

Approaching Amyloid-Related Imaging Abnormalities (ARIA) in the Emergency Department (ED)



In the ED, ARIA should be considered as a differential diagnosis in patients with Alzheimer's disease (AD) who are receiving anti-amyloid monoclonal antibody (mAb) therapy



What is ARIA?¹

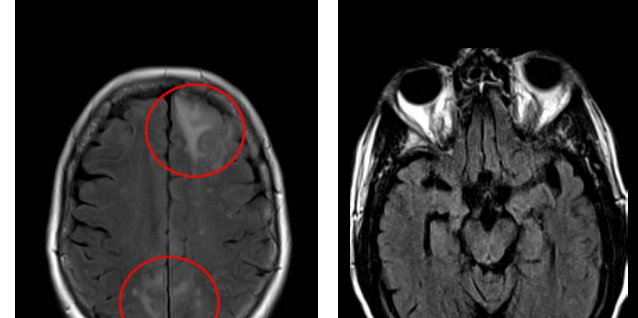
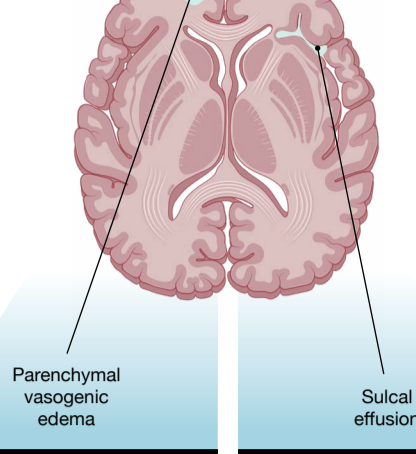
- ARIA are a consequence of **amyloid beta (Aβ) buildup in brain blood vessels**
- The mobilization of Aβ by **mAbs** is hypothesized to increase the permeability of blood vessels to fluid or blood products, leading to ARIA

THERE ARE TWO SUBTYPES OF ARIA

ARIA-edema, effusion (ARIA-E):

- A buildup of fluid on the brain due to damage to the blood-brain barrier¹
- Brain swelling seen as **hyperintensities on FLAIR MRI sequences**²

Hyperintense abnormalities on FLAIR sequences

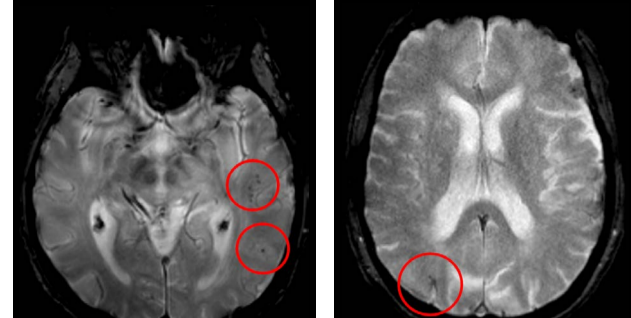
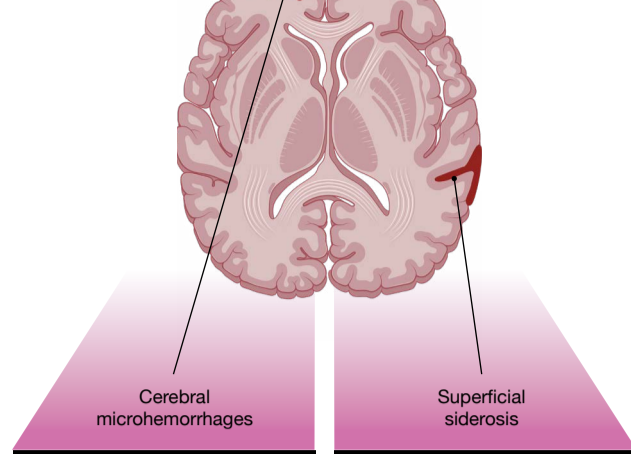


Figures created in Biorender.com. MRI images: data on file.

ARIA-hemosiderin, hemorrhage (ARIA-H):

- Hemosiderin deposition in the parenchyma (microhemorrhages) or leptomeningeal/subpial space (superficial siderosis)^{1,2}
- Bleeds seen as **hypointensities on T2* GRE or SWI MRI sequences**^{2,3}

Hypointense abnormalities on T2* GRE sequences



Rare lobar intracerebral hemorrhage, also termed macrohemorrhages, can also occur⁴

WHAT ARE COMMON CLINICAL SYMPTOMS OF ARIA?

Patients with symptomatic ARIA may present with varying symptoms, including:¹



Headache



Confusion



Dizziness, nausea, or vomiting



Changes in vision



Problems with walking or balance

Approximately 80% of ARIA cases are asymptomatic and typically detected through routine MRI monitoring^{1,5,6}

DIAGNOSING ARIA IN THE ED²



Medical history:

- ✓ Diagnosis of **AD**
- ✓ Recent or current **anti-amyloid treatment**
 - ☐ Check for medication alert bracelet / medication card

CONSIDER A DIAGNOSIS OF ARIA!

USING MRI TO DETECT ARIA⁶

- **MRI** is key for the diagnosis and differential diagnosis of ARIA⁷
- The use of CT is limited by insensitivity to ARIA-H and milder forms of ARIA-E⁷
- It is essential to request the **right MRI sequences to detect ARIA**⁷
- If possible, request an MRI with similar characteristics as the baseline acquisition to facilitate comparisons⁶
- It is important to consider field strength, as this may affect visibility of microhemorrhages⁶

FIELD STRENGTH⁶

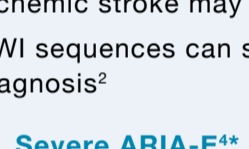
3T recommended

≥1.5T adequate

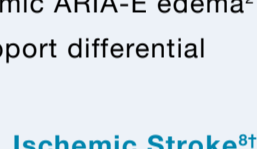
<1.5T inadequate

- Ischemic stroke may mimic ARIA-E edema²
- DWI sequences can support differential diagnosis²

Severe ARIA-E**

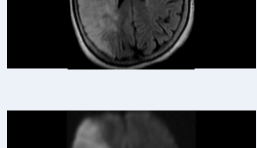
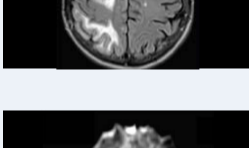


Ischemic Stroke^{8†}



T2 FLAIR

DWI



ARIA are suspected

Order MRI sequences needed to detect ARIA (minimum T2 FLAIR, T2* GRE, and DWI)



*Figure adapted with permission from Cogswell (2022)⁴; †Case courtesy of Balachandran G, Radiopaedia.org, rID-10704⁸; ‡Case courtesy of Abdrabou A, Radiopaedia.org, rID-22738.⁹

KNOWING IF A PATIENT IS ON AN ANTI-AMYLOID mAb THERAPY IS KEY FOR DIAGNOSIS²

It is essential to gather the appropriate information to support an accurate diagnosis. Inaccurate differential diagnosis of stroke may result in the administration of thrombolytic therapy, which may increase the risk of intracerebral hemorrhage in patients with ARIA¹⁰

GRADING THE SEVERITY OF ARIA⁴

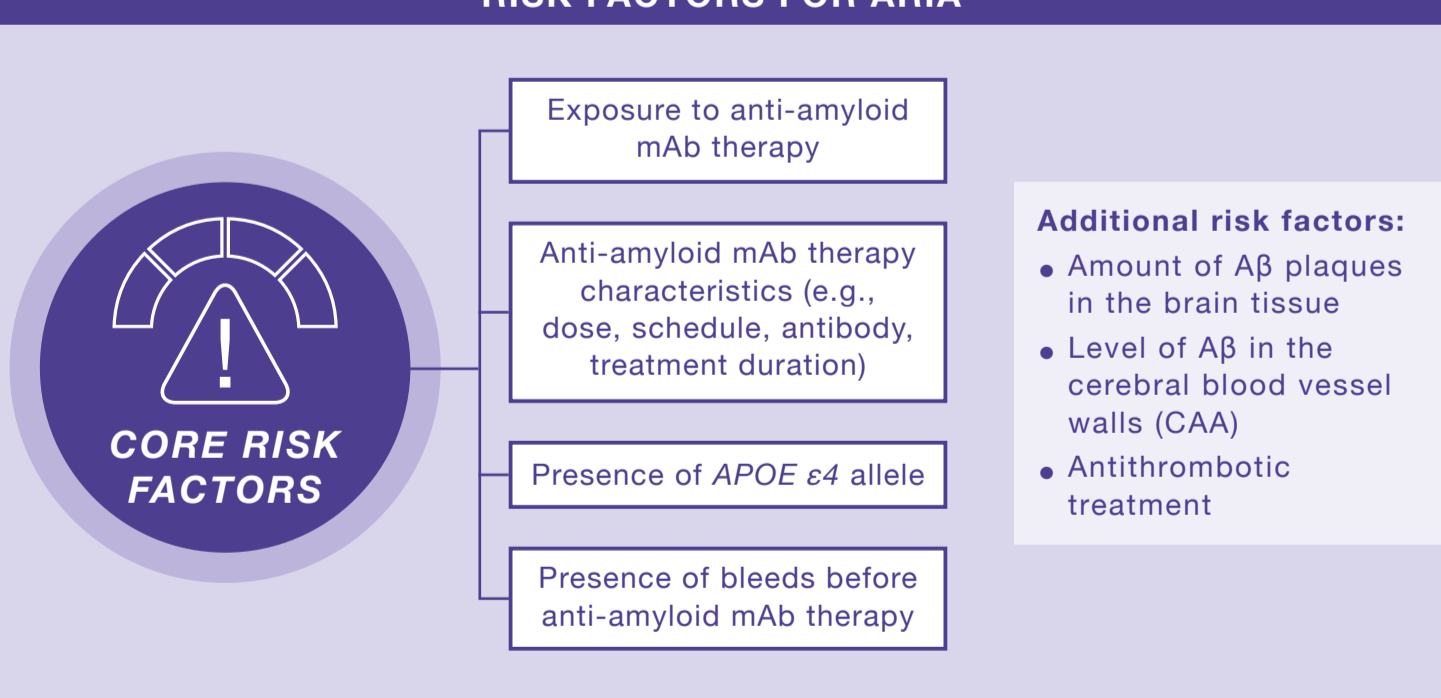
	MILD	MODERATE	SEVERE
ARIA-E New sulcal and/or cortical/subcortical FLAIR hyperintensity	1 location <5 cm	1 location 5–10 cm OR >1 location each <10 cm	≥1 location >10 cm
ARIA-H New superficial siderosis	1 focal area	2 focal areas	>2 focal areas ¹¹
ARIA-H Number of new microhemorrhages	≤4 microhemorrhages	5–9 microhemorrhages	≥10 microhemorrhages

ARIA are graded on the basis of treatment-emergent events. For ARIA-H, this count includes cumulative new microhemorrhages or regions of siderosis compared with the baseline, pretreatment examination.⁴

MRI images 1 to 5 and 7 to 9: data on file.

MRI image 6 adapted with permission from Kate et al. (2018)¹¹ CC BY 4.0: <http://creativecommons.org/licenses/by/4.0/>

RISK FACTORS FOR ARIA¹



MANAGING ARIA IN THE ED

In the US, there are currently **no evidence-based clinical guidelines** for the management of ARIA in the ED⁵

Management of ARIA and stroke are time-sensitive – **timely action and appropriate treatment** are essential to ensure optimal patient outcomes⁵

Communication about suspected ARIA with patient's neurologist/physician is crucial⁶

Refer to the anti-amyloid mAb prescribing information for guidance. Careful clinical evaluation should be performed prior to continuing anti-amyloid mAb therapy¹²

Scan the QR code for ARIA MRI protocols and additional resources from the **American Society of Neuroradiology**



Scan the QR code for additional information on ARIA from **www.UnderstandingARIA.com**



REFERENCES
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ABBREVIATIONS
Aβ, amyloid beta; AD, Alzheimer's disease; ARIA, amyloid-related imaging abnormalities; ARIA-E, amyloid-related imaging abnormalities – edema, effusion; ARIA-H, amyloid-related imaging abnormalities – hemosiderin, hemorrhage; CAA, cerebral amyloid angiopathy; CT, computerized tomography; DWI, diffusion weighted imaging; ED, emergency department; FLAIR, fluid-attenuated inversion recovery; GRE, gradient recalled echo; mAb, monoclonal antibody; MRI, magnetic resonance imaging; PRES, posterior reversible encephalopathy syndrome; SAH, subarachnoid hemorrhage; SWI, susceptibility weighted imaging; T, Tesla.

This content is intended for healthcare professionals only for educational and informational purposes and does not substitute for sound medical judgment or clinical decision making in the context of medical treatment.