

New Treatments for Nonarteritic Anterior Ischemic Optic Neuropathy



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KEYWORDS

- Ischemic optic neuropathy • Nonarteritic anterior ischemic optic neuropathy (NAION)
- Ischemic Optic Neuropathy Decompression Trial (IONDT)
- Obstructive sleep apnea syndrome (OSAS)

KEY POINTS

- The diagnosis of nonarteritic anterior ischemic optic neuropathy (NAION) is made clinically and without definitive confirmatory ancillary testing.
- The Ischemic Optic Neuropathy Decompression Trial, which showed a lack of benefit of optic nerve sheath decompression, is the largest prospective interventional study of NAION and has helped characterize the natural history of this optic neuropathy.
- Thus far, medical treatment, including with corticosteroids and aspirin, have failed to show a definitive benefit in visual outcomes from NAION.
- Release of vitreopapillary traction may be helpful in some patients who have optic disc edema and visual loss that may resemble NAION.
- The treatment of sleep apnea has been suggested to reduce the risk of fellow eye involvement in patients with NAION.

INTRODUCTION

Nonarteritic anterior ischemic optic neuropathy (NAION) refers to a presumed ischemic process of the anterior portion of the optic nerve. Although many associations with NAION have been reported, none have been proven to be definitively causal. This form of ischemic optic neuropathy has been associated with various risk factors, including advanced age, systemic hypertension, nocturnal hypotension, diabetes mellitus, hyperlipidemia, and a predisposing optic disc morphology.^{1,2} A small optic disc and small optic cup have been thought to contribute to a compartment syndrome, which may perpetuate ischemia of the optic disc as axonal swelling develops.¹⁻³

Characteristically, NAION presents with a sudden onset of painless visual loss of one eye that may affect visual acuity, visual field, or both, typically in patients older than 50 years.² The pupil of the affected eye has a relative afferent pupillary defect

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(RAPD), unless there is bilateral and symmetric optic nerve disease. The typical fundoscopic appearance acutely includes sectoral or generalized optic disc edema, which may be mildly pale or hyperemic, with associated nerve fiber layer hemorrhage. Acutely, the presence of optic disc edema is required for the diagnosis of NAION (**Fig. 1**), although patients may present later with sector or diffuse optic atrophy. Visual field defects are related to involvement of the nerve fiber bundles as they are anatomically arranged and coalesce to make up the optic disc, and are often altitudinal (**Fig. 2**). The optic disc edema typically lasts weeks and is followed by the development of optic disc pallor and thinning of the involved retinal nerve fiber layer (**Fig. 3**).⁴

Although some forms of ischemic optic neuropathy have a more clearly identifiable cause, for example, with acute severe anemia and hypotension (“shock”),⁵ the most common form of this optic neuropathy is spontaneous and idiopathic. This is the form most investigators refer to when discussing NAION and the type that is the basis of this review.

Despite increasing knowledge about the risk factors (**Box 1**) and clinical findings of NAION, the treatment of this optic neuropathy has remained limited and without clear evidence-based benefit. To help understand some of the more recent suggestions, some historical treatments of NAION are reviewed, beginning with the Ischemic Optic Neuropathy Decompression Trial (IONDT). Focusing on treatments since the IONDT, the historical and more recent treatments (**Box 2**) are then blended to help recognize the ongoing frustration in the treatment of this form of ischemic optic neuropathy. Other reviews of the treatment of NAION cover therapies that predated the IONDT.^{6,7}

PATHOPHYSIOLOGY AND CLINICAL DIAGNOSIS

NAION is the most common acute optic neuropathy in patients older than 50 years. Ischemia involving the short posterior ciliary arteries (branches of the ophthalmic artery) is the most commonly purported mechanism in NAION.³ Although optic neuropathy is the mechanism of visual loss, some patients may develop decreased vision because of leakage of fluid within and under the retina.⁸ The retinopathy from NAION was likely overlooked more frequently before the routine use of more sensitive imaging techniques, such as optical coherence tomography (OCT) (**Fig. 4**).



Fig. 1. Fundus photograph of the left eye showing hyperemic optic disc edema in a small optic disc with a small optic disc cup.

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