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## Introduction:

- Leber hereditary optic neuropathy (LHON) is associated with point mutations in mitochondrial DNA, characterized by bilateral optic neuropathy.
- There is sparse data describing neuropathological illustration of PRES and white matter lesions in LHON. Furthermore, multiple sclerosis (MS)-like symptoms with LHON, known as Harding syndrome, is rare making diagnostic and treatment challenges.
- We present an 18-year-old male who presented with seizures, encephalopathy, and radiographic findings consistent with PRES. The patient also had multiple white matter lesions in midbrain, pons, medulla, and upper cervical spine of unclear etiology. His encephalopathy and seizures resolved on pulse dose steroids.

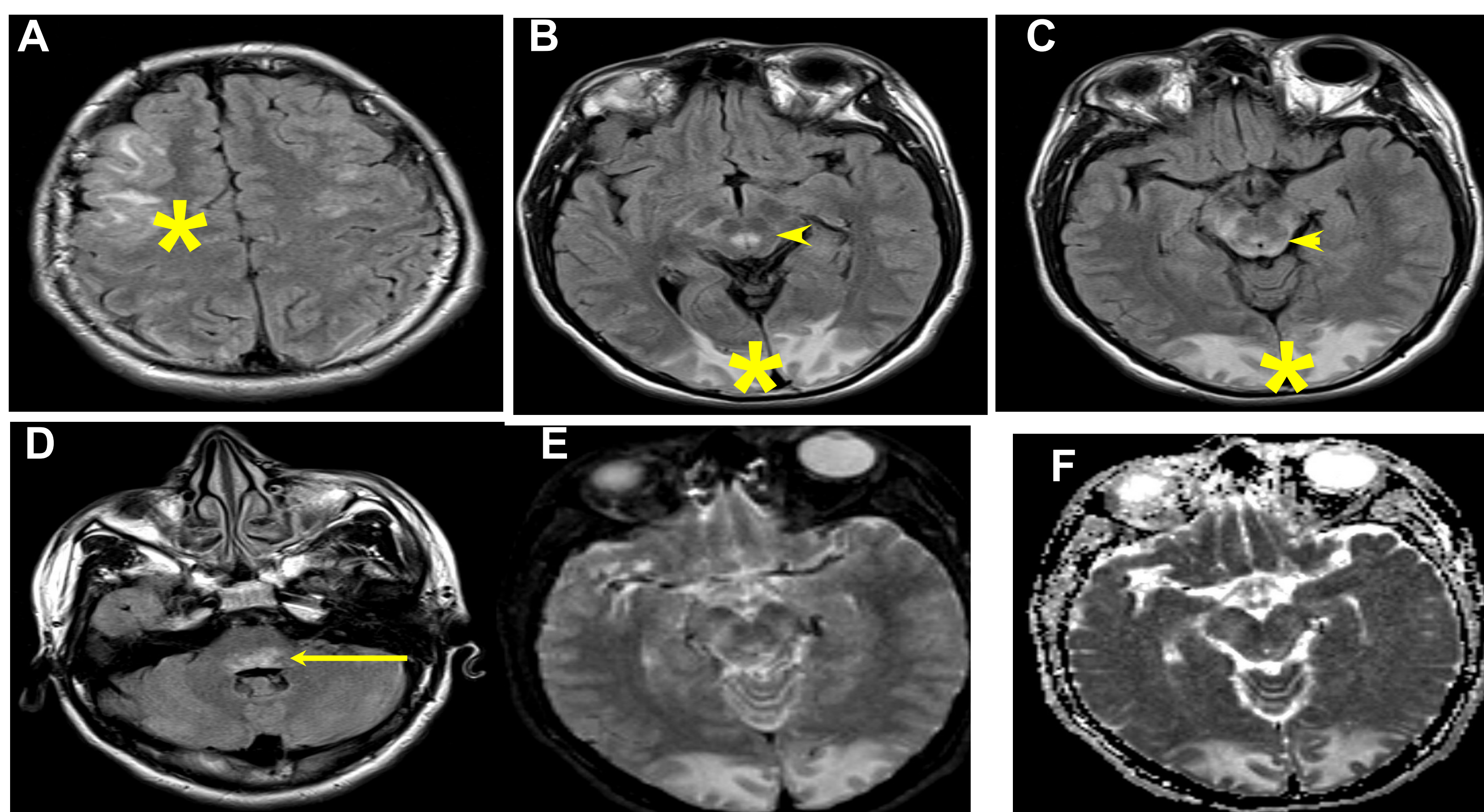
## Case Description:

The proband is 18-year-old male with a history of progressive optic atrophy. He initially presented with steroid responsive vision loss and transient encephalopathy. He was found to have demyelinating lesions of the area postrema and brainstem. Following clinical improvement, he presented approximately one year later with dyspnea, headaches and loss of vision followed by a generalized tonic-clonic seizure.

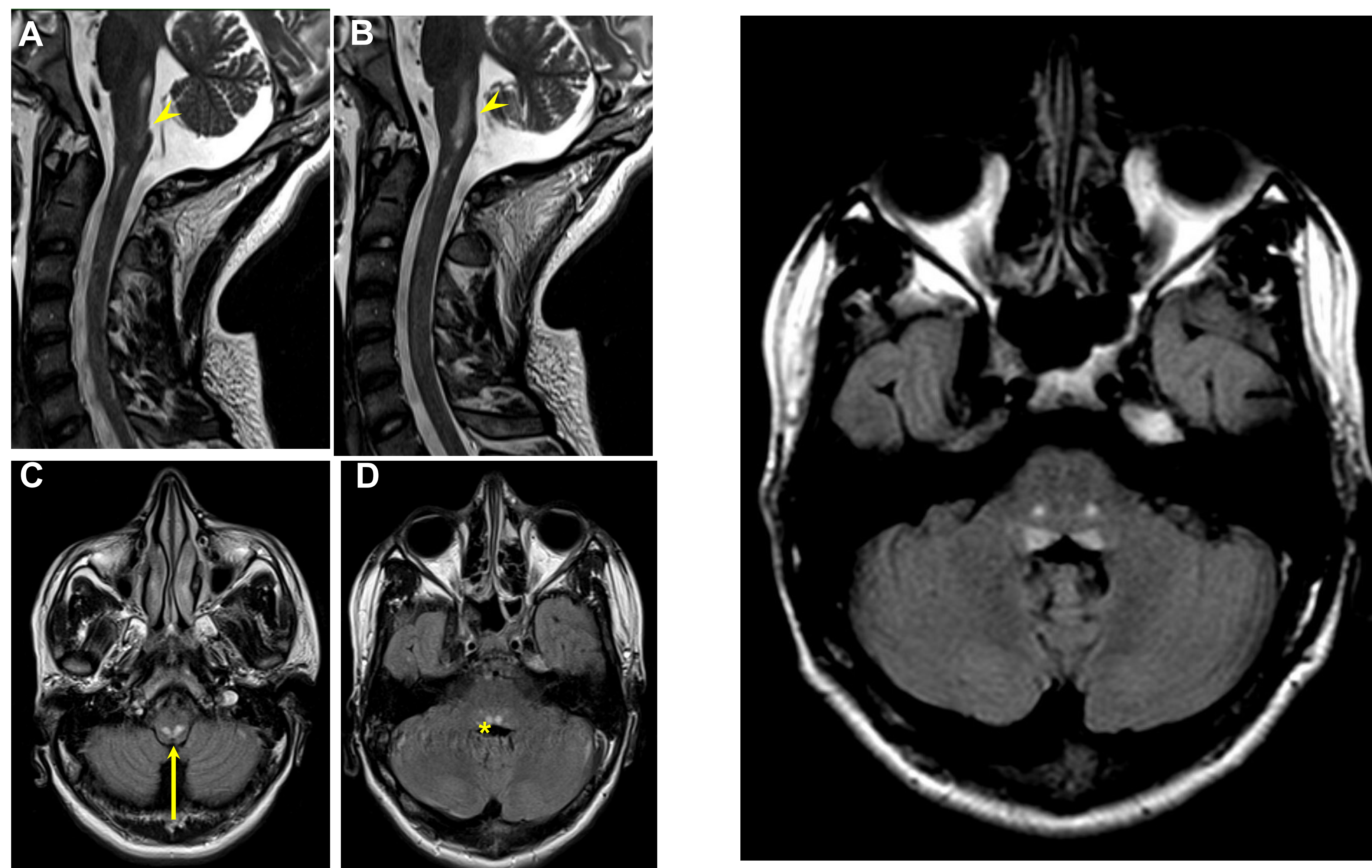
He presented to our hospital in status epilepticus with seizures from the occipital lobe. He was treated with IV keppra, IV fosphenytoin and midazolam infusion. Neuroimaging revealed FLAIR hyperintensities in the bilateral frontal lobes, occipital lobes and areas of the mid brain, pons and medulla and upper cervical spine without restricted diffusion.

His initial infectious labs and lumbar puncture returned negative. He was started on pulse dose steroids on 4th day of admission, repeat brain MRI after 4 days of pulse steroids was improved. Rapid genome sequencing revealed a homozygous likely pathogenic mutation c.24G>A (p.Trp8Ter) in the DNAJC30 gene.

**Non-contrast brain MRI obtained on hospital day 2. Note confluent T2/FLAIR signal prolongation (A,D, asterix) in the subcortical white matter including right frontoparietal (A) and bi-occipital (B,C) regions. Patchy and symmetric hyperintensities of the midbrain and periaqueductal grey matter predominance (B,C, arrowhead) and dorsal pons (D, arrow). There is no restricted diffusion seen on diffusion-weighted imaging (E,F) suggesting these are non-ischemic, non-metabolic, lesions.**



**MRI brain and C-spine with and without contrast performed on hospital day 8. Note T2/FLAIR signal prolongation in the area postrema (A,B arrowhead). Brainstem hyperintensities are not most prominent in the medial lemniscus (D, arrow) and medial longitudinal fasciculus (asterix) (left picture). Note discrete T2/FLAIR signal prolongation (arrowhead) in the medial lemniscus (triangular) and pontine nuclei (dots). The lesions are not enhancing (right), 10 months prior to admission.**



## Discussion :

The case presented is unique with several overlapping diagnostic challenges in a case of molecularly confirmed LHON.

- The patient's case differs from classical LHON in that the patient has had multiple clinical attacks, white matter signal abnormalities without restricted diffusion, and an episode of PRES with status epilepticus.
- Although Harding's syndrome has been reported as variant of LHON with neuroinflammatory disease overlay, the patient's subsequent presentation of PRES is atypical. The patient's clinical and radiographic presentation is dissimilar from more diffuse mitochondrial disorders, such as Leigh's disease.
- The etiology of PRES in this case remains unclear, he had only one documented high blood pressure and has had no other risk factors for PRES. His remarkable improvement in encephalopathy and improvement of hyperintensities on MRI post steroid treatment poses the question of this genetic disorder being associated with MS-like symptoms (Harding syndrome).

## Conclusion:

- The association between LHON and neuroinflammatory disease is rare.
- The etiology of this symptom and radiographic findings is unclear but the presence of PRES may indicate a link between endothelial dysfunction, mitochondrial dysfunction, and neuroinflammatory disease.

## References :

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