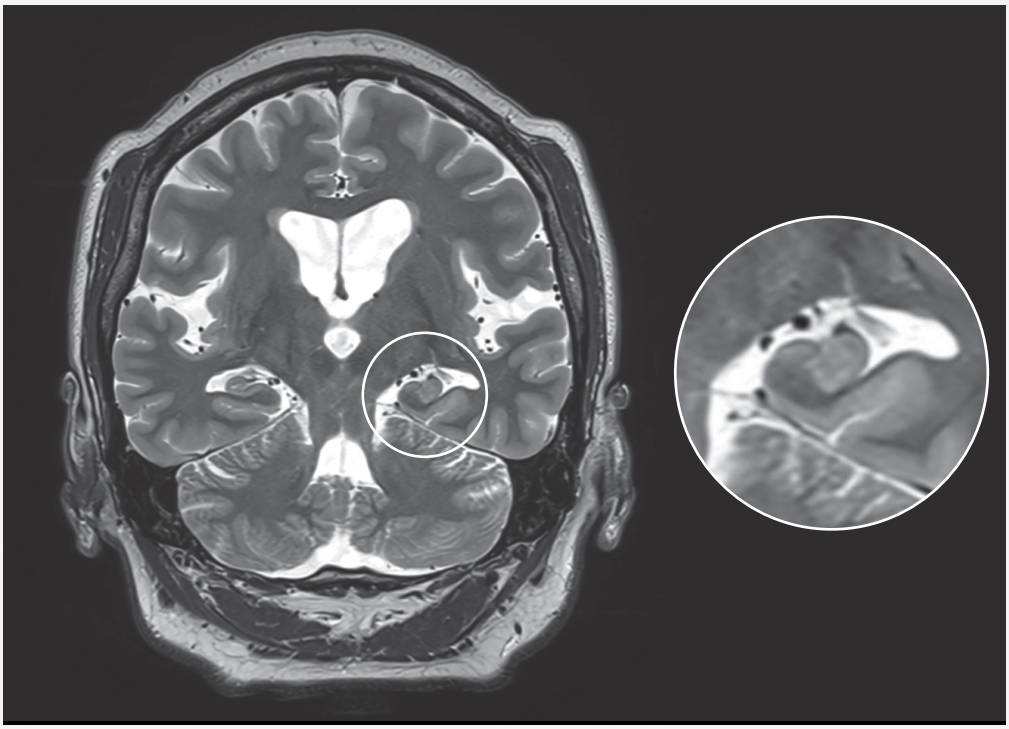
Scan time 02:42

Fast·thin-section scan(1.5 mm)



Scan time 01:34

Fast·thin-section scan enhanced by SwiftMR™*



Scan time 01:34

In this case, hippocampal sclerosis is observed in the left hippocampal tail portion. Loss of granulosa cell layer is more obvious on 1.5mm thin-section image reconstructed with SwiftMR™. Again, overall image quality, sharpness, and structural conspicuity is improved by applying SwiftMR™, while noise and coarse image is shown in the original input image.

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DOC811(Rev.4)

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