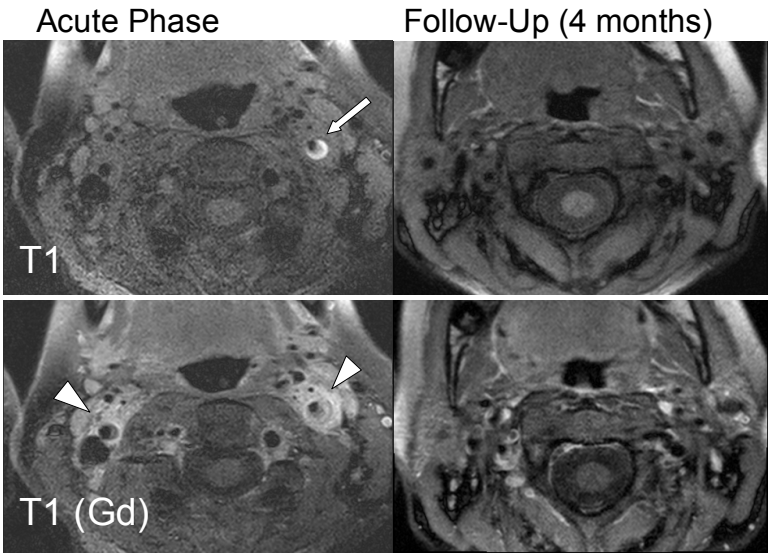
Spontaneous cervical artery dissection: an inflammatory disease? Results of a prospective observational PET-CT and MRI study

T. Saam[1], T. Pfefferkorn[2], M. Habs[1], M. Hacker[3], A. Rominger[3], C. C. Cyran[1], M. Dichgans[2], M. F. Reiser[1], and K. Nikolaou[1]
[1]Clinical Radiology, University of Munich, Munich, Bavaria, Germany, [2]Neurology, University of Munich, Munich, Bavaria, Germany, [3]Nuclear Medicine, University of Munich, Munich, Bavaria, Germany

Purpose: Spontaneous cervical artery dissection (sCAD) is a frequent cause of ischemic stroke in young adults. The pathogenesis of sCAD is poorly understood. However, several observations suggest an inflammatory component [1,2]. High-resolution MRI and F18-FDG-PET/CT may non-invasively detect perivascular inflammation. The aim of this study was to use PET/CT and MRI to estimate the prevalence of perivascular inflammation in sCAD.

Material & Methods: In this prospective monocentric observational study 33 consecutive patients with sCAD received a high-resolution black-blood contrast enhanced cervical MRI at 3Tesla (best in-plane interpolated resolution 0.25 x 0.25 mm²; fat-saturated pre- and post contrast T1w-, T2w- and TOF images) in combination with PET-CT. Patients demonstrating perivascular uptake of gadolinium (MRI) and/or FDG-uptake (PET/CT) were reassessed by MRI and/or PET/CT after three months.



The figure shows images of a 41 year old female patient with a preceding upper respiratory infection andno other co-morbidities. She suffered from an infarction in the territory of the left middle cerebral artery. High-resolution T1w images of the time of admission showed an intramural hematoma in the left internal carotid artery, consistent with an arterial dissection (arrow). Furthermore strong perivascular contrast enhancement in both carotid arteries (arrowhead) was seen. 4 months later the hematoma resolved and no perivascular inflammation was found.

Results: 27 patients (82%) PET-CT demonstrated significant perivascular FDG-uptake at the site of the arterial dissection, which in 7 patients (21%) was not confined to the site of the dissection. There was a strong positive correlation between the presence of a dissection and perivascular contrast enhancement ($R=0.73$; $p<0.001$) and edema ($R=0.65$; $p<0.001$) as assessed by MRI. In all patients with positive MRI and/or PET findings, follow-up examinations revealed spontaneous normalization or partial resolution of perivascular abnormalities.

Conclusion: This study demonstrates that inflammatory changes at the site of the arterial dissection are common in sCAD patients. In a subset of these patients, perivascular inflammation was not confined to the site of the dissection, suggesting that vessel wall inflammation might play a role in the pathogenesis of sCAD.

References:
[1] Genius J et al. Postacute C-reactive protein levels are elevated in cervical artery dissection. *Stroke 2005 Apr;36(4):e42-e44.*
[2] Forster K et al. Elevated inflammatory laboratory parameters in spontaneous cervical artery dissection as compared to traumatic dissection: a retrospective case-control study. *J Neurol 2006 Jun;253(6):741-5.*