ARIA MRI Protocol Overview

General Overview for Radiologists & Healthcare Providers

Overview of MRI in Detecting ARIA in Patients on Amyloid Targeting Therapies

Treatment with anti-amyloid immunotherapy can lead to radiographic changes known as Amyloid Related Imaging Abnormalities (ARIA).[1]

MRI is key to identifying ARIA, regardless of clinical presentations and distinguishing it from stroke. Therefore, it is crucial for radiologists to recognize and monitor ARIA.[1,2]

Consistent imaging with the same scanner and parameters is ideal but often not feasible in clinical practice. Harmonized protocols ensure standardized evaluations across scanners.[1]

Summary of ASNR Recommendations for Three Key Patient Scenarios (as Presented in Cogswell et al.)[1]

	1 Baseline/enrollment evaluation	2 Asymptomatic ARIA monitoring	3 Symptomatic patient on therapy
Order	MRI brain dementia without IV contrast (indication: AD therapy enrollment)	MRI brain without IV contrast (indication: AD therapy monitoring)	MRI brain without (and with) IV contrast (indication: AD therapy, new symptoms)
Protocol	"AD therapy enrollment"	"AD therapy monitoring"	"AD therapy monitoring"
Minimum sequences	• 2D or 3D T2 FLAIR • GRE* ± SWI • DWI • 3D T1 • T2 FSE	• 2D or 3D T2 FLAIR • GRE* ± SWI • DWI	• 2D or 3D T2 FLAIR • GRE* ± SWI • DWI ± additional sequences
Reporting template	"AD therapy enrollment"	"AD therapy monitoring"	"AD therapy monitoring"
Key findings	• Microhemorrhages • Siderosis • White matter hyperintensities • Infarcts	• ARIA-E (edema, effusion) • ARIA-H (new microhemorrhages, siderosis)	• ARIA-E • ARIA-H • Other acute findings
Recommended communication	Standard reporting	Mild ARIA -> notification required Moderate or severe ARIA -> closed loop communication*	

*Closed loop communication will be important between referring providers, radiologists, primary care providers, and hospital administrations to accommodate the increasing demand for MRI scans without compromising efficiency and efficacy of imaging.[1]

Scan the QR code or copy paste the link for reporting templates

AD therapy enrollment and monitoring template

*GRE must be performed with an appropriate TE, 3T TE 15-20 ms, 1.5T TE 25-35 ms.

Abbreviations: 2D=two-dimensional; 3D=three-dimensional; AD=Alzheimer's disease; ANSR=American Society of Neuroradiology; ARIA=amyloid-related imaging abnormalities; ARIA-E=ARIA-edema/effusion; ARIA-H=ARIA-hemosiderosis/ microhemorrhages; DWI=diffusion-weighted imaging; FLAIR=fluid-attenuated inversion recovery; FSE=fast spin echo; GRE=gradient recalled echo; IV=intravenous; MRI=magnetic resonance imaging; ms=milliseconds; SWI=susceptibility-weighted imaging; TE=time to echo; T1=T1-weighted image; T2=T2-weighted image.

References: 1. Cogswell PM, et al. Am J Neuroradiol. 2024:ajnr.A8469. 2. Agarwal A, et al. Radiographics. 2023;43(9):e230009.

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Role of Radiologist & MRI Protocol Standardization

Role of Radiologists in Patient Lifecycle[1]

Radiologists play an important role in the decisions to enroll and maintain patients on treatment based on MRI findings.

Each patient will need multiple MRI scans during the course of treatment, including:

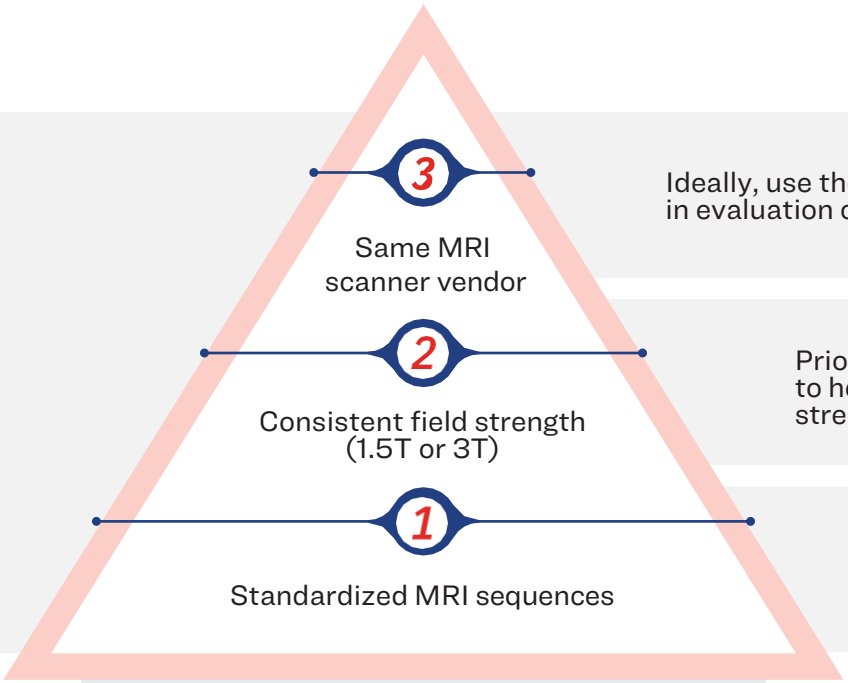
- Baseline/enrollment MRI to confirm therapy eligibility
- Routine MRI exams to monitor for ARIA
- Follow-up MRI for documented ARIA cases if applicable

Communication between ordering providers and radiologists is critical in all interactions, with specific empasis on the following clinical indications:

- Baseline assessment
- Workup of symptoms potentially related to ARIA
- Asymptomatic monitoring

Pyramid of MRI Protocol Standardization for ARIA Monitoring[1]

In clinical practice, lower levels of the pyramid are given higher priority over the upper levels.



3 — Ideally, use the same scanner vendor to minimize differences in evaluation of white matter signal change

2 — Prioritize consistency in field strength; sensitivity to heme products increase with higher field strength

1 — Use a standardized set of MRI sequences

If a patient cannot be imaged on the same scanner, using the same field strength, or employing standardized sequences, radiologists must be aware of potential differences that could impact ARIA evaluation

Abbreviations: ARIA=amyloid-related imaging abnormalities; MRI=magnetic resonance imaging; T=Tesla.

References: 1. Cogswell PM, et al. Am J Neuroradiol. 2024:ajnr.A8469.

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Radiologic Classification & Reporting

Standard Radiographic Classification for ARIA with Severity Score[1]

Based on treatment-related imaging findings, ARIA-E, ARIA-H microhemorrhages, and ARIA-H superficial siderosis are graded as:[1]

Mild — Moderate — Severe

	Mild	Moderate	Severe
ARIA-E (new, treatment emergent sulcal and/or cortical/ subcortical FLAIR hyperintensity)	One location <5 cm	One location 5-10 cm OR more than one location each <10cm	One or more location >10 cm
ARIA-H (new, treatment emergent microhemorrhage)	≤ 4	5-9	≥ 10
ARIA-H (new, treatment emergent superficial sideroisis)	1 focal area	2 focal areas	> 2 focal areas

REPORTING[1]

- For the baseline/ enrollment MRI exam → the report should include the relevant exclusionary findings
- For the ARIA monitoring exams → the report must include all relevant findings to arrive at an ARIA severity score

Abbreviations: ARIA=amyloid-related imaging abnormalities; ARIA-E= ARIA-edema/effusion; ARIA-H=ARIA-hemosiderosis/microhemorrhages; FLAIR=fluid-attenuated inversion recovery; MRI=magnetic resonance imaging.

Reference: 1. Cogswell PM, et al. Am J Neuroradiol. 2024:ajnr.A8469.

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