Neurosciences Quiz

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Notice: Authors are encouraged to submit quizzes for possible publication in the Journal. These may be in any field of Clinical Neurosciences, and should approximately follow the format used here (maximum of 2 figures). Please address any submissions to the Assistant Editor, Neurosciences Journal, Riyadh Armed Forces Hospital, PO Box 7897, Riyadh 11159, Kingdom of Saudi Arabia. E-mail: smorrison@smj.org.sa

A young man with poor vision

Case Presentation

An 18-year-old boy with rapidly progressive bilateral painless visual loss over one week. There was no history of a similar previous episode, no history of smoking or exposure to any drugs or toxins. Family history showed 2 maternal uncles are blind, and one sister was admitted to a psychiatric hospital. Neurological examination revealed a fully conscious young man. Higher mental functions and speech are normal. Cranial nerve examination revealed marked reduction of visual acuity bilaterally, as he could only perceive light. Pupils reactive to light. Fundal examination is shown in **Figures 1a & b**. The eye movements are full, and the rest of the cranial nerve examination was normal. The motor examination revealed bilateral hand dystonia and mild cerebellar ataxia.

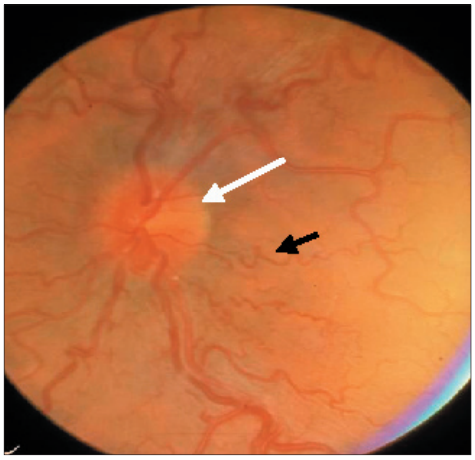

Figure 1a.

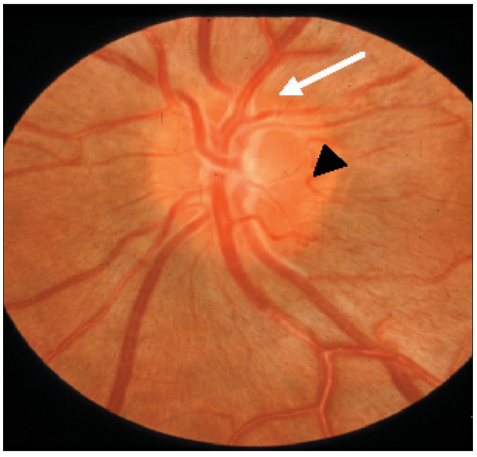

Figure 1b.

Questions:

A. Describe the fundal findings.

B. What is the likely diagnosis?

C. How can you confirm the diagnosis?

Answer Page

A. Findings:

Figure 1a: The fundal examination reveals optic disc edema (white arrow), and vascular tortuosity (black arrow).

Figure 1b: Closer view of the fundus reveals optic disc edema (white arrow) and peripapillary microangiopathy (arrow head).

B. Diagnosis:

Acute Leber Optic Neuropathy (LHON).

C. Confirmation:

Genetic screening for common mDNA point mutations.

Discussion

The hereditary optic neuropathies comprise a group of disorders in which the cause of optic nerve dysfunction appears to be hereditable, based on familial expression or genetic analysis. In some hereditary optic neuropathies, optic nerve dysfunction is typically the only manifestation of the disease.[1] In others, various neurologic and systemic abnormalities are regularly observed. The most common hereditary optic neuropathies are autosomal dominant optic atrophy (Kjer's disease) and maternally inherited Leber's hereditary optic neuropathy (LHON).[1] Leber's hereditary optic neuropathy is a maternally inherited disorder affecting the optic nerves in which the typical clinical presentation is subacute, painless, sequential visual loss in young adult males. Patients with LHON who have atypical clinical features may be initially misdiagnosed.[1,2] In Leber's hereditary optic neuropathy, male individuals in their teens or twenties suffer acute visual loss that is sequential in 78% of cases and simultaneous in 22%.[2] The clinical setting may be of acute, sub-acute or relentlessly progressive painless visual loss, bilateral (simultaneous or sequential), with centrocecal scotoma, altered color perception (dyschromatopsia) and optic atrophy. The inheritance pattern may present as autosomally dominant, recessive, X-linked or matrilineal.[2] The family history is suggestive of maternal inheritance in 50% of patients, and in the other 50% the disease seems to be sporadic.[2,3] Fundus examination in the initial stages shows papilledema and peripapillary microangiopathy, evolving to atrophy of the nerve fiber layer of the retina and finally leading to optic atrophy and centrocecal scotoma.[3] Four main mutations of mitochondrial DNA (mtDNA) encompass over 90% of patients with LHON: 11778 (genetic subunit ND4), 14484 (ND6), 3460 (ND1) and 14459 (ND6). The mutation at 14459 corresponds to the dystonia phenotype for LHON.[2,4]

References

1. Newman NJ, Biousse V. Hereditary optic neuropathies. ***Eye*** 2004; 18: 1144-1160.
2. Kerrison JB. Hereditary optic neuropathies. ***Ophthalmol Clin North Am*** 2001; 14: 99-107.
3. Huoponen K. Leber hereditary optic neuropathy: clinical and molecular genetic findings. ***Neurogenetics*** 2001; 3: 119-125.
4. Brown MD, Allen JC, Van Stavern GP, Newman NJ, Wallace DC. Clinical, genetic, and biochemical characterization of a Leber hereditary optic neuropathy family containing both the 11778 and 14484 primary mutations. ***Am J Med Genet*** 2001; 104: 331-338.