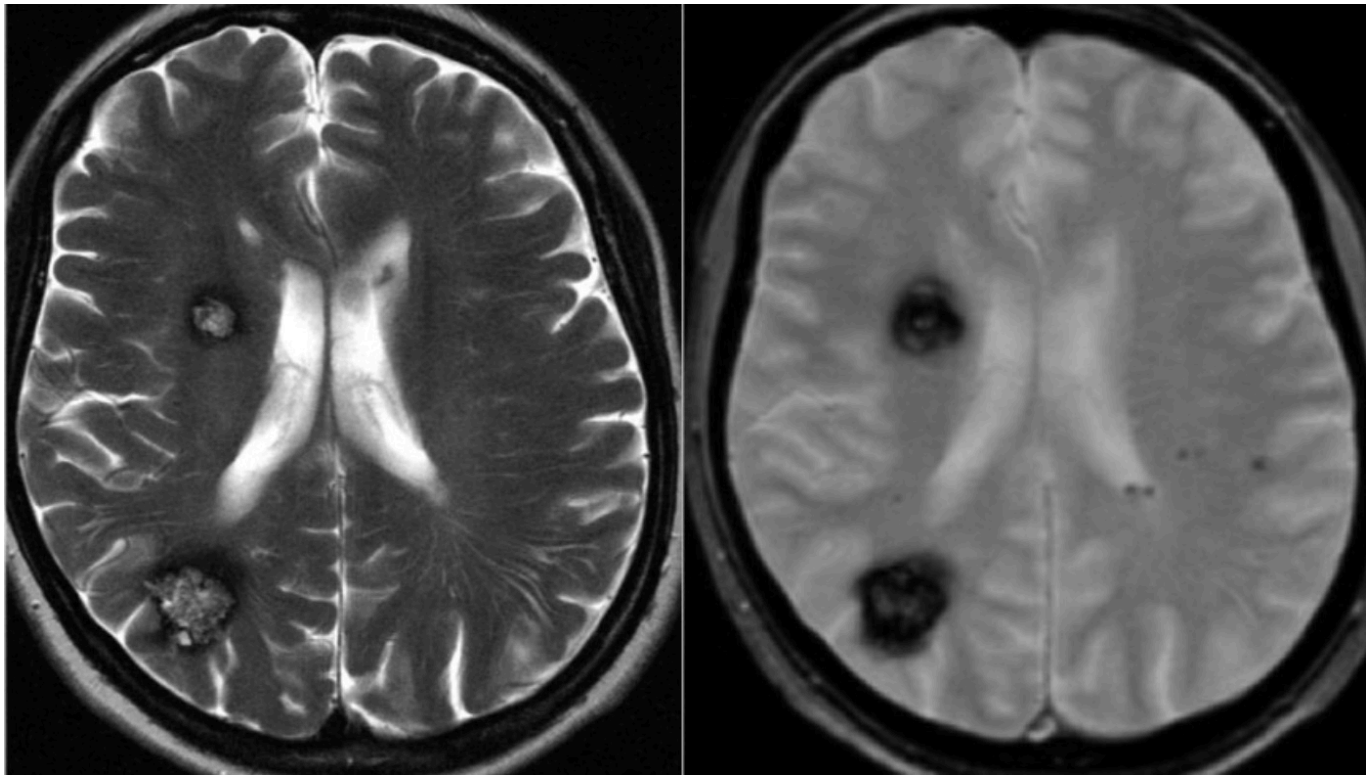
Hemosiderin rim

The Hypointensity can be delineated further in the gradient echo sequence T2* images due to hemosiderin deposition in and around the cavernous malformation [1) 2)].

The T2-weighted image show a cavernous malformation as heterogeneous and “popcorn-like” with a mixed signal intensity core and a hypointense hemosiderin rim.



T2WI and T2* gradient echo show multiple cavernomas. Notice the popcorn appearance with peripheral rim of hemosiderin on the T2WI. The lesions are almost completely black on the gradient echo due to blooming artefacts. T2* and susceptibility weighted imaging (SWI) markedly increase the sensitivity of MRI to detect small cavernomas. The five black dots in the left cerebral hemisphere on the T2* are also cavernomas and are not visible on the T2WI.

Based on the currently available data in 2017, Dammann et al., concluded that if surgical treatment of cavernoma-related epilepsy is performed, the peri-lesional hemosiderin should be resected. However, cases of eloquent or multiple localization or widespread hemosiderin deposit in which a complete resection is challenging should undergo a specific preoperative work-up [3)].

The functional-based resection using intraoperative functional brain mapping allows safe resection of CA and the peripheral hemosiderin rim located within or close to eloquent brain areas [4)].

An online survey composed of 61 items was sent to 26 centers to establish a multicenter international

retrospective cohort of adult patients who underwent a surgical resection as the first-line treatment of a supratentorial cavernous angioma located within or close to eloquent brain area.

272 patients from 19 centers (mean 13.6 ± 16.7 per center) from eight countries were included. The pre-operative management varied significantly between centers and countries regarding the pre-operative functional assessment, the pre-operative epileptological assessment, the first given antiepileptic drug, and the time to surgery. The intra-operative environment varied significantly between centers and countries regarding the use of imaging systems, the use of functional mapping with direct electrostimulations, the extent of resection of the hemosiderin rim, the realization of a post-operative functional assessment, and the time to post-operative functional assessment. The present survey found a post-operative improvement, as compared to pre-operative evaluations, of the functional status, the ability to work, and the seizure control.

They observed a variety of practice between centers and countries regarding the management of cavernous angioma located within eloquent regions. Multicentric prospective studies are required to solve relevant questions regarding the management of cavernous angioma-related seizures, the timing of surgery, and the optimal extent of hemosiderin rim resection [5].

In ten studies comparing extended hemosiderin excision with only lesion resection were identified by searching the English-language literature. Meta-analyses, subgroup analyses and sensitivity analysis were conducted to determine the association between hemosiderin excision and seizure outcome after surgery.

Patients who underwent extended surrounding hemosiderin excision could exhibit significantly improved seizure outcomes compared to patients without hemosiderin excision. However, further well-designed prospective multiple-center RCT studies are still needed [6].

Previous works showed that extent of resection and its surrounding hemosiderin rim were found to consistently correlate with a more favorable post-operative seizure-free outcome [7] [8].

Patients with short duration of epilepsy associated with cavernous malformations could benefit greatly from complete resection of hemosiderin rim and cavernous malformations [9].

High field intraoperative MRI imaging (iopMRI) and neuronavigation might play a crucial role to achieve both goals [10].

26 patients (14 female, 12 male, mean age 39·1 years, range: 17-63 years) with CM related epilepsy were identified. Eighteen patients suffered from drug resistant epilepsy (69·2%). Mean duration of epilepsy was 11·9 years in subjects with drug resistant epilepsy (n=18) and 0·3 years in subjects presenting with first-time seizures (n=8).

24 lesionectomies and two lesionectomies combined with extended temporal resections were performed.

Seven lesions were located extratemporally.

Complete CM removal was documented by postsurgical MRI in all patients. As direct consequence of iopMRI, refined surgery was necessary in 11·5% of patients to achieve complete cavernoma removal and in another 11·5% for complete resection of additional adjacent epileptogenic cortex. Removal of the hemosiderin rim was confirmed by iopMRI in 92% of patients. Two patients suffered from mild

(7·7%) and one from moderate (3·8%) visual field deficits. Complete seizure control (Engel class 1A) was achieved in 80·8% of patients with a mean follow-up period of 47·7 months [11].

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