FDA 510(k)-cleared

CE 2460

HIPAA COMPLIANT

bsi ISO 13485 Quality Management for Medical Devices CERTIFIED

Swift Imaging
Reliable Reading

SwiftMR™ Case Report | Pediatric

Introduction

Radiologic exams including magnetic resonance imaging (MRI) for pediatric patients require utmost attention to safety and efficacy. While it is now known that an MR exam itself is non-invasive and generally poses minimal risk to infants and children, acquiring diagnostically appropriate images remain difficult in the routine clinical settings due to several factors. Apart from potential side effects of contrast medium and sedatives, the lack of or difficulty in getting cooperation from pediatric patients frequently lead to prolonged exam times and retakes due to image quality degradation. Furthermore, pediatric neuroimaging requires careful attention and optimization to image acquisition parameters since imaging protocols developed for adult patients may be suboptimal due to the difference in structural size, myelination, and sulcation. In this sense, exam time reduction by means of optimized accelerated acquisition has greater implications for pediatric patients compared to adult population.

SwiftMR™ is a FDA 510(k)-cleared* deep learning (DL)-based software medical device developed by AIRS Medical. SwiftMR™ is capable of reducing image noise and increasing spatial resolution of MR images owing to its vast training dataset of high-quality MR images. This enables quality improvement of MR images coming from accelerated acquisition times, alleviating potential limitation in diagnosis from otherwise low-quality images. Furthermore, reducing scan times also contributes to decreasing pediatric patient discomfort, reducing the amount of potential sedation and retakes due to motion.

The following clinical cases were collected from a research collaboration with Seoul National University Hospital (Seoul, Korea). This prospective study was approved by the institutional review board (IRB) and informed consents were received from all enrolled subjects (or their parent or guardian) who required MRI exams due to brain neoplasms or follow-up exams after treatment. The purpose of this study was to clinically compare the quality of pediatric brain MR images acquired at institutional conventional protocol and accelerated protocol reconstructed with SwiftMR™.

* 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.

Seunghyun Lee, MD, Ph.D
Department of Radiology, Seoul National University Hospital, Korea

In a prospective study, the image qualities between conventional images and accelerated images processed with SwiftMR™ were compared.

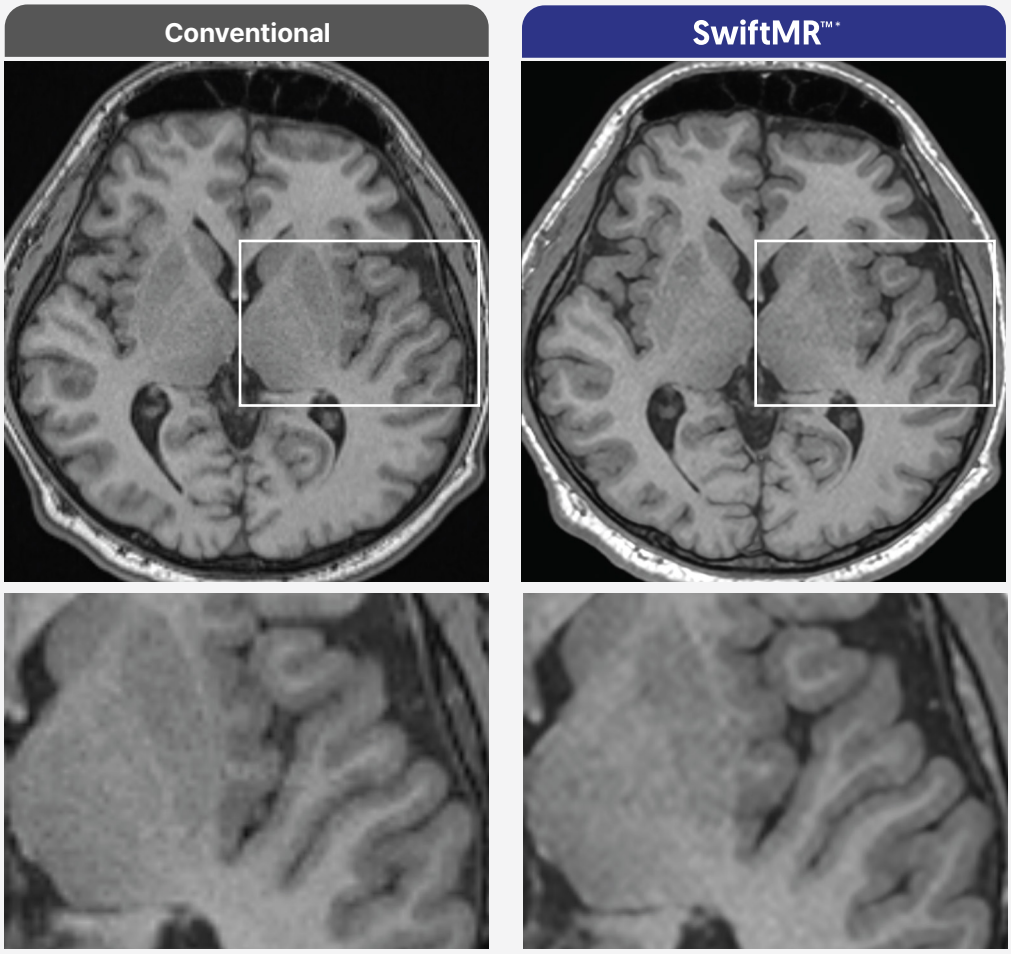
Case #1

15y/o | Male

w/ B-lymphoblastic lymphoma

Brain T1WI

3D MPRAGE
Acquisition voxel size:
Ⓛ 1.0×1.0×1.0 mm
Ⓡ 0.8×1.3×1.2 mm
MPR thickness 1.0 mm



Scan time 04:29

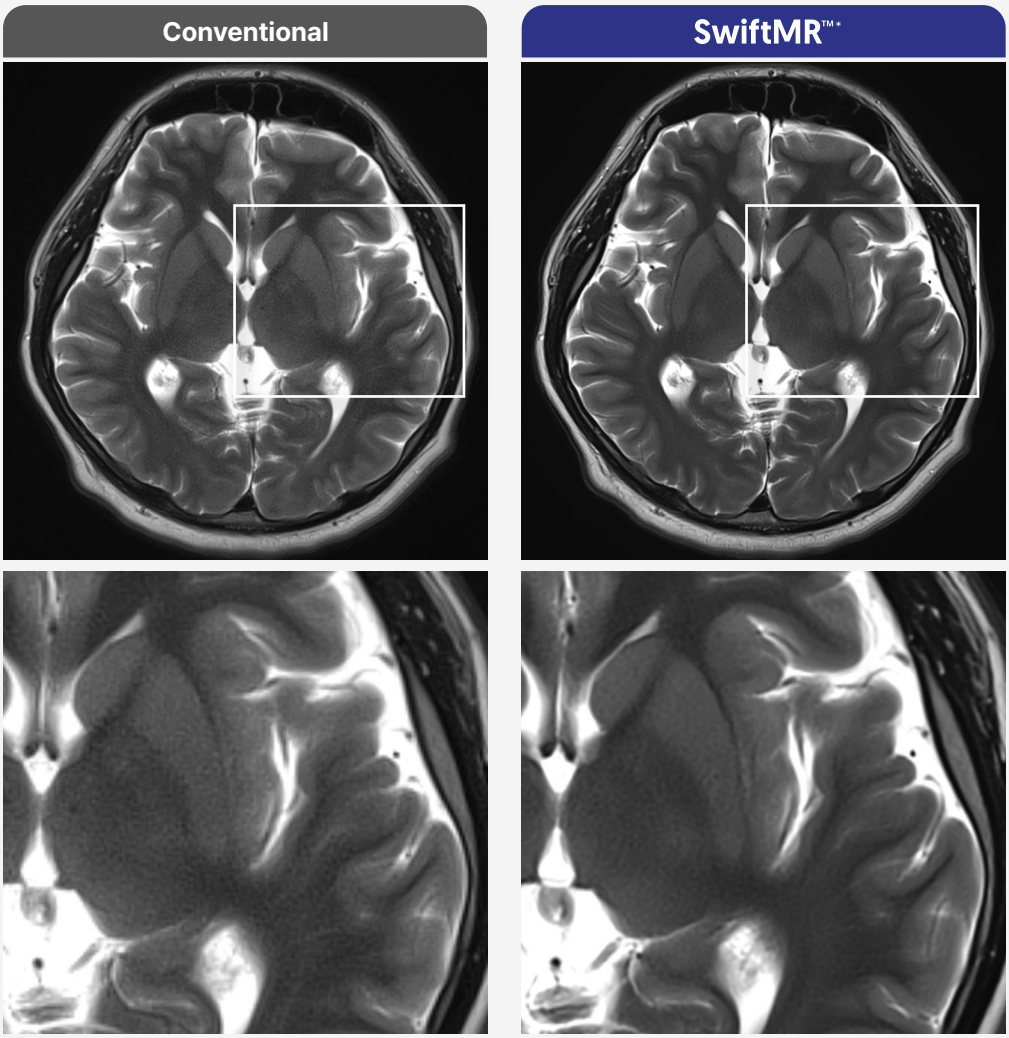
Scan time 03:07

Axial multiplanar reformat (MPR) from SwiftMR-processed source images has reduced image noise and improved spatial resolution. Improved signal-to-noise ratio (SNR) results in clear delineation of gray-white matter compared to conventional images. In pediatric brain MR imaging, good gray-white matter differentiation on the T1-weighted imaging is essential to assessing unique pediatric brain diseases such as cortical dysplasia.

* For investigational purpose only

Brain
AX T2WI

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



Scan time 02:26 | Scan time 01:01

Reduced image noise presented in SwiftMR™ image. Axial T2-weighted image displays good gray-white matter differentiation with improved overall image quality after SwiftMR processing.

* For investigational purpose only

AIRS MEDICAL

Case #2

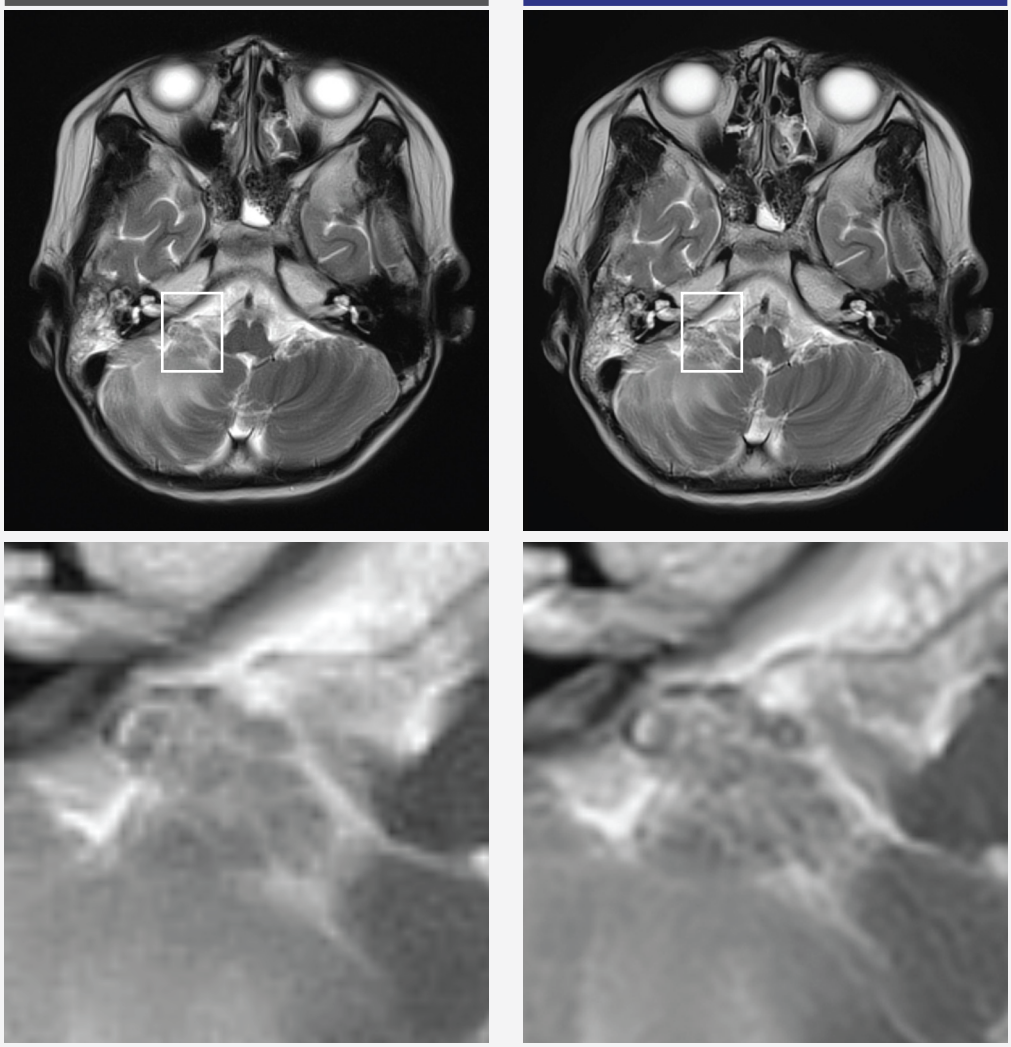
9y/o | Male

w/ intracranial
Ewing sarcoma

Brain
AX T2WI

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

Conventional	SwiftMR™*



Scan time 02:26

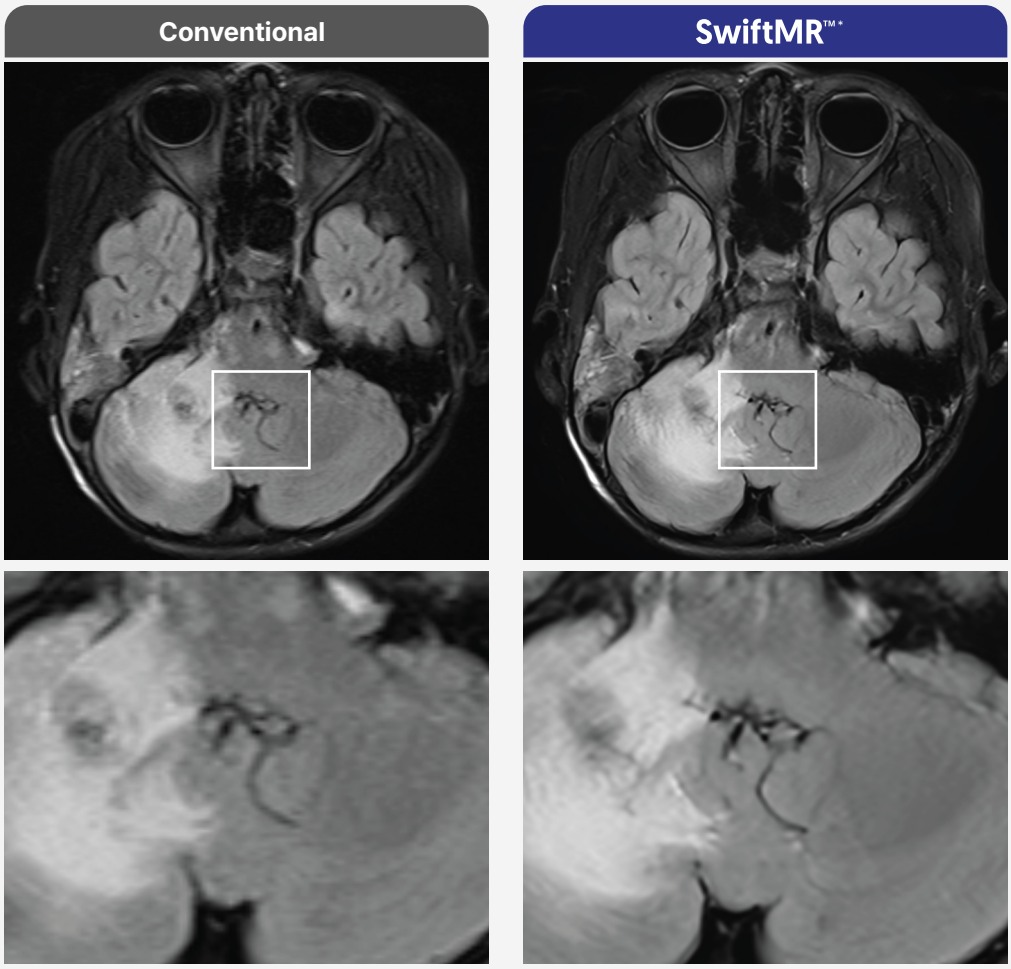
Scan time 01:01

Overall image quality and structural conspicuity is improved by applying SwiftMR™. In particular, the boundary of the lesion at the right cerebellar hemisphere is distinctly presented. In this case, considering the patient's history, radiation treatment-induced change versus metastatic lesion should be a differential diagnosis. Therefore, an accurate assessment of the lesion with edema is needed on the T2-weighted image.

* For investigational purpose only

Brain
AX FLAIR

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



Scan time 02:24

Scan time 01:05

On axial FLAIR image, SwiftMR-processed image shows reduced amount of noise and improved spatial resolution and contrast. This results in better conspicuity of anatomies including vascular structures near the fourth ventricle.

* For investigational purpose only

AIRS MEDICAL

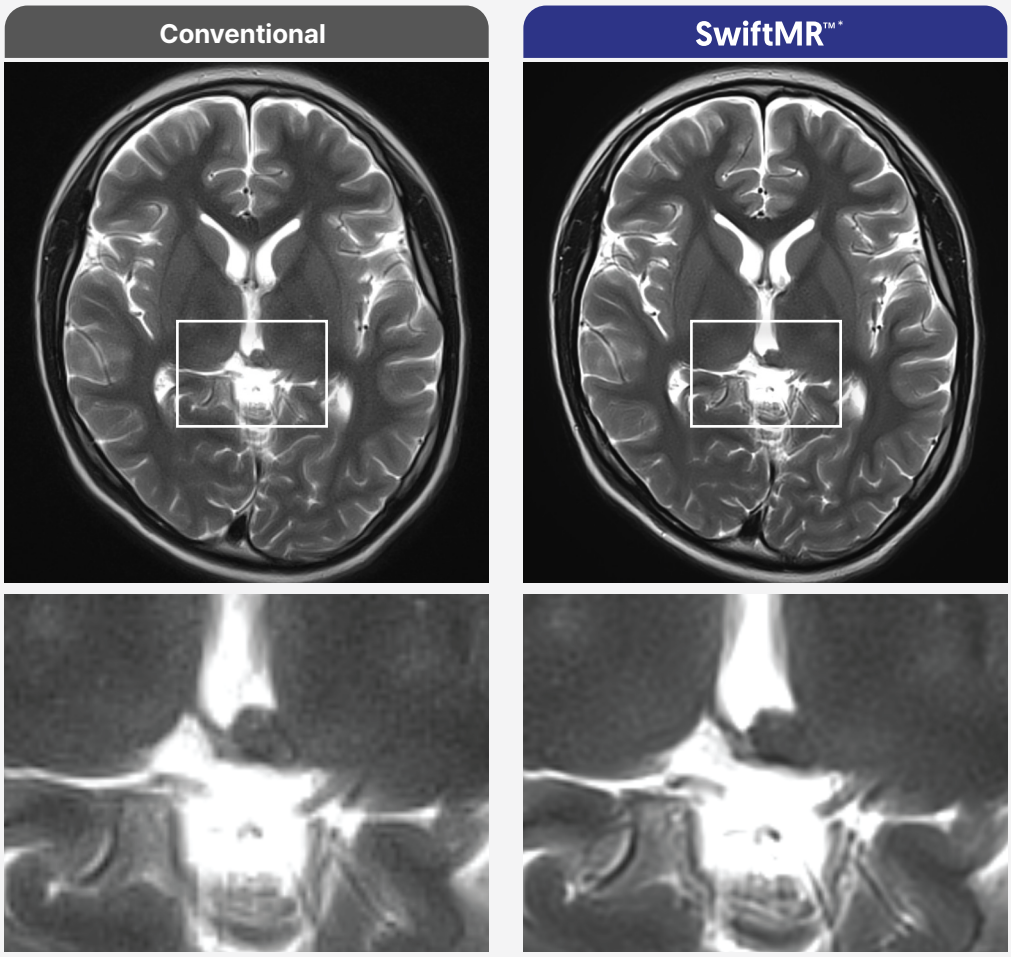
Case #3

13y/o | Male

follow-up
for pineal gland
germ cell tumor

Brain
AX T2WI

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



Scan time 02:26

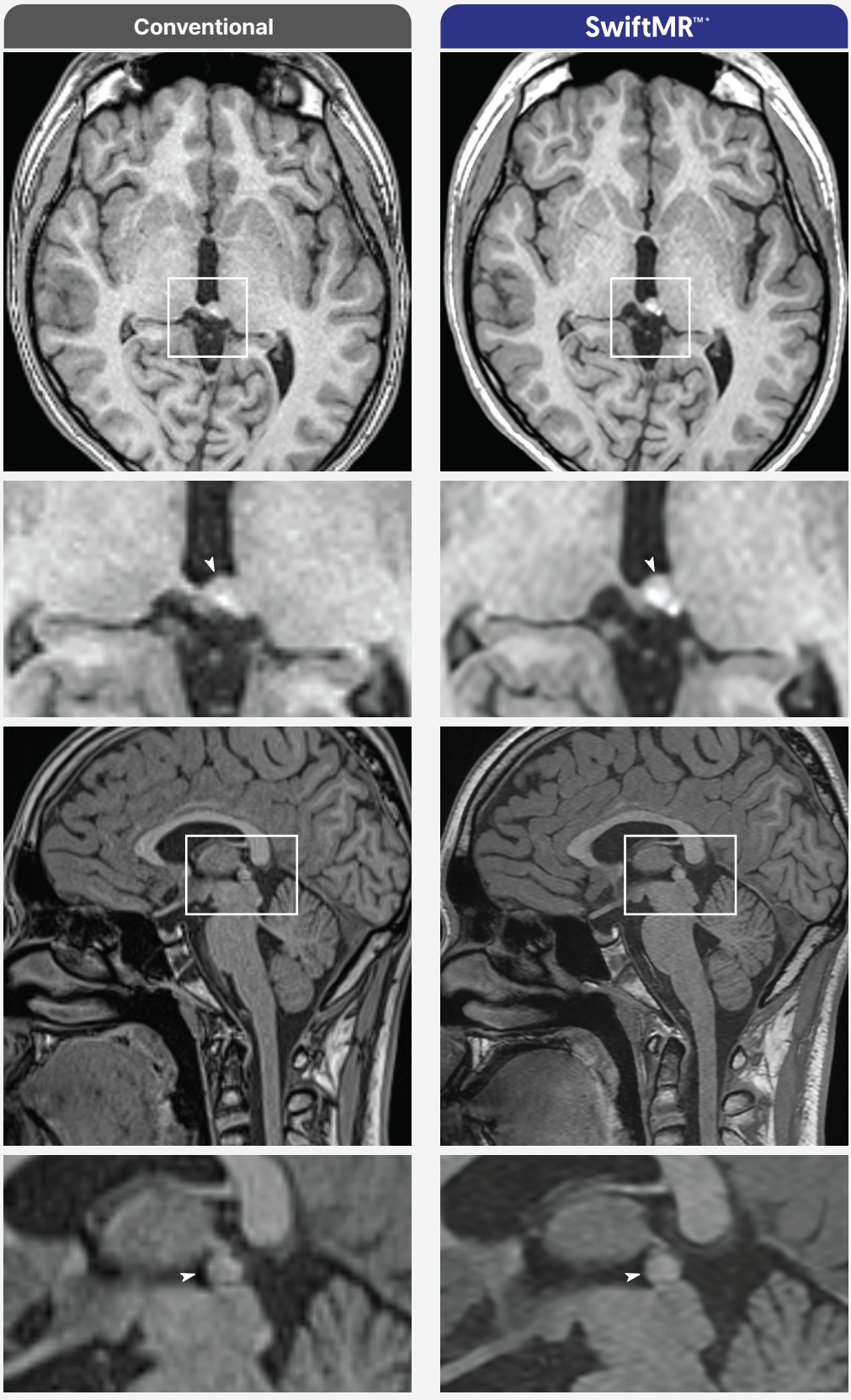
Scan time 01:01

SwiftMR-processed image shows increased spatial resolution and contrast, and the conspicuity of pineal gland tumor has improved.

* For investigational purpose only

Brain
T1WI

3D MPRAGE
Acquisition voxel size:
Ⓛ1.0×1.0×1.0 mm
Ⓡ0.8×1.3×1.2 mm
MPR thickness: 1.0 mm



Scan time 04:29

Scan time 03:07

Reduced noise can be found in SwiftMR-processed images. In this case, a pineal germ cell tumor with a decreased state on chemotherapy is observed in the pineal gland. The conspicuity of the pineal gland tumor (white arrow) becomes more evident with improved sharpness and overall image quality.

* For investigational purpose only

AIRS MEDICAL

DOC002052(Rev.1)

AIRS MEDICAL

This document is for use by healthcare professionals only

support@airsmed.com

AIRS Medical Inc.

Seoul Office, HQ
13-14F, Keungil Tower, 223, Teheran-ro,
Gangnam-gu, Seoul, 06142, Republic of Korea

T +82 70.7777.3187 **F** +82 2.6280.3185

Chicago Office
475 North Martingale Road, Suite 710,
Schaumburg, IL 60173

T +1 847.306.8731

airsmed.com