MULTIPLE CEREBRAL CAVERNOUS MALFORMATIONS – A CASE REPORT

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ABSTRACT

Cavernomas are frequent low-flow vascular malformations with a characteristic MRI aspect due to their specific morphology. We present the case of a 64-year old male diagnosed in 2008 with multiple cerebral cavernomas and symptomatic epilepsy, who developed left face, arm and leg paresthesias during the last 6 days. The MRI examination performed in our clinic showed increased number of infracentimetic lesions with no signs of hemorrhage or growth of the previous documented ones. Considering MRI findings and the patient being seizure free for the last three years there is no current indication for invasive treatment. The presence of multiple lesions along with their aspect on T2* MRI sequences suggest a hereditary form in absence of familial history of cerebral cavernous malformations.

Key words: multiple cerebral cavernomas, symptomatic epilepsy, MRI T2*

INTRODUCTION

Cerebral cavernomas are the second most commonvascular malformations, usually asymptomatic, with a specific MRI appearance. Both sporadic and familial forms have been described, the latter usually being associated with multiple lesions.Seizures, focal neurological deficits, headaches and cerebral hemorrhages are the main accompanying findings.

CASE PRESENTATION

We report the case of a 64-year old right-handed male referred to our clinic for left face, arm and legparesthesias, which started 6 days before admission. The patientpresented three atonic seizures in 2008 and the MRI examination performed at that time showed multiple cerebral cavernomas with both supra- and infratentorial lesions. A diagnosis of symptomatic epilepsy was formulated and antiepileptic treatment with Topiramatewas initiated; two other seizures occurred in 2009 and Levetiracetam was added to the previous treatment, the patient being seizure-free since then.He has a history oftype 2 diabetes mellitus (2008) and left-Grawitz tumor for which a nephrectomy was performed in May 2013. He has no familial background of central nervous system cavernomas or other neurological diseases.

The neurologic examination at admission revealed left face hypoesthesia, left horizontal nystagmus and left body hypoesthesia, with no other pathological findings.

A cerebral MRI examination with sag T1W, ax T2W, cor FLAIR, cor T2* and ax diffusion images was performed and showed T2W hypo/hyperintense lesions, low-signal T2* lesions, T1W hypo/hyperintense lesions located in the right pons (Figures 1, 2), the left frontal lobe and bilaterally in the parietal lobes (Figures 3, 4) with diameters varying from 5 to 20 mm.

Multiple low-signal T2* lesions varying from 1 to 3 mm, with both supra- and infratentorial location,with nosurrounding edema in parenchyma (Figures 5-9). These lesions are highly suggestive for cerebral cavernomas with no signs of recent hemorrhages.

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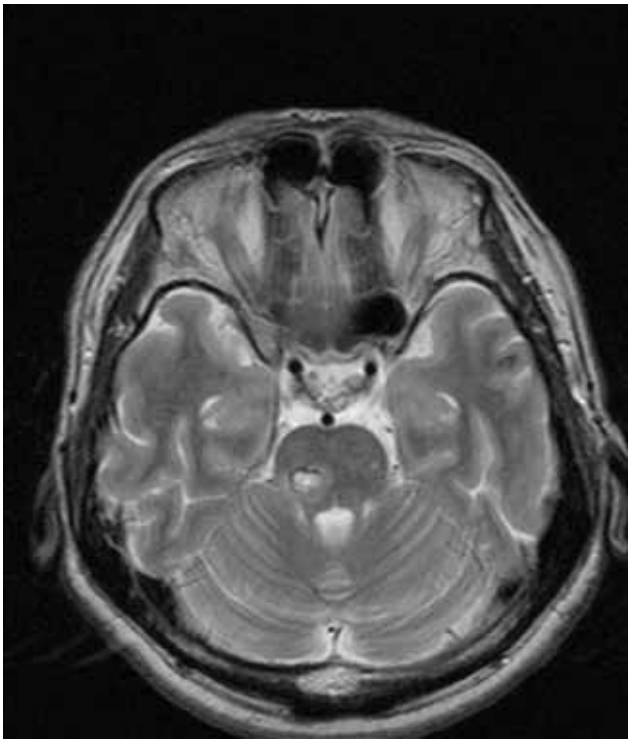

FIGURE 1. *ax-T2 – Pontine cavernoma*

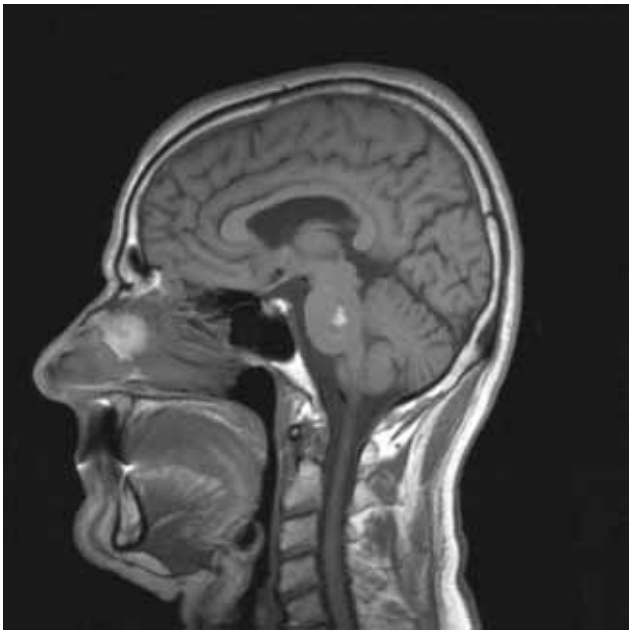

FIGURE 2. *sag-T1 – Pontine cavernoma*

The examination also revealed minute hyperintense T2W and FLAIR lesions disseminated in the white matter with predominantly subcortical distribution, suggesting demyelinating lesions of ischemic etiology (Figure 10).

Post-contrast images reveal some central enhancement of the lesions located in the frontal lobe and posterior cerebellum and a linear enhancement extending from the medial aspect of the lesion to the confluence of the transverse and sagittal venous

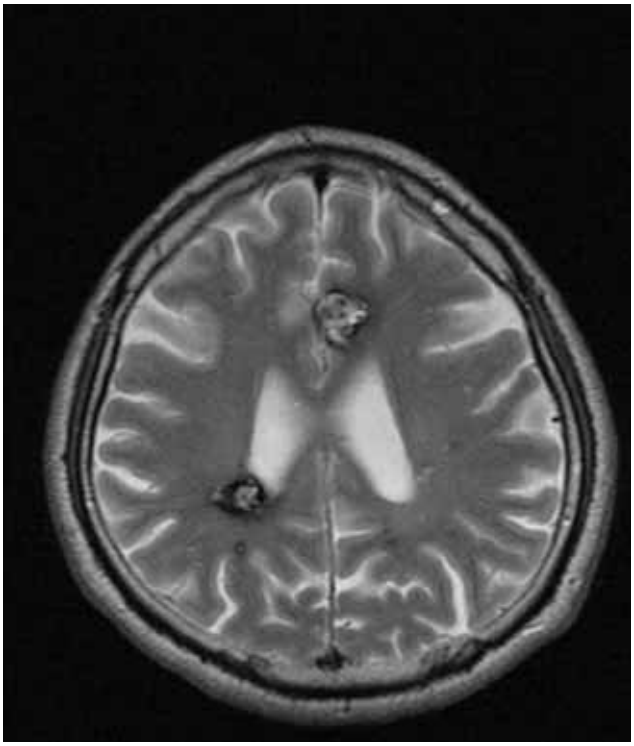

FIGURE 3. *ax T2 – Frontal and right cavernomas*

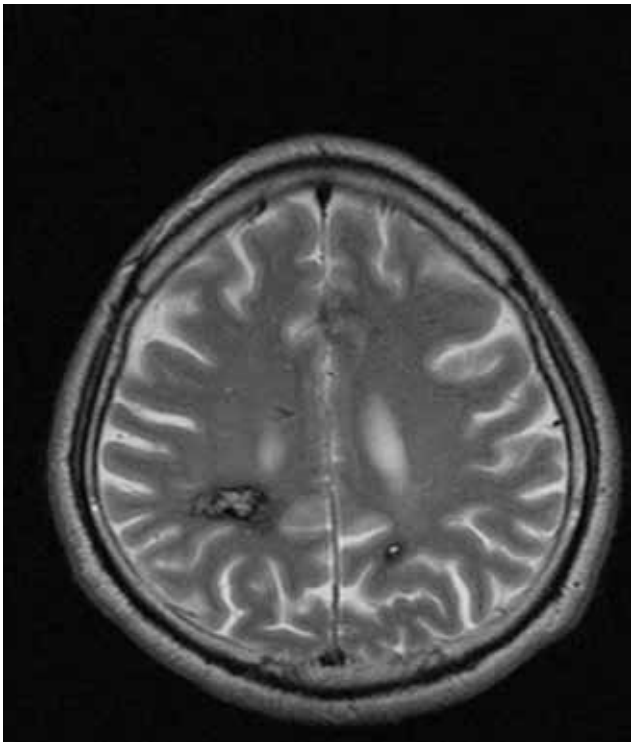

FIGURE 4. *ax T2 – Frontal and right cavernomas*

sinuses suggestive for a venous malformation. (Figures 11, 12)

No pathological findings were revealed during EEG examination.

Comparing the MRI examinations there arenew minute lesions suggestive for early stage cerebral

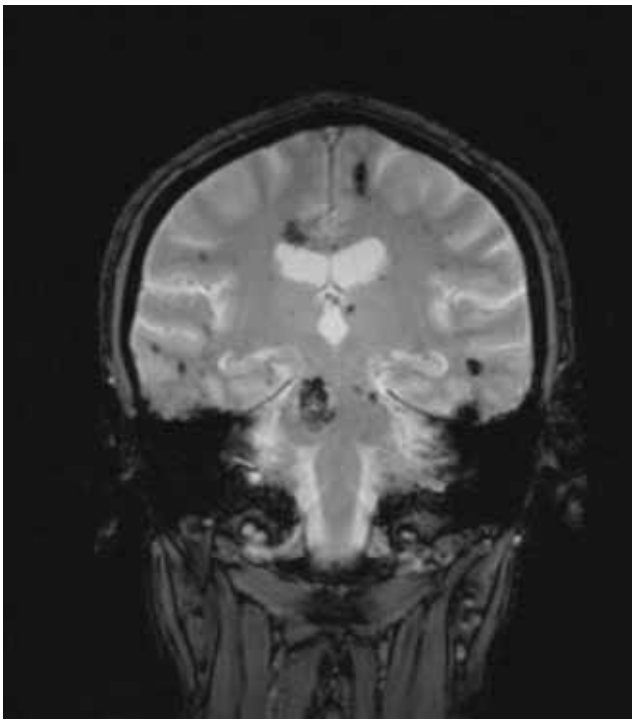

FIGURE 5. *cor T2GRE*

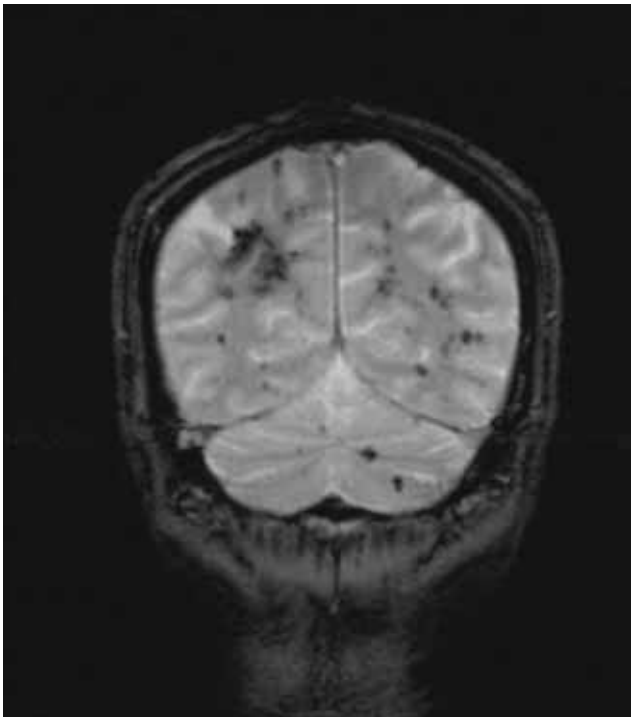

FIGURE 6. *cor T2GRE*

cavernomas. We consider these lesions as being responsible for the current symptoms and decide to continue the antiepileptic treatment with Topiramate 100 mg daily, Levetiracetam 500 mgdaily, along with antiagregant therapy (Aspirin 100 mg daily) and statine (Atorvastatine 40 mg daily) for the associated cardiovascular risk factors.

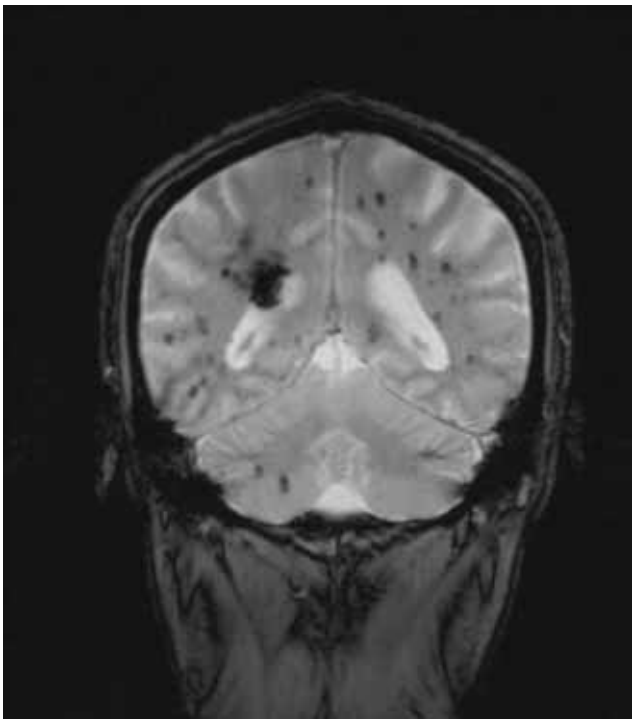

FIGURE 7. *cor T2GRE*

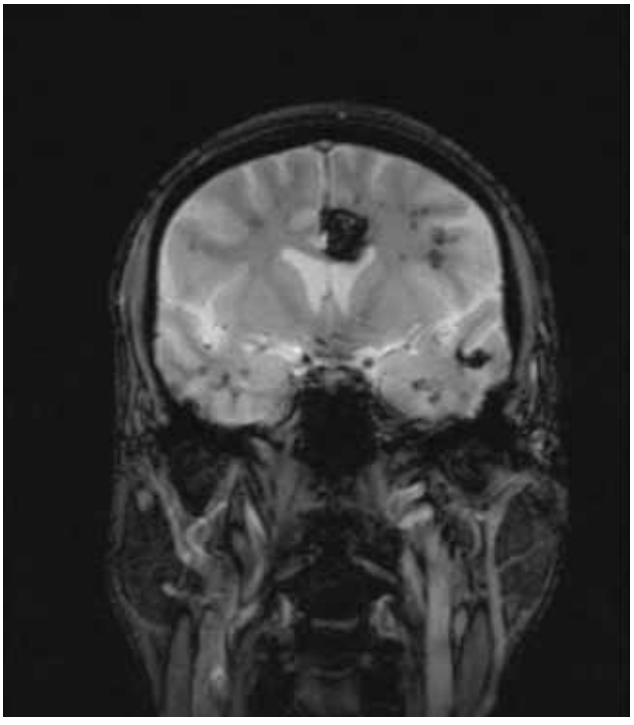

FIGURE 8. *cor T2GRE*

DISCUSSIONS

Cerebral cavernomas are low-flow vascular malformations consisting of clustered, dilated vessel-like channels, lacking smooth muscle support and filled with blood in different stages of degradation. (1,2)

Based on MRI and pathology data, there is a prevalence of 0,5% in general population, although

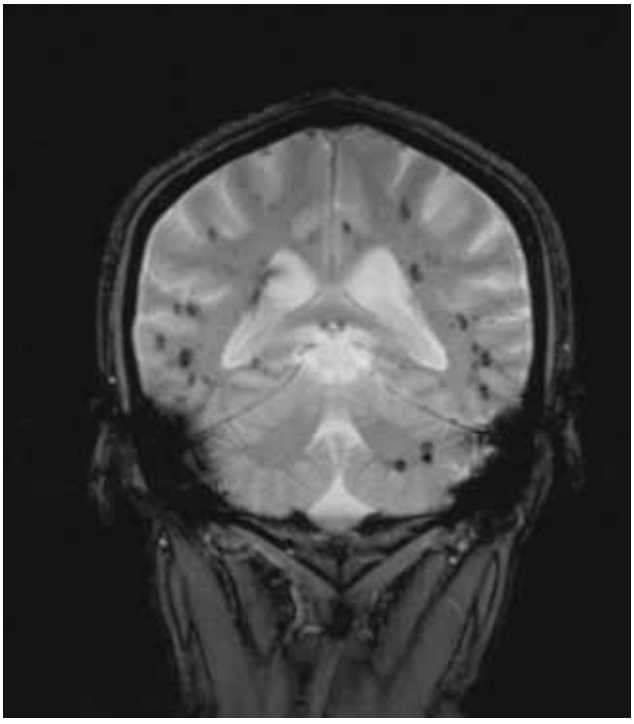

FIGURE 9. *cor T2GRE*

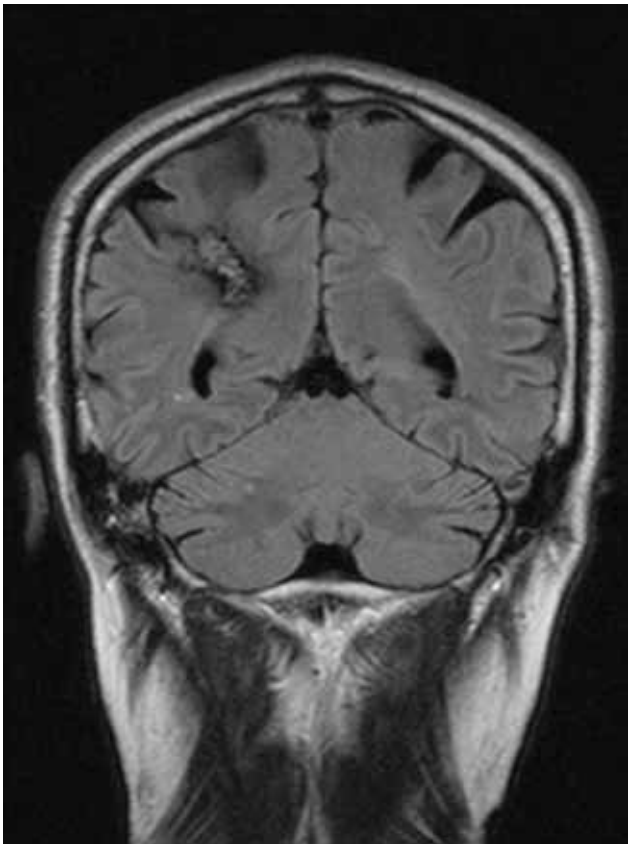

FIGURE 10. *cor FLAIR – Subcortical ischemic lesions*

there is a lower clinical prevalence because most patients are asymptomatic at the time of diagnosis (70-80%). (2) Both sporadic and familial forms have been described, the latter being associated with mutations in one of three genes: KRITl (CCM1), CCM2 (MGC4607) and PDCD10 (CCM3). The familial form, with a prevalence of 20%, is autosomal dominant with incomplete penetrance and variable expression. (3)

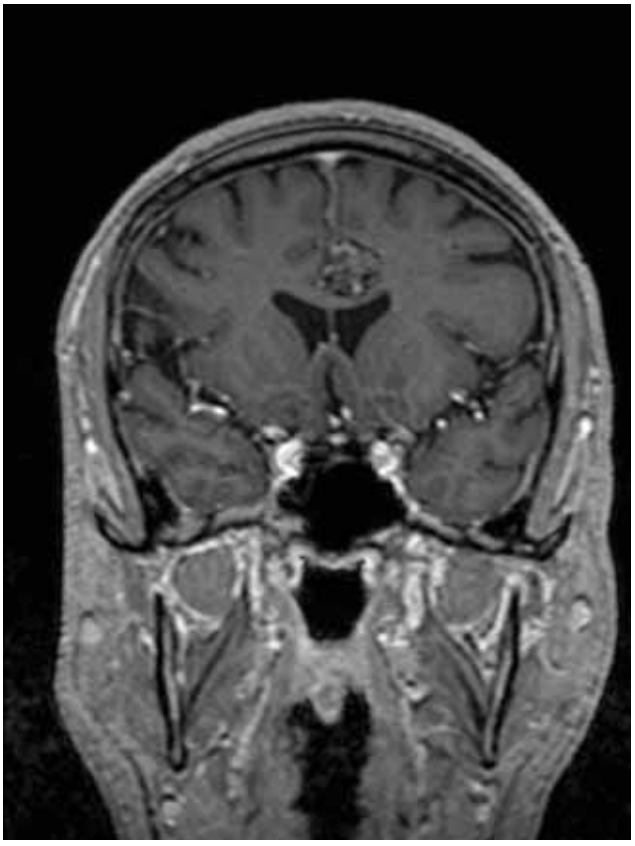

FIGURE 11. *cor T1 3D with contrast*

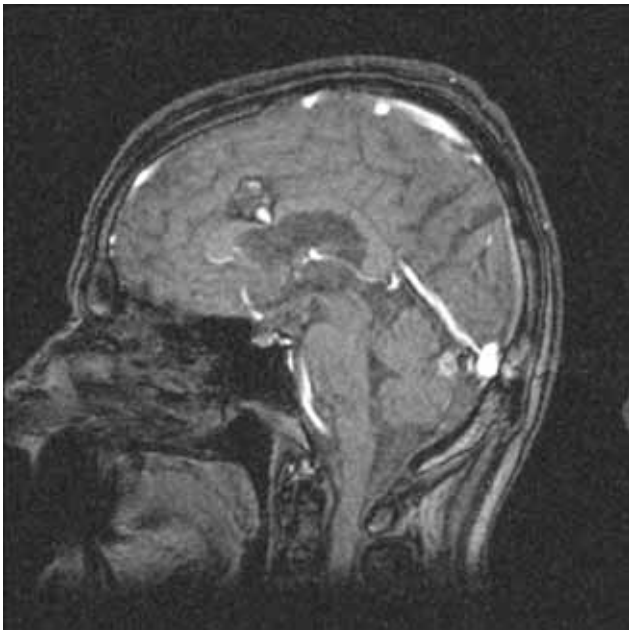

FIGURE 12. *TOF FL2D SAG SINUS OBL*

As cerebral cavernomas contain blood in different degradation stages, methemoglobin and hemo-

siderin give a very specific MRI appearance with a peripheral ring of hypointensity secondary to hemosiderin deposition. For the above mentioned lesions there is a four-type classification that eases the differential diagnosis. The MRI lesions in our case are highly suggestive for type II (mixed-signal intensity core, on both T1W and T2W with hypointenserimon on T2W images – classical cerebral cavernous malformations with popcorn appearance) and type IV (minute lesions seen as punctate hypointense foci on T2* images – may represent early stage cavernomas seen frequently in familial forms). Because of high sensitivity detection, MRI T2* sequences are currently considered the method of choice in familial forms' diagnosis. (4)

In order to increase the sensitivity of lesion detection a Susceptibility-Weighted MR Imaging is required, since it is believed to be the only imaging method capable of appropriately detecting this type of lesions.(2, 4)

Another feature of inherited lesions is related to their dynamic nature – dimensions can be variable and lesions can appear or disappear in time, their evolution being accountable for the transient focal neurologic deficits.

An important aspect is related to the dimensions of the cavernous lesions, the ones larger than 1 cm are associated with a higher risk of hemorrhage, while smaller ones with focal neurological deficits.

In general, patients with symptomatic epilepsy are initially treated using antiepileptic drugs, but incases of uncontrolled seizures surgical resection might be taken into consideration; this is also an option for superficial lesions with recurrent hemorrhages. Poorly accessible deep lesions can be treated using stereotactic radiosurgery, but its indication should be carefully investigated because of the relatively high rate of radiation-induced side effects. (2, 5, 6)

CONCLUSIONS

Summing up the above, the patient presented two of the most common symptoms of cerebral cavernomas (seizures, focal neurological deficits – hypoesthesia of the left body), but since he is seizure free under current antiepileptic medication and has no MRI evidence of growing of the infratentorial lesions or hemorrhages in these areas, there is no current indication for surgical intervention.

The multiple lesions on the MRI and their typical appearance suggest a familial form and additional MR Isequences (Susceptibility – Weighted MRI) and genetic testingare to be performed.

We also consider genetic testing and MRI examinations for first degree family members.

Clinical and MRI examination were recommended periodically.

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