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## A case of hemiparesis associated with cranial nerve lesions due to intravascular lymphomatosis (2003:4b)

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**Abstract** Intravascular lymphomatosis is a rare variant of non-Hodgkin's lymphoma with an unusual predilection for the central nervous system. Most cases are not diagnosed until postmortem because of variable clinical presentation and non-specific laboratory findings. We studied a 41-year-old lady who presented with progressive neurological symptoms. MR showed multifocal grey and white matter lesions. Brain biopsy showed an intravascular lymphoma of the B-cell lineage. This report illustrates the ischaemic origin of the radiological lesions, as they are all hyperintense on the diffusion-

weighted images. This has, to our knowledge, never been published before. MR did not show any enhancement after intravenous Gadolinium-DTPA (parenchymal or meningeal) which is a very uncommon finding in this entity. Intravascular lymphomatosis should be taken into account in the differential diagnosis of repeated cerebral ischemia of unclear aetiology.

**Keywords** Vasculitis · Lymphoma · Diffusion-weighted

### Case report

A 41-year-old woman, without any relevant medical history, presented with a progressive left hemiparesis. Neurological examination revealed a left homonymous hemianopia, a central left VIIth nerve paresis and a left XIIth nerve paresis. She had been complaining of lethargy and weight loss for months. The laboratory data showed no significant abnormalities. Cerebrospinal fluid analysis was normal.

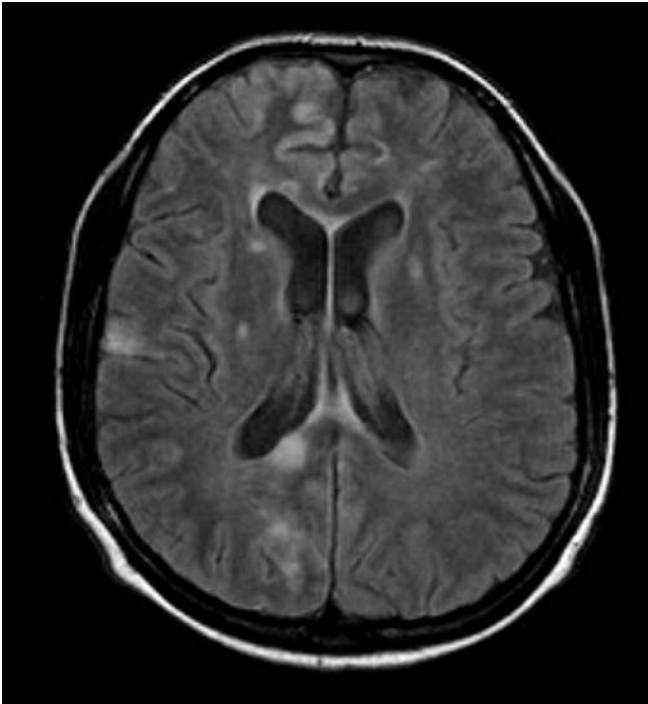
T2-weighted images showed several hyperintense cerebral lesions. Grey matter lesions were seen in the basal ganglia on both sides, the right frontoparietal cortex, anteriorly in the right frontal cortex and in the left gyrus cinguli. White matter lesions were found in the genu and splenium of the corpus callosum, in the centrum semi-ovale and the corona radiata on both sides and in the right parietal lobe. All lesions were hyperintense on the FLAIR-sequence (Fig. 1) and there was no enhancement after intravenous contrast medium administration. 3D-TOF MR-angiography showed a filiform stenosis of a right middle cerebral artery branch. Catheter angiography confirmed this stenosis (Fig. 2) and showed additional lesions in a right posterior cerebral artery branch and a right anterior cerebral artery branch.

Transesophageal echocardiography (TEE) was normal.

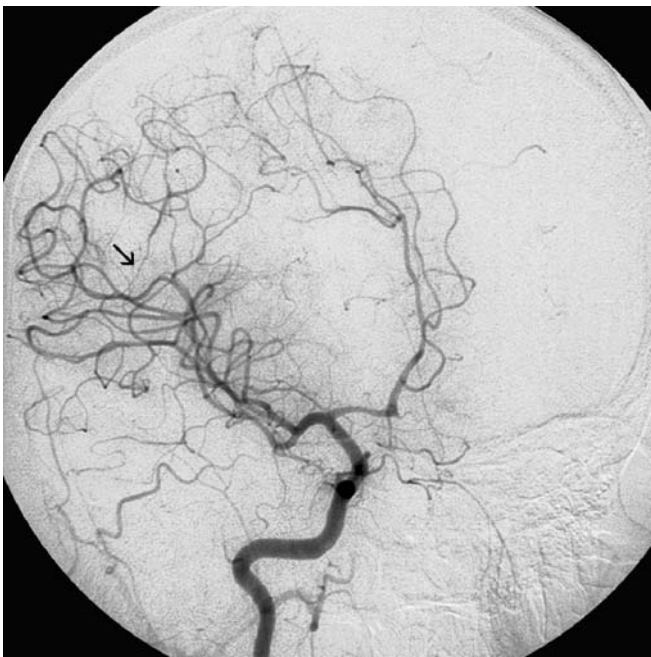
Additional blood examinations showed a normal level of anti-neutrophil cytoplasmatic autoantibodies (ANCA) and circulating immune complexes.

Open brain biopsy was performed two days after the initial MR-examination. Histological examination showed atypical cell clusters in the intraparenchymatous and leptomeningeal blood vessels. The atypical cells were large with vesicular nuclei, prominent nucleoli and some showed mitotic figures (Fig. 3). Furthermore, immunohistochemical examination with antibodies directed against CD-45 and CD-20 was positive, while CD3 was negative in the tumor cells.

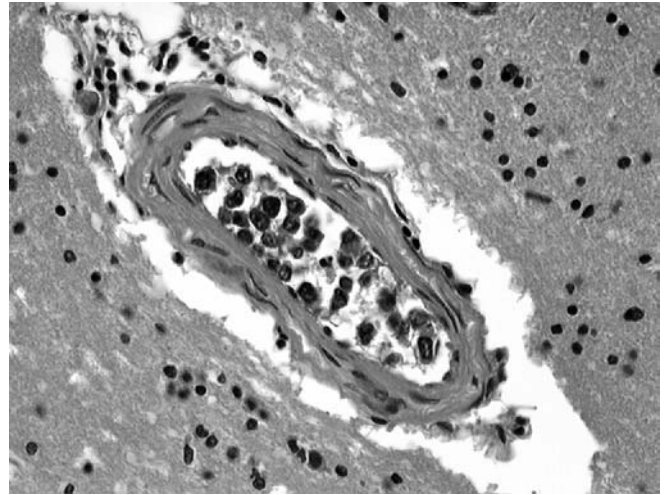
Postoperative MR on day 6 showed new lesions in the grey and white matter of the right temporal lobe. On diffusion-weighted MR images, the existing and the new lesions were strongly hyperintense, suggesting recent infarcts (Fig. 4). FDG-PET showed no abnormalities.



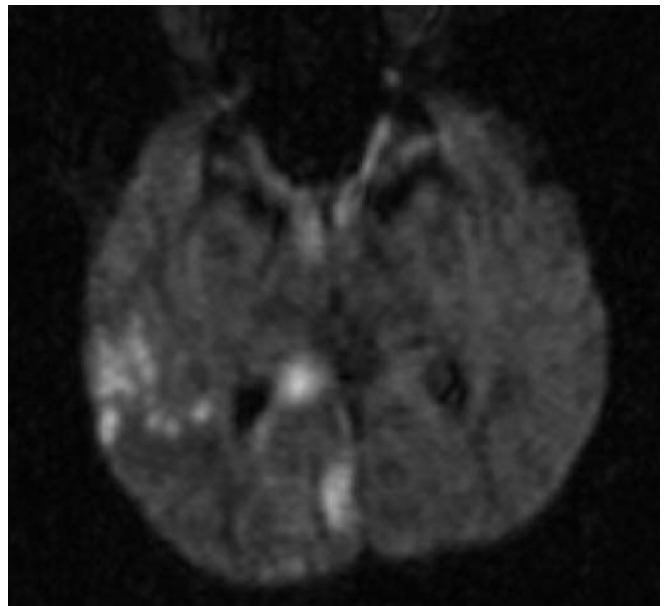
**Fig. 1** Axial FLAIR image shows white matter lesions in the right side of the genu and splenium of the corpus callosum and in the right occipital lobe. This image also shows grey matter lesions on both sides in the nucleus lentiformis, in the head of the right nucleus caudatus, the right frontoparietal cortex and anteriorly in the right frontal cortex



**Fig. 2** Catheter angiography shows a filiform stenosis of a middle cerebral artery branch (*arrow*)



**Fig. 3** Microscopic specimen shows an intravascular cluster of atypical cells. This cluster fills the lumen of this intraparenchymatous vessel. The cells have a prominent vesicular nucleus



**Fig. 4** Postoperative (day 6) diffusion-weighted MR-image shows the hyperintensity of the new lesions in the right temporal lobe. The existing lesions in the right parietal lobe and in the right side of the splenium of the corpus callosum are also hyperintense

## Diagnosis

The microscopic features defined the lesions as an intravascular large B-cell lymphoma.

## Discussion

Intravascular lymphomatosis was first described as angioendotheliomatosis proliferans systemisata in 1959 [1]. Later, immunocytochemical and cytogenetic studies revealed that the malignant cells were of lymphoid origin [2, 3]. The initial predilection sites of this rare variant of non-Hodgkin's lymphoma, are the brain and the skin [3]. Most cases are not diagnosed during life because of the variable clinical presentation and non-specific laboratory findings.

Although this entity is well recognized in the literature, the imaging findings have not been characterized in detail as only a limited number of cases have been reported until now. Multifocal hyperintense lesions on T2-weighted images, probably caused by small vessel occlusion leading to ischemia and infarction, is the most common imaging finding [4]. Enhancing mass lesions should be considered as an extraluminal spread of the tumor cells [4]. Dural/arachnoidal enhancement found in some cases of intravascular lymphomatosis could be used as a

diagnostic tool to differentiate this entity from vasculitis [4]. In this case, we found several hyperintense lesions on the T2-weighted images. Multifocal grey matter lesions were suggestive of infarction caused by emboli or vasculitis, whereas some white matter lesions suggested demyelination. TEE excluded a cardiac source of emboli. Multiple sclerosis was excluded from the differential diagnosis on the clinical basis and on the basis of the cerebrospinal fluid analysis. Moreover the angiographic findings and the presence of grey matter lesions were not compatible with multiple sclerosis.

A normal level of immunological blood results made the diagnosis of vasculitis unlikely.

The parenchymal lesions did not enhance and MR showed furthermore no meningeal (dural/arachnoidal) enhancement. In the review article of Williams et al [4], only 1 out of 7 patients presented with the same non-enhancement characteristics.

Most of the lesions are hyperintense on the diffusion weighted images, which, to our knowledge, has never been described before in this entity. This supports -or even proves- the hypothesis that the lesions are caused by small vessel obstruction by tumoral cells.

Intravascular lymphomatosis should be taken into account in the differential diagnosis of repeated cerebral ischaemia of unclear aetiology.

## References

1. Pflieger V, Tappeiner J (1959) Zur Kenntnis der systemisierten Endotheliomatose der cutanen Blutgefäße (reticuloendotheliosis?). *Hautarzt* 10:359-363
2. Sheibani K, Battifora H, Wingberg CD, Burke JS, Ben Ezra J, Ellinger GM, Quigley NJ, Fernandez BB, Morrow D, Rappaport H (1986) Further evidence that malignant angioendotheliomatosis is an angiotropic large cell-lymphoma. *N Engl J Med* 314:943-948
3. Demirer T, Dail DH, Aboulafia DM (1994) Four varied cases of intravascular lymphomatosis and a literature review. *Cancer* 73:1738-1745
4. Williams RL, Meltzer CC, Smirmitopoulos JG, Fukui MB, Inman M (1998) Cerebral MR imaging in intravascular lymphomatosis. *Am J Neuroradiol* 19:427-431

There were no precisely correct answers to this case. Numerous excellent responses were obtained and the suggestions included vasculitis/angiitis, sarcoid, CADASIL, etc. Perhaps the case was too complex – even the authors suggested that it was a rare feature!