

3D black-blood imaging in arteritis temporalis

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Section: Neuroradiology

Area of Interest: Vascular

Procedure: Diagnostic procedure

Imaging Technique: MR

Special Focus: Tissue characterisation Obstruction /

Occlusion Case Type: Clinical Cases

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Patient: 81 years, male

Clinical History:

We present the case of a 81-year-old male patient who was hospitalised at the geriatric department. During his inpatient stay he developed severe bilateral temporal pain and jaw-claudication. Pre-existing medical conditions were paroxysmal atrial fibrillation, mitral valve insufficiency, coronary heart disease and left-sided ischaemic stroke.

Imaging Findings:

The T1-weighted 3D black-blood imaging at 3.0 Tesla revealed a strong vascular enhancement of both temporal arteries as well as corresponding "stranding" of the perivascular subcutaneous soft-tissue compared to the non-pathologic anatomy (Fig. 1, 3). Furthermore we found a vascular enhancement of the vertebral artery in the V3-and V4-segment, which is suggestive for giant-cell arteritis.

Additionally slight enhancement was noticed in the middle third of the basilar artery and the right external carotid artery. Due to the results of the neurosonography, suspicion of an occlusion of the right vertebral artery was raised and we could confirm this finding via MR-angiography (Fig. 2). There was complete blockage of the V1-and V2-segment with retrograde filling of the V3-and V4-segment via the basilar artery. An ischaemic intracranial lesion was not identified.

Discussion:

Giant cell arteritis is a systemic vasculitis, first described by Horton in 1937. The vascular inflammation process involves activated T-cells, macrophages and multinucleated giant cells which are found in clusters at the internal elastic membrane. The ophthalmic, posterior ciliary, superficial temporal, occipital facial and internal maxillary arteries are commonly affected. [2]

Due to the rare occurrence, varying clinical symptoms and restricted value of laboratory markers the diagnostic work-up of extracranial vasculitis demands an interdisciplinary approach. An early and correct diagnosis is essential to avoid long term damage. [1]

The contrast-enhanced T1-weighted 3D black-blood imaging is mainly used in the work-up of inflammatory intracranial disease, brain tumours, metastasis as well as cervical dissection. [3, 4]

Compared to the T1-weighted gadolinium-enhanced 3D sequences, the T1-weighted black-blood sequence displayed the temporal artery inflammation very accurately and was far more superior. There was a clear depiction of the lymphocytic infiltration of the tunica media and the vasa vasorum. Moreover, marked local vascular inflammation on the 3D black-blood sequence showed a focal “stranding” of the perivascular soft-tissue, which we believe is due to the affection of the vasa vasorum (Fig. 1).

After biopsy of the left temporal artery, histology revealed a focal thickening with significant narrowing of the vascular lumen. The intima was thickened and showed signs of fibrosis with focal accumulation of fibroblast-like cells and macrophages. Microcalcifications were noted at the transition from intima to media. Especially in the media and adventitia lymphocytic accumulations were found, which were located around the vasa vasorum of the adventitia. In parts of the media, histology revealed giant cells of the antibody-type as well as macrophages.

Immunohistochemistry identified lymphocytic infiltrations that were CD3 positive, consistent with T-lymphocytes. Additionally the giant-cells as well as the multinucleated giant cells (MGCS) of the antibody-type CD68 were immune reactive. Summarising the diagnosis of a temporal arteritis Horton was confirmed.

We recommend the 3D black-blood sequence in the diagnostic imaging work-up of a temporal artery inflammation as it is superior to a common T1-weighted 3D post-gadolinium sequence. Additionally we propose to look for a “stranding” of the perivascular tissue as an expression of giant cell and lymphocytic infiltration.

Written informed patient consent for publication has been obtained.

Differential Diagnosis List: Temporal arteritis, Takayasu arteritis, Primary amyloidosis, Stroke

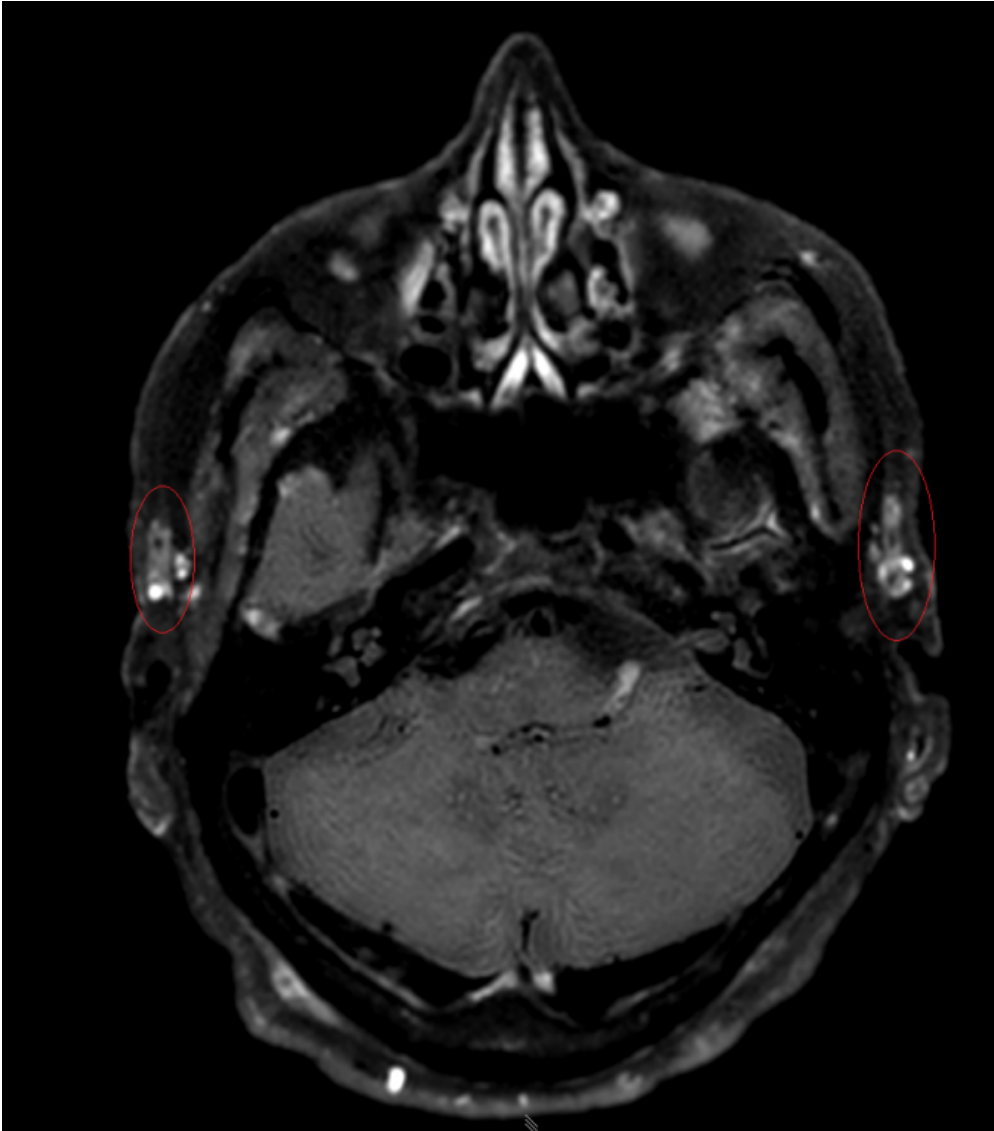
Final Diagnosis: Temporal arteritis

References:

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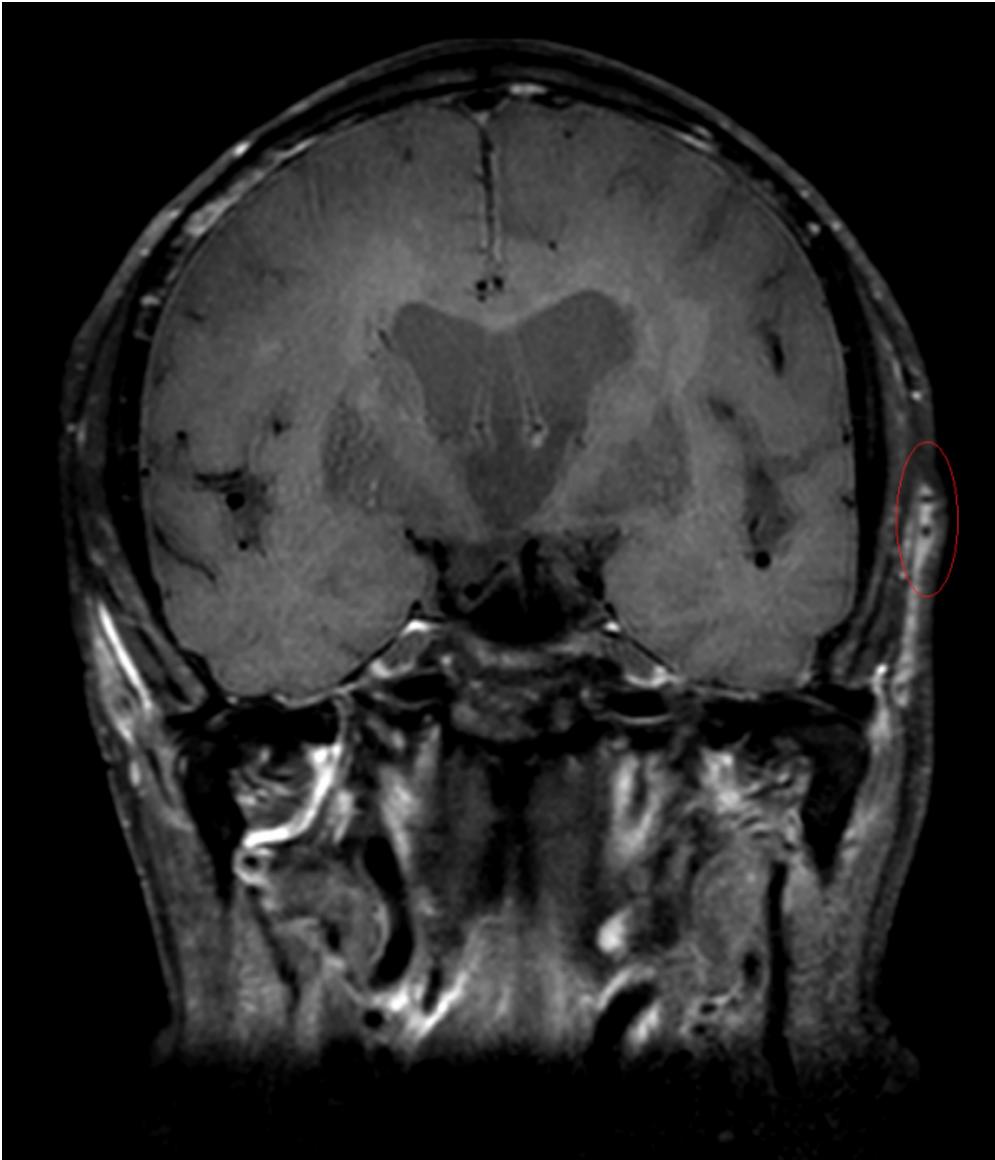
Figure 1

a



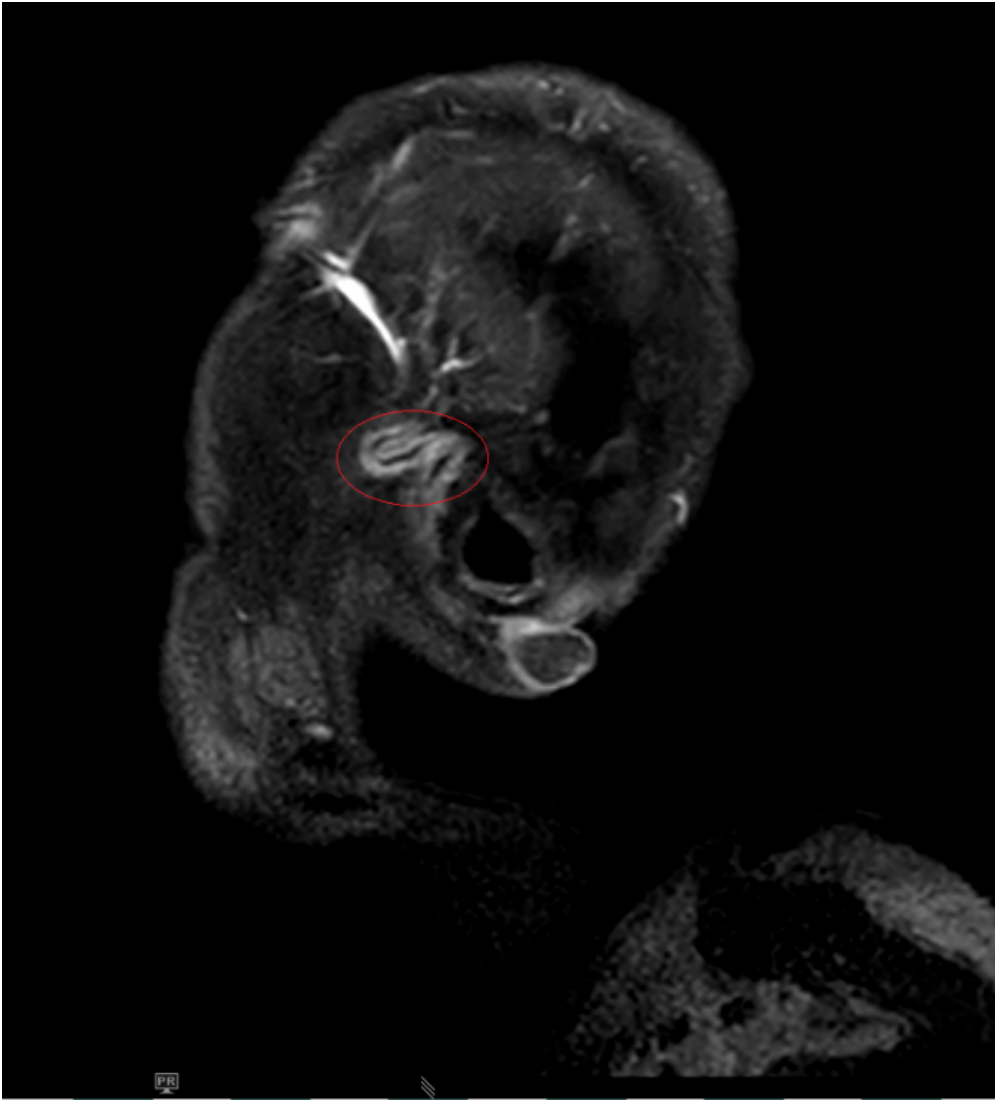
Description: Bilateral enhancement of the temporal arteries with slight perivascular stranding. **Origin:** McCoy MR, Department of Neuroradiology, PMU Salzburg, Salzburg, Austria

b



Description: Enhancement of the left temporal artery with slight perivascular stranding. **Origin:** McCoy MR, Department of Neuroradiology, PMU Salzburg, Salzburg, Austria

c



Description: Contrast-enhancement of the left temporal artery with perivascular stranding. **Origin:** McCoy MR, Department of Neuroradiology, PMU Salzburg, Salzburg, Austria

Figure 2

a



Description: Normal depiction of the temporal artery without enhancement. **Origin:** McCoy MR, Department of Neuroradiology, PMU Salzburg, Salzburg, Austria

b



Description: Normal depiction of the temporal artery without enhancement. **Origin:** McCoy MR, Department of Neuroradiology, PMU Salzburg, Salzburg, Austria

Figure 3

a



Description: Blockage of the right vertebral artery in the V1-and V2 segment; The V3-and V4 segment is filled retrogradely. **Origin:** McCoy MR, Department of Neuroradiology, PMU Salzburg, Salzburg, Austria

b



Description: Blockage of the right vertebral artery in the V1-and V2 segment; oblique view; The V3- and V4 segment is filled retrogradely. **Origin:** McCoy MR, Department of Neuroradiology, PMU Salzburg, Salzburg, Austria