

Neuromyelitis Optica: Are cortical lesions a common finding?

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Introduction Neuromyelitis optica (NMO) is an inflammatory demyelinating disease, which mainly affects the optic nerves and the spinal cord. One of the diagnostic criteria of NMO is a brain MRI at disease onset, which does not meet the diagnostic criteria for MS concerning the white matter (WM) lesions [1]. Cortical lesions (CLs) are a common finding in multiple sclerosis [1] and Double Inversion Recovery (DIR) has significantly increased the number of detected CLs in patients with multiple sclerosis (MS) [2]. Whether CLs are a common finding in NMO or the absence of CLs is suggestive for NMO is unknown so far.

Methods Four female patients which fulfill the diagnostic criteria for NMO underwent a MR scan at 3 T (Tim Trio, Siemens, Erlangen, Germany) with a 32 channel head coil. Besides standard 2D FLAIR and 3D T2-weighted TSE sequences, a 2D DIR sequence was used for the detection of CLs. The number of transversal slices was adjusted to cover the whole supratentorial brain with a slice thickness of 3 mm, the other parameters were as follows: TR 14s, TE 12 ms, TI₁ (time between the first inversion pulse and the excitation pulse) 3600 ms, TI₂ (time between the second inversion pulse and the excitation pulse) 350 ms, turbo factor 8, FoV 256x156, matrix 256 x 156. All DIR images were examined for the presence of CLs, subcortical lesions (SCLs) and white matter lesions (WMLs) by two readers experienced in evaluating DIR sequences in a consensus approach. For the identification of CL the MAGNIMS guidelines were followed [3]. In contrast to the guidelines the image contrast was chosen for each slice separately as incidental MT effects alter the signal of 2D DIR sequences depending on slice position [4].

Results High quality images with good suppression of WM and CSF were obtained. Table 1 summarizes the number of CLs, SCLs and WMLs in the four patients with NMO. Typical flow artifacts commonly found in 2D DIR sequences (Fig. 1) could easily be identified and were not counted as CLs. Typical image findings in the patients are shown in Fig. 2.

Conclusion Even though the number of WML was low in all four patients, CLs were found in all patients. Therefore CLs seem to be a frequent finding in NMO patients and absence of CLs cannot be considered an imaging finding suggestive of NMO.

Literature:

- [1] Wingerchuk DM. 2007, Neurologist 13: 2-11.
- [2] Geurts JJ, et al. 2005, Radiology 236: 254-60.
- [3] Geurts JJ, et al. 2010, ECTRIMS Meeting 2010, Göteborg: p767
- [4] Bender B, Klose U. 2010, Invest Radiol 45: 196-201.

Table 1: Demographic data, EDSS Score and number of cortical lesions (CL), subcortical lesions (SCL) and white matter lesions (WML).

Age	Duration of disease	EDSS	CLs	SCLs	WMLs
55y	5 years	4	3	2	13
47y	17 years	8.5	4	1	14
39y	7 years	0	4	0	1
40y	4 years	6	3	1	2

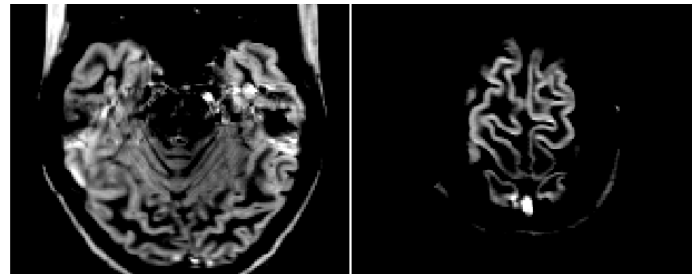


Fig 1.: Typical flow artifacts in phase encoding direction in 2D DIR in a healthy volunteer. Mostly the artifacts are found in the insula, the temporal cortex and lateral of the occipital sinus sagittal superior.

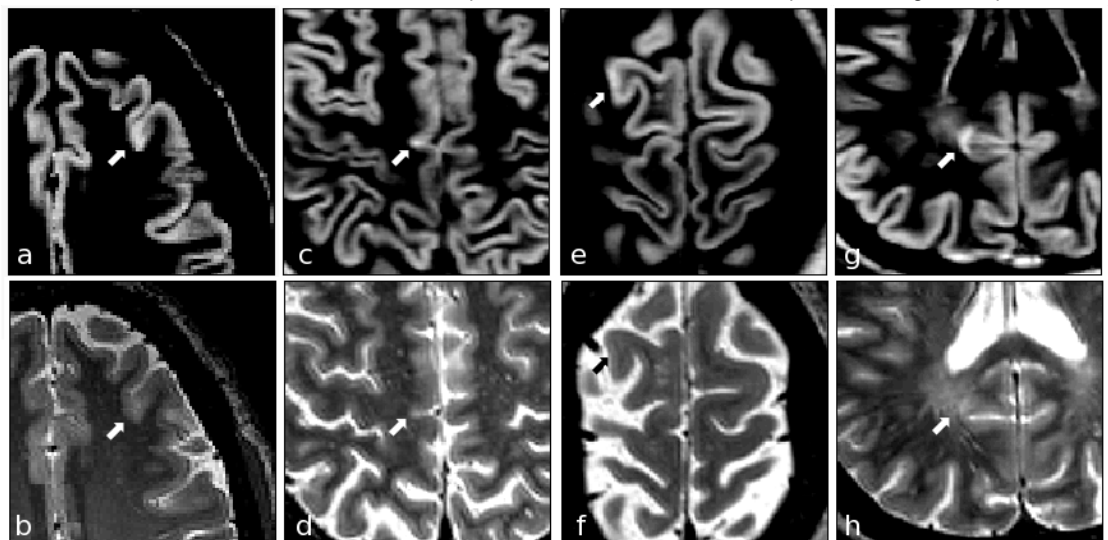


Fig. 2: Top row DIR images, bottom row T2w images of the corresponding slice from the NMO patients. a-d: Typical cortical lesions with a correlate in T2w images. e, f: Cortical lesion without correlate in the T2w image. g, h: Mixed cortical/subcortical lesion, that can be clearly separated in the DIR image.