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Bilateral Optic Neuritis: How to Diagnose and Manage the Disease

Muhammad Hidayat, MD

Abstract

Bilateral optic neuritis usually presents as **sudden onset of bilateral visual loss.**

Usually thought to affect children, often follows a viral syndrome, and is not typically associated with subsequent multiple sclerosis.

In adults simultaneous bilateral acute optic neuritis has been considered **rare** particularly in individuals **without known systemic inflammatory or autoimmune disorders.**

- Corticosteroid is still the first choice of treatment → showing an improvement but still unsatisfying
- Another combination of therapy probably needed based on the etiology and special circumstances.

Introduction

Optic neuritis (ON) : **inflammation of the optic nerve.**

Presented in isolation or associated with multiple sclerosis (MS) or occur in the setting of neuromyelitis optica (NMO).

Diagnosis: Typical and Atypical Optic Neuritis

- Triad :
  - subacute unilateral loss of vision
  - periocular pain
  - impaired colour vision
- Mostly caused by idiopathic inflammatory demyelination →occur as an isolated syndrome or in association with **multiple sclerosis (MS).**

Atypical features :

- Absence of pain : 8% of people with typical ON
- Marked swelling of the nerve, with retinal exudates and peripapillary hemorrhages
- Evidence of neuroretinitis : macular star
- Severe visual loss to no light perception,
- Progression of visual loss or pain for more than 2 weeks

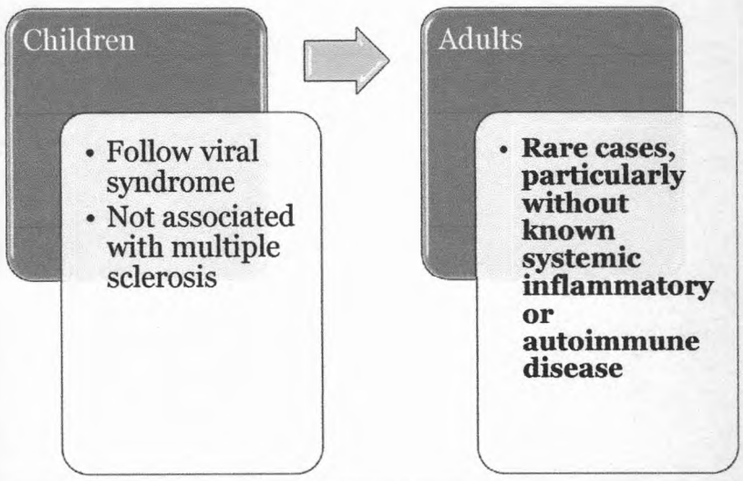
Bilateral Optic Neuritis

Bilateral acute optic neuritis in adults is related to multiple sclerosis (MS), about 10-75%

Morrissey et al. found bilateral acute optic neuritis in 23 adult and 5 patient (22%) with MS

- **Bradley dan Whitty classified the patient to :**
  - unilateral optic neuritis (71%)
  - bilateral simultaneous (7%)
  - bilateral neuritis and non simultaneous might present within 3 months.
- **No significant recovery time in bilateral or unilateral**

Bilateral Optic Neuritis



Ancillary Test

- MRI
- Computerized tomography (CT)
- Cerebrospinal fluid examination to detect cells (in infective and atypical inflammatory causes), elevated protein, and oligoclonal bands.
- Blood tests and other paraclinical investigations

- Toxin screens, serum B12, mitochondrial genetics for Leber's hereditary optic neuropathy,
- Orbital ultrasound for posterior scleritis
- Optical coherence tomography
- Fluorescein angiography, and electroretinography for retinal disease

Management

The largest study for management of ON is the Optic Neuritis Treatment Trial, a multicenter randomized clinical trial with fifteen years of follow up.

Patients were assigned to three groups:

1. **Received oral prednisone (1 mg/kg for 14 days),**
2. **Received intravenous methylprednisolone (250 mg iv 4 time a day for 3 days) followed by an oral prednisone taper (1 mg/kg for 11 days), and**
3. **Received oral placebo.**

The trial showed that **intravenous corticosteroids followed by an oral taper accelerated visual recovery**, but did not improve the long-term visual outcome when compared to placebo.

ON associated with systemic autoimmune disease, vasculitis, or sarcoidosis

- The most common treatment option is to use highdose steroids at onset : 3–5 days of 1000 mg IV methylprednisolone
- In autoimmune disese :
  - The earlier steroids are started in lupus-associated ON, the better the visual outcome
  - Treatment of sarcoidosis refractory to steroids may include immunosuppressive agents (eg, azathioprine and cyclosporine) and antimetabolites (cyclophosphamide, chlorambucil, and methotrexate).

Special scenarios in the treatment of ON

- Special scenarios in the treatment of ON include pediatric ON and ON occurring during pregnancy

Pediatric ON

Treatments may include high-dose steroids, IV immunoglobulin, and TPE.

IV methylprednisolone is given on a weight-based regimen (4–30 mg/kg/day) up to 1 g for 3–5 days.

Difference between adults and pediatric ON

in a higher number of pediatric ON cases, there may be worsening if steroids are tapered too quickly

ON occurring during pregnancy

- In pregnancy, steroids are not contraindicated.
- Methylprednisolone is a pregnancy category C drug, but this risk is considered low, and IV methylprednisolone is generally regarded to be relatively safe for pregnancy.
- Patients were given 2 g/kg within the first 2 months of pregnancy, then 0.4 g/kg every 6 weeks until 12 weeks postpartum.

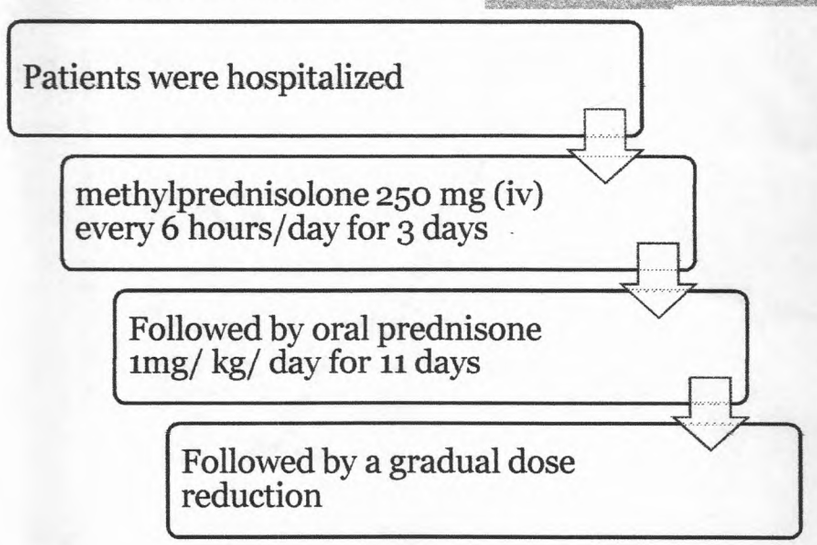
- Treatment for all patients are based on ONTT protocol

TABLE 1.2. Treatment recommendations of the Optic Neuritis Treatment Trial

- Corticosteroid treatment should be considered when the brain MRI scan reveals multiple abnormalities consistent with MS.
- Methylprednisolone 250 mg IV should be administered to patients with optic neuritis over a 30-min period every 6 h for a total of 12 doses, or 1 g IV methylprednisolone in one dose over 1 h each day for 3 consecutive days, followed by a prednisone taper at 1 mg/kg/day orally for 11 days. Prednisone should be tapered to 20 mg on day 15 and to 10 mg on days 16 and 18. There are no current studies to demonstrate a clinically significant difference between administering IV methylprednisolone four times a day and giving it all in one dose.
- IV methylprednisolone decreases the incidence of more neurological deficits within the 2 years after treatment, especially in patients who had initial abnormal brain MRI scans.
- IV methylprednisolone does not improve the ultimate visual outcome.

Study of Bilateral Optic Neuritis in dr. M. Djamil Hospital (2017)

- Outward Patients with :
  - Visual function testing : follow up of 3 days, 2 weeks, and 3 months.
  - Presence or absence of pain with extraocular movement.
  - Visual acuity
  - Perimetry
  - Neuro-imaging (CT Scan)



Result

→ 9 patients had bilateral optic neuritis vision from January 2016 to January 2017

3 Men, 6 women → 21 - 45 years old

Orbital pain was found in all 9 patients

Visual acuity ranging from finger counting to hand movement, with sudden onset

RE : 1/300 to 3/60, with mostly 1/300 : 4 eyes (44%), 1/60 :2 eyes (22%), 2/60 2 eyes (22%), 3/60 : 1 eye (11%)

LE : 1/300 to 5/60, mostly 1/60 : 2 eyes (22%), 4/60 and 5/60 : 1 eye (11%)

- All patients were treated metil prednisolon IV 4x 250 mg in 3 days (total 12x)
  - Followed by oral prednisone 11 days : 1 mg/kg BB, and tappering off

Perimetry : mostly unspecific → central scotoma, quadranopia scotoma, general depressed, and multiple focal

CT scan within normal limit

No.	Age	Sex	Visual Acuity Before Treatment		Visual Acuity after 3 days treatments		Visual Acuity after 2 weeks treatments		Visual Acuity after 3 months treatments	
			RE	LE	RE	LE	RE	LE	RE	LE
1	30	P	3/60	5/60	6/9	1/60	6/7.5	6/9	6/6F	6/7,5
2	21	P	1/300	4/60	6/21	6/9	6/12	6/6	6/10	6/6
3	41	P	1/300	1/60	1/60	6/6 f	1/60	1/60	1/60	1/60
4	30	P	1/60	3/60	6/9	6/7.5	6/7.5	6/7.5	6/6	6/6
5	39	L	2/60	3/60	6/6 f	6/12	6/6 f	6/6 f	6/6	6/6
6	23	L	2/60	2/60	6/7.5	6/7.5	6/6	6/6	6/6	6/6
7	45	L	1/300	2/60	6/12	6/6 f	6/7.5	6/6	6/6	6/6
8	43	P	1/300	1/60	6/7.5	1/60	6/6f	6/6f	6/6	6/6
9	35	L	1/60	1/300	6/6 f	6/9	6/6	6/6f	6/6	6/6

Discussion

- Our study shows prevalence of bilateral optic neuritis in **female is more than male** with ratio 2:1. All literatures stated that female outnumbered male, thus, supporting our study.
- **Orbital pain was found in all patients.** In the literature stated that pain within ad around the affected eye arises before or at the time of the onset of visual loss in about 90% of cases.
- **Sudden visual loss in both eyes** is the chief complain from all patients in this study, suitable to the main sign of optic neuritis.

- Visual outcome in 8 patients are good, with 20/20 after 2 weeks follow up.
- **Visual outcome for bilateral optic neuritis is better after treatment of IV methylprednisolone and oral prednisone,** reaching up to 20/20 in 6 months to 1 year of follow up. The benefit of this treatment regiments is greates in the first 15 days.
- The remaining 1 patient in this study has poor visual outcome with 1/60 for both eyes after treatment. This patient came to us after 6 months of visual loss (late condition).

Conclusion

- The diagnosis approach to the patients with bilateral optic neuritis (symptoms and findings) is essential to define the mangement.
- Corticosteroid is still the first choice.
- Another combination of therapy probably needed based on the etiology and special circumstances.

Thank you