Anterior cerebral artery infarct

Stroke in the anterior cerebral artery territory are much less common than either middle cerebral artery or posterior cerebral artery territory infarcts.

Epidemiology

ACA territory infarcts are rare, comprising ~2% of ischaemic strokes.

ACA territory infarcts are less common because if the A1 segment is occluded there is generally enough collateral flow via the contralateral A1 segment to supply the distal ACA territory.

Etiology

Embolic strokes (often with MCA involvement) are the most common cause.

Rarely, they are also seen as a complication of severe midline shift, where the ACA is occluded by mass effect or severe vasospasm.

An asymmetry of the A1 segment of the anterior cerebral artery (A1SA) was identified on digital subtraction angiography studies from 127 patients (21.4%) and was strongly associated with anterior communicating artery aneurysm (ACoAA) ($p < 0.0001$, OR 13.7). An A1SA independently correlated with the occurrence of ACA infarction in patients with ACoAA ($p = 0.047$) and in those without an ACoAA ($p = 0.015$). Among patients undergoing Anterior communicating artery aneurysm endovascular treatment, A1SA was independently associated with the severity of ACA infarction ($p = 0.023$) and unfavorable functional outcome ($p = 0.045$, OR = 2.4).

An A1SA is a common anatomical variation in SAH patients and is strongly associated with ACoAA. Moreover, the presence of A1SA independently increases the likelihood of ACA infarction. In SAH patients undergoing ACoAA coiling, A1SA carries the risk for severe ACA infarction and thus an unfavorable outcome. Clinical trial registration no.: DRKS00005486 (http://www.drks.de/) [1].

Clinical features

see Anterior cerebral artery syndrome.

Diagnosis

The features are those of cerebral infarction in the anterior cerebral artery vascular territory:

Paramedian frontoparietal cerebral cortex

Anterior corpus callosum.

Anterior limb of the internal capsule.

Inferior portion of the Caudate nucleus head.

Differential diagnosis

Watershed infarct

Cerebral venous infarction [2].

Case series

Kumral et al. studied 48 consecutive patients who admitted to the stroke unit over a 6-year period.

They performed magnetic resonance imaging (MRI) and magnetic resonance angiography (MRA) in all patients, and Diffusion weighted magnetic resonance imaging (DWI) in 21. In the stroke registry, patients with ACA infarction represented 1.3% of 3705 patients with ischemic stroke. The main risk factors of ACA infarcts was hypertension in 58% of patients, diabetes mellitus in 29%, hypercholesterolemia in 25%, cigarette smoking in 19%, atrial fibrillation in 19%, and myocardial infarct in 6%. Presumed causes of ACA infarct were large-artery disease and cardioembolism in 13 patients each, small-artery disease (SAD) in the territory of Heubner's artery in two and atherosclerosis of large-arteries (<50% stenosis) in 16. On clinico-radiologic analysis there were three main clinical patterns depending on lesion side; left-side infarction (30 patients) consisting of mutism, transcortical motor aphasia, and hemiparesis with lower limb predominance; right side infarction (16 patients) accompanied by acute confusional state, motor hemineglect and hemiparesis; bilateral infarction (two patients) presented with akinetic mutism, severe sphincter dysfunction, and dependent functional outcome. Our findings suggest that clinical and etiologic spectrum of ACA infarction may present similar features as that of middle cerebral artery infarction, but frontal dysfunctions and callosal syndromes can help to make a clinical differential diagnosis. Moreover, at the early phase of stroke, DWI is useful imaging method to locate and delineate the boundary of lesion in the territory of ACA [3].

1)
Jabbarli R, Reinhard M, Roelz R, Kaier K, Weyerbrock A, Taschner C, Scheiwe C, Shah M. Clinical relevance of anterior cerebral artery asymmetry in aneurysmal subarachnoid hemorrhage. J Neurosurg. 2017 Nov;127(5):1070-1076. doi: 10.3171/2016.9.JNS161706. Epub 2016 Dec 23. PubMed PMID: 28009232.
2)
https://radiopaedia.org/articles/anterior-cerebral-artery-aca-infarct
3)
Kumral E, Bayulkem G, Evyapan D, Yunten N. Spectrum of anterior cerebral artery territory infarction: clinical and MRI findings. Eur J Neurol. 2002 Nov;9(6):615-24. PubMed PMID: 12453077.