ARIA Differential Diagnosis

MRI findings 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.[1] The risk of ARIA is increased with the use of monoclonal antibodies that remove amyloid plaque in patients with AD[1–3]

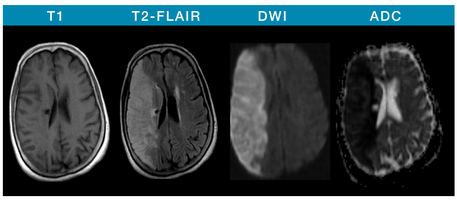
When differentiating between ARIA and other imaging abnormalities, it is important to consider the **full clinical history** of the patient and contextualize it against the **use/non-use of monoclonal antibodies that remove amyloid plaque** and the patient's clinical **presentation/symptoms**[2]

MRI is key for the diagnosis and differential diagnosis of ARIA*

CT is generally insufficient to detect milder forms of ARIA-edema/effusion (ARIA-E) and is insensitive to the detection of microhemorrhages and siderosis (ARIA-H)[3]

ISCHEMIC STROKE

Right MCA hyperacute ischemic stroke[4]

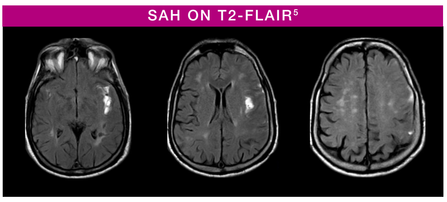


Case courtesy of Balachandran G, Radiopaedia.org, rID: 10704

- Acute ischemic stroke shows restricted diffusion while ARIA-E does not
- Diffusion weighted imaging (DWI) is needed to differentiate between ARIA-E and ischemic stroke[2]
- Signs and symptoms of ischemic stroke: acute onset, hemiparesis, dysphasia or dysarthria, facial paresis, paresthesia, eye movement abnormalities, and visual field defects[6]
- Knowing if a patient is on monoclonal antibodies that remove amyloid plaque helps with determining the diagnosis of ARIA[2]

SUBARACHNOID HEMORRHAGE (SAH)

Left sylvian fissure and adjacent sulci SAH[5]



Case courtesy of Abdrabou A, Radiopaedia.org, rID: 22738

- Leptomeningeal FLAIR hyperintensity of ARIA-E effusion may be mimicked by SAH[2]
- Common symptoms of SAH: severe headache and vomiting. Decreased level of consciousness and focal neurological signs can also be present[6]
- Differentiating ARIA-E and SAH may require a systematic clinical and diagnostic approach[2]

PERILESIONAL EDEMA

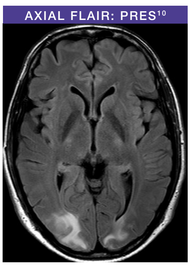
- The parenchymal FLAIR hyperintensity of ARIA-E edema may be mimicked by edema due to malignancy and infection[2]
- The detection of an underlying source of parenchymal edema (other than ARIA-E) can be enhanced by gadolinium administration in cases where there are other differential diagnostic possibilities or cause is uncertain[2]

POSTERIOR REVERSIBLE ENCEPHALOPATHY SYNDROME (PRES)

- PRES has similar findings to ARIA-E on MRI[2]
- Causes of PRES: hypertension, renal disease, autoimmune disorders, cytotoxic medications, pre-eclampsia, and sepsis[7]
- Signs of PRES: encephalopathy, epileptic seizures, visual disturbances, and focal neurological deficits[7]
- Less specific signs: (very similar to ARIA) headache, nausea, and vomiting[7]
- Some symptoms of PRES and ARIA may overlap,[7,8,9] but the clinical context of treatment with monoclonal antibodies that remove amyloid plaque versus underlying risk factors of PRES can enable differentiation[2]

Case courtesy of Hani Makky Al Salam, Radiopaedia.org, rID: 7697

AXIAL FLAIR: PRES[10]



CEREBRAL AMYLOID ANGIOPATHY – RELATED INFLAMMATION

CAA is characterized by the accumulation of **amyloid β** within blood vessels walls.[11,12] It is a common neuropathological finding among older adults, especially among those with Alzheimer's disease.[12] CAA is considered an important cause of lobar **intracerebral hemorrhage**[11,12]

CAA-related inflammation (CAA-ri) represents an unusual life-threatening manifestation of CAA.[11] It is a **spontaneous** inflammatory condition that responds to steroids or immunosuppressant therapy[13]

ARIA may be thought of as transient exacerbation of the effect of CAA that occurs **secondary** to treatment with monoclonal antibodies that remove amyloid plaque[13]

ARIA can be serious and life-threatening[13]

CAA-ri versus ARIA

Both have **similar imaging findings** of sulcal effusions/edema and microhemorrhages/siderosis and are best differentiated by a history of administration of **monoclonal antibodies that remove amyloid plaque** in ARIA patients and non-use in CAA-ri patients

KEY CONSIDERATIONS

- ARIA can be mimicked by several other disease processes: ischemic stroke, SAH, and PRES[2]
- Knowing a patient is on monoclonal antibodies that remove amyloid plaque helps with differential diagnosis[2]
- Understanding the patient's clinical history and differences between Ischemic Stroke, SAH, CAA-ri, PRES is key[2]
- History, neurologic exam, and selected diagnostic procedures (including selected neuroimaging modalities and laboratory tests) are beneficial in making a diagnosis[2]

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For additional information on ARIA, scan here:

www.UnderstandingARIA.ca

ABBREVIATIONS:

AD, Alzheimer's disease; ADC, apparent diffusion coefficient; ARIA, amyloid-related imaging abnormalities (includes ARIA-E and H); ARIA-E, ARIA-edema/effusion; ARIA-H, ARIA-hemosiderin/hemorrhage; CAA, cerebral amyloid angiopathy; CAA-ri, cerebral amyloid angiopathy-related Inflammation; CT, computed tomography; DWI, diffusion weighted imaging; FLAIR, fluid-attenuated inversion recovery; MCA, middle cerebral artery; MRI, magnetic resonance imaging; PRES, posterior reversible encephalopathy syndrome; SAH, subarachnoid hemorrhage.