

ARIA MRI examples and radiographic severity grading

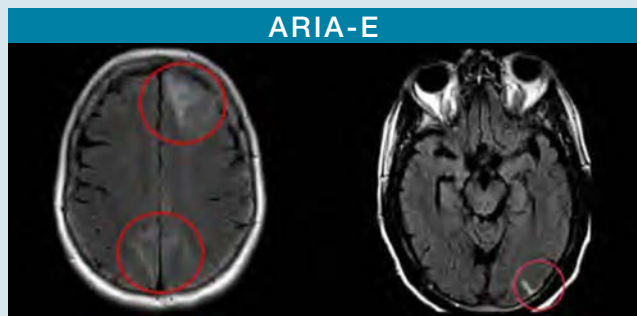


MRI FINDINGS SEEN IN AMYLOID-RELATED IMAGING ABNORMALITIES (ARIA) are a consequence of the presence of amyloid in blood vessel walls (cerebral amyloid angiopathy [CAA]).¹ CAA can cause **spontaneous ARIA** in patients with Alzheimer's disease (AD).¹ The risk of ARIA is increased with the use of monoclonal antibodies that remove amyloid plaque in patients with AD.¹⁻³ In these cases, surveillance MRIs can be used to monitor for ARIA.^{1,3}

ARIA MRI FINDINGS

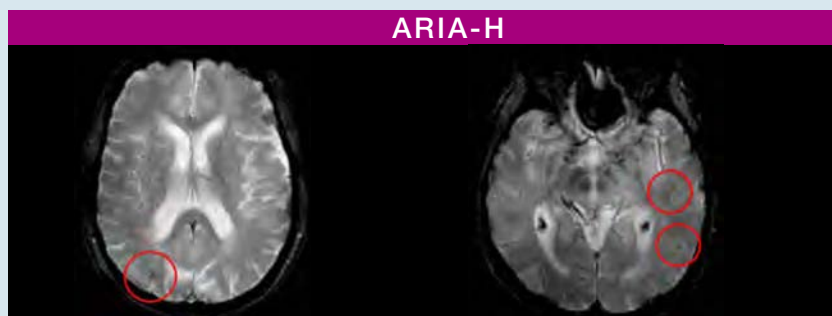
ARIA is subdivided into ARIA-oedema/effusion (ARIA-E) or ARIA-haemosiderin/haemorrhage (ARIA-H)¹⁻³

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ARIA-E

VASOGENIC OEDEMA³ FLAIR hyperintense; parenchymal oedema³
SULCAL EFFUSION³ FLAIR hyperintense; sulcal abnormalities³



ARIA-H

SUPERFICIAL SIDEROSIS⁴ T2*GRE hypointense abnormalities⁴
MICROHAEMORRHAGES³ Punctate foci of signal void on T2*GRE³

Intracerebral haemorrhage (also termed macrohaemorrhage) is a lobar intracerebral haemorrhage which occurs spontaneously in AD and with monoclonal antibodies that remove amyloid, related to underlying CAA.^{1,4}

ARIA-E SEVERITY GRADING (IMAGING CASES)⁴

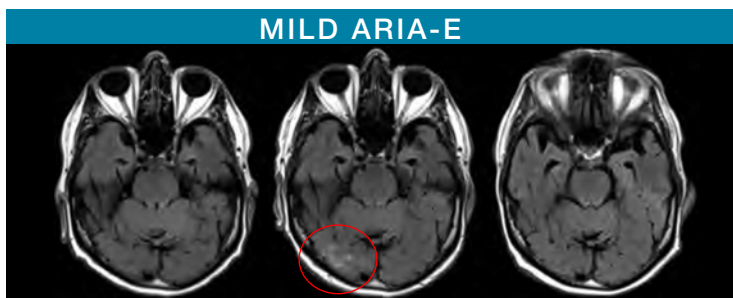
ARIA-E can be categorised by radiographic severity (mild to severe) based on the following criteria:⁴

	MILD	MODERATE	SEVERE
ARIA-E Sulcal and/or cortical/ subcortical FLAIR hyperintensity	1 location <5 cm	1 location 5–10 cm OR >1 location each <10 cm	≥1 location >10 cm

ARIA is graded on the basis of treatment-emergent events.⁴ Adapted from Cogswell *et al* (2022)

The **parenchymal** signal abnormalities can range from being subtle in a single region, to being multi-focal, or nearly pan-hemispheric. **Sulcal effusions** occur in the leptomeningeal or sulcal space, in isolation or near grey matter disturbances¹

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MILD ARIA-E

Baseline Post-treatment Follow-up MRI

Axial T2-FLAIR images acquired in three different timepoints: pre-, post-treatment with monoclonal antibodies that remove amyloid plaque, and 1 month follow-up

Mild ARIA-E: the red circle shows a T2-FLAIR hyperintensity (sulcal effusion) measuring <5 cm in diameter and mono-focal (single region). On follow-up, ARIA-E resolved⁴



MODERATE ARIA-E

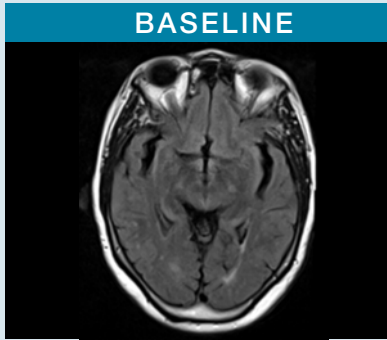
Baseline Post-treatment

These axial T2-FLAIR images acquired pre- and post-treatment with monoclonal antibodies that remove amyloid plaque

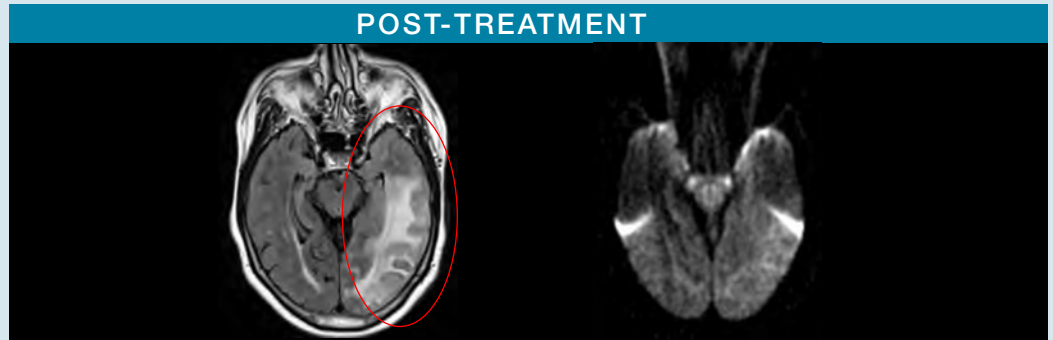
Moderate ARIA-E: the red circle shows new T2-FLAIR hyperintensity (parenchymal oedema) in two areas measuring 5–10 cm⁴

SEVERE ARIA-E

Axial T2-FLAIR images acquired pre- and post-treatment with monoclonal antibodies that remove amyloid plaque
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BASELINE



POST-TREATMENT

Severe ARIA-E: Severe ARIA-E: the red circle shows an extensive T2-FLAIR hyperintense signal (parenchymal oedema) measuring >10 cm (severe ARIA-E). Negative DWI differentiates ARIA-E from acute ischaemia or other cause of cytotoxic oedema⁴

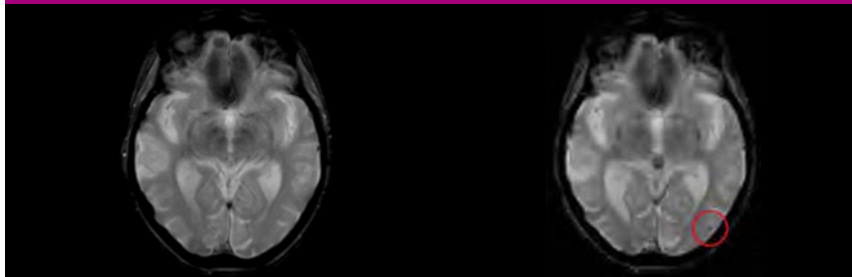
ARIA-H SEVERITY GRADING (IMAGING CASES)⁴

ARIA-H microhaemorrhage and ARIA-H superficial siderosis are each categorised by radiographic severity (mild to severe) based on the following criteria⁴:

	MILD	MODERATE	SEVERE
ARIA-H Superficial siderosis	1 focal area	2 focal areas	>2 focal areas
Number of new microhaemorrhages	≤4	5–9	≥10

ARIA is graded on the basis of treatment-emergent events. For ARIA-H, this count includes cumulative new microhaemorrhages or regions of siderosis compared with the baseline, pre-treatment examination. Adapted from Cogswell *et al* (2022)⁴

MILD ARIA-H



Baseline

Post-treatment

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Axial T2*-GRE imaging acquired pre- and post-treatment with monoclonal antibodies that remove amyloid plaque

Mild ARIA-H, microhaemorrhage (red circle): this patient had one treatment-emergent microhaemorrhage in the left occipital lobe⁴

SEVERE ARIA-H



Post-treatment

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Axial T2*-GRE imaging acquired post-treatment with monoclonal antibodies that remove amyloid plaque

Severe ARIA-H, microhaemorrhage (red circles): ≥10 microhaemorrhages in the left and right parietal lobe⁴

REFERENCES:

1. Sperling RA, *et al*. *Alzheimers Dement*. 2011;7(4):367–385;
2. Barakos J, *et al*. *AJNR Am J Neuroradiol*. 2013;34(10):1958–1965;
3. Barakos J, *et al*. *J Prev Alzheimers Dis*. 2022;9(2):211–220;
4. Cogswell PM, *et al*. *AJNR Am J Neuroradiol*. 2022;43(9):E19–E35.

Any suspected adverse events should be reported to the Ministry of Health according to the National Regulation by using an online form <https://sideeffects.health.gov.il> or emailed the registration holder's safety unit at: eir_pv@eisai.net

For medical education purposes. This material is intended to provide an overview of ARIA based on available literature

ABBREVIATIONS:

AD, Alzheimer's disease; ADC, apparent diffusion coefficient; ARIA, amyloid-related imaging abnormalities (includes ARIA-E and H); ARIA-E, ARIA-oedema/effusion; ARIA-H, ARIA-haemosiderin/haemorrhage; CAA, cerebral amyloid angiopathy; DWI, diffusion weighted imaging; FLAIR, fluid-attenuated inversion recovery; GRE, gradient recalled echo; MRI, magnetic resonance imaging.

For full information please refer to LEQEMBI SPC as approved by the Israeli MOH.