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CASE REPORT

Can subtenon methylprednisolone acetate be a choice for the acute non-arteritic ischemic optic neuropathy treatment?

Ulusoy Mahmut Oğuz*, Kıvanç Sertaç Argun, Atakan Mehmet*****
***Department of Ophthalmology, Başkent University Konya Research Hospital, Konya, Turkey**
****Department of Ophthalmology, Uludağ University Faculty of Medicine, Bursa, Turkey**
*****Department of Ophthalmology, Aksaray State Hospital, Aksaray, Turkey**

Correspondence to: Mahmut Oğuz Ulusoy, MD,
Department of Ophthalmology, Başkent University Konya Research Hospital
Konya, 42000, Turkey,
Phone: 90 533 521 2778, E-mail: drmoguz@gmail.com

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Abstract

Nonarteritic ischemic optic neuropathy is characterized by sudden, painless, unilateral vision loss. A case of an acute NAION patient who was treated with subtenon methyl prednisolone acetate was presented. The patient, a 65-year-old male, presented vision loss for two days. The total ophthalmologic examination, fundus photography, and automated perimetry were applied to the patient before and after 1, 3, and 6 months from injection. The visual acuity increased from 0,1 to 0,3 in the first month and to 0,7 at the last visit, the visual field defect being mostly improved. This case showed that 40 mg of subtenon methyl prednisolone acetate injection was an effective and safe treatment method for acute NAION. However, a large randomized controlled trial is needed to assess the efficacy of subtenon methyl prednisolone acetate as a treatment for NAION.
Keywords: nonarteritic anterior ischemic optic neuropathy (NAION), subtenon injection, methyl prednisolone acetate, steroid, treatment

Introduction

Nonarteritic ischemic optic neuropathy (NAION) is the most common optic neuropathy, which is characterized by sudden, painless, unilateral vision loss in patients older than 50 years [**1**]. Although the main etiology of NAION is unclear, atherosclerotic diseases, arterial hypertension, nocturnal arterial hypotension, diabetes mellitus, ischaemic heart disease, and small optic discs are thought to be acting as predisposing factors in the development of this disease [**2**]. Furthermore, the optic disc edema is known to increase the ischemia of the prelaminar part of the optic nerve head, which is affected in NAION. Steroids can help to resolve the optic disc edema and protect the axons from further damage of ischemia [**3**].

In this study, we reported our experience of a single patient who received 40 mg subtenon methylprednisolone acetate at an early stage of NAION.

Case report

A 65-year-old male patient presented to our clinic with sudden, painless vision loss in his left eye, which lasted for 2 days. His initial visual acuity was 18/ 20 in the right eye, 20/ 200 in the left eye and color testing was corrupted with Ishihara test. A relative afferent pupillary defect was present in his left eye. Intraocular pressure (IOP) was 14 mmHg in

both eyes. In slit lamp biomicroscopy, grade I posterior subcapsular cataract (PSC) was present in both eyes. Optic disc edema and flame-shaped peripapillary hemorrhage was seen at fundus examination (**Fig. 1**).

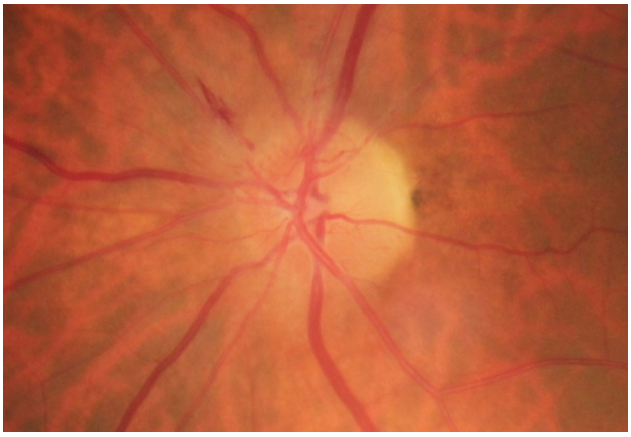

Fig. 1 A fundus photograph at the time of diagnosis demonstrated optic disc edema with a flame-shaped hemorrhage

The fundus photograph of the left eye was taken. The automated perimetry was applied with Humphrey 30–2 visual field examination and an inferior altitudinal defect was detected in the left eye (**Fig. 2**).

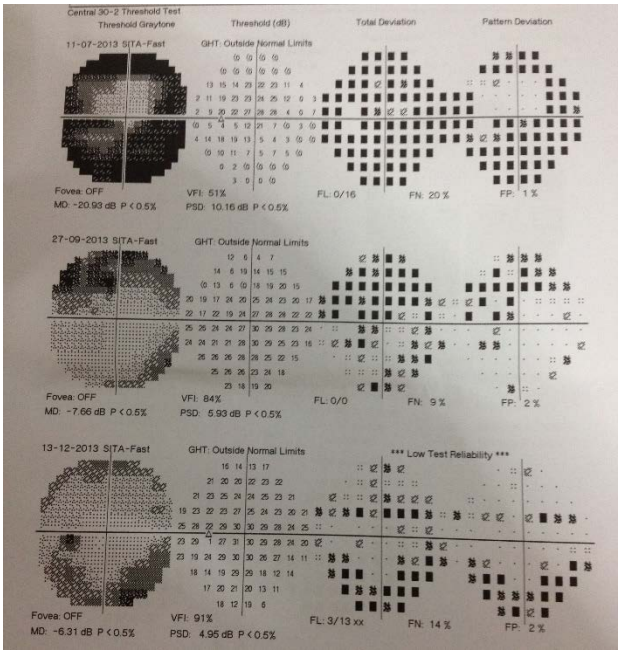

Fig. 2 Humphrey 30.2 visual field test showing the dramatic visual field improvement

The patient reported a systemic hypertension for 15 years. The erythrocyte sedimentation rate and C-reactive protein levels of the patient were evaluated to discriminate the situation from Arteritic ischemic optic neuropathy and the parameters were normal. The patient was diagnosed with left acute NAION. After the patient was presented the disease and the risks of injection and the informed consent was obtained, 40 mg subtenon methylprednisolone acetate was injected in his left eye. Topical tetracaine was applied to the ocular surface. A cotton-tipped applicator soaked in tetracaine was then placed over the inferotemporal quadrant for 2 minutes as the patient looked superonasally. The methyl prednisolone acetate suspension was then shaken and 1 cc (40 mg) was drawn into a tuberculin syringe by using a 25-gauge, 0.5-inch long needle. The lower eyelid was lifted, and as the patient looked superonasally, the 25-gauge needle was used to penetrate the posterior subtenon space. Before the injection of methyl prednisolone acetate, the needle was moved from side to side to check that the sclera was not engaged in the needle tip. A 40 mg injection of methyl prednisolone was then injected in the posterior subtenon space.

The ophthalmologic examination, fundus photography, and automated perimetry were repeated at 1, 3, and 6 months after the injection. At the first month examination, the visual acuity was 3/ 10, optic nerve head borders became clear, and the flame-shaped hemorrhage disappeared. At the final examination, the visual acuity was 7/ 10, in slit lamp microscopy grade I, PSC was present, and the IOP was 13 mmHg. The optic disc edema and hemorrhage totally disappeared but there was a pale temporally region (**Fig. 3**).

In the automated perimetry, the visual field defect was substantially improved (**Fig. 2**). No complication could be seen regarding the subtenon injection for 6 months.

This study adhered to the tenets of the Declaration of Helsinki to review the patient's data. An informed consent was obtained from the patient.

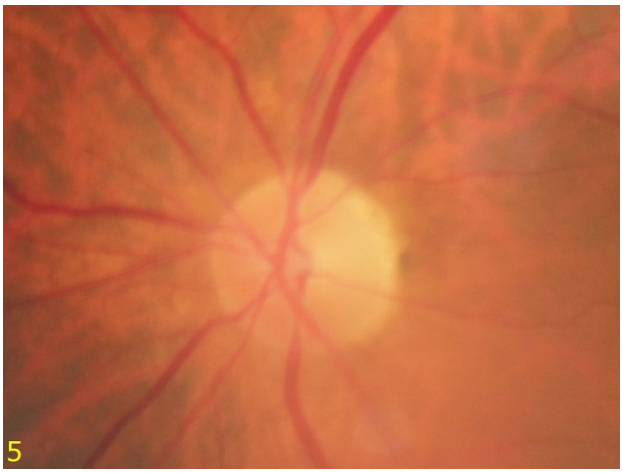

Fig. 3 A fundus photograph at 6 months after the subtenon methyl prednisolone injection demonstrated a segmental pale neuroretinal rim

Discussion

NAION is thought to be the acute ischemia of the optic nerve head that resulted from the reduced perfusion pressure of the posterior ciliary arteries [**4**]. Because the main mechanism of the pathology is unknown, the disease has no certain treatment. That is why the present treatment choices cannot go forward from the trial to decrease the ischemia and protection of the fellow eye. The protection of the fellow eye can be provided by improving the systemic situation of the patient and by using salicylic acid.

For the affected eye, most of the evaluated drugs are steroids, which help breaking the ischemia cycle by resolving the optic disc edema. The specialists who offer steroids to these patients especially use the systemic forms. The reason for this choice is the possible complications of the intravitreal injections such as intraocular pressure (IOP) elevation, endophthalmitis, retinal detachment, and glaucoma [**5**]. However, it is known that the NAION patients are older and most of them have systemic diseases. For this reason, it would be appropriate to avoid the side effects of the systemic steroids in the treatment of NAION.

In previous studies, some authors [**3,4,6**] reported the beneficial effects of intravitreal triamcinolone injection for the acute NAION patients, except for Jonas [**7**]. In the first three studies, 4 mg triamcinolone were used for patients and all of them showed visual improvement, but only in Yaman's study, a visual field defect recovery was seen in patients.

The alternative technique of the local application of steroids is subtenon injection. Tanner et al. [**8**] first reported the subtenon injection of steroids in the treatment of uveitis in 1998. After that, several studies reported that subtenon steroid injection is an effective method for diabetic macular edema, uveitis cystoid macular edema, and other situations. Nevertheless, most of the complications of intravitreal injection were not seen with this technique, the effectiveness in the treatment of the same situations being similar [**9**].

The possible complications of intravitreal injection and the side the effects of systemic steroids led us to use the subtenon injection technique of the methyl prednisolone acetate. The patient attended our clinic for 2 days, being a shorter period than presented in previous studies. The following observations could be made: a faster visual acuity improvement (at 1 month it was 3/ 10), regress of the optic disc edema and the final values at 6 months 7/ 10. This visual acuity result was satisfactory, because the 18-52% of these patients' final vision was lower than 20/ 200, which was reported in previous studies [**10**]. Besides, the visual field defect mostly vanished. Another study reported that more than 50% of the NAION patients are left with constricted visual fields [**11**].

No complication was observed regarding the subtenon injection.

In conclusion, NAION is an unforeseeable condition and it results in serious vision losses. Because there is no definitive treatment of this disease, the most beneficial but with less side effects technique must be chosen. Based on the results of our case, it could be stated that subtenon injection of methyl prednisolone acetate met the criteria. However, large randomized controlled trials may be necessary to establish the efficacy and safety of subtenon methyl prednisolone acetate injections as a treatment of choice for acute NAION.

Competing/ conflicts of interest

No stated conflict of interest.

Funding sources

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