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Bilateral Optic Neuritis Treated with Intravenous Corticosteroid

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Abstract

Introduction: Optic neuritis is a term used to refer an inflammation of the optic nerve. Bilateral optic neuritis in adults has been considered rare particularly in individuals without known systemic inflammatory or autoimmune disorders.

Purpose: To describe cases of acute bilateral optic neuritis in adult treated with intravenous corticosteroid in M. Djamil Hospital, Padang, Indonesia.

Method: We performed a retrospective study review of medical records from patients referred to neuro-ophthalmology clinic in M. Djamil Hospital with acute bilateral optic neuritis from January 2016 to April 2017. Exclusion criteria included previous multiple sclerosis or myelopathy, known systemic disorders or medications associated with optic neuropathy, uveitis, or neoplasm. Patients received intravenous methylprednisolone followed by tapering oral methylprednisolone. Visual acuity, visual fields, ophthalmoscopy finding, and neurological evaluation were recorded at baseline and at 1 month or 3 months.

Result: Nine patients of 4 men and 5 women, with an age range of 21-45 years old, had bilateral decreased vision, 6 with pain on eye movement. All patients had normal neurological evaluations, with visual acuity ranging from finger counting to hand movement and variety of visual field pattern. Both optic nerves showed abnormal ophthalmoscopy finding. After corticosteroid therapy for average 2 weeks, all patients show improvement in visual acuity, visual field, and ophthalmoscopy finding. No patient developed a neurological problem during the follow up with a mean of 3 months.

Conclusion: Idiopathic acute bilateral optic neuritis rarely occurs in adults. Corticosteroid therapy shows good visual outcome.

Keywords: Bilateral optic neuritis; Corticosteroid therapy

Introduction

Optic neuritis involves the inflammation, disintegration, and myelination of the optic nerve and might be unilateral or bilateral, typical or atypical. Typical optic neuritis may occur alone or together with multiple sclerosis, whereas atypical optic neuritis is not associated with multiple sclerosis.

Clinical manifestations of optic neuritis are moderate to severe acute-to-severe, worsening in hours to days. Orbital pain at the time of movement is one of the typical symptoms of optic neuritis, caused by stimulation of the trigeminal nerve due to the inflammatory process. Color vision disorder (dyschromatopsia) is common in optic neuritis and is associated with the duration of the disease.

Blue-yellow vision impairment often occurs in the acute phase and red-green defects often occur after 6 months. The decrease in contrast sensitivity is usually the earliest symptom when compared with decreased vision. In optic neuritis, visual field defects may vary, but the most common feature is the central scotoma. Fundoscopic examination of optic neuritis shows elevation and hyperemia of the optic disc. In retrobulbar optic neuritis, the fundoscopic image will

appear normal. Relative Afferent Pupillary Defects (RAPD) do not appear in bilateral cases [1].

Bilateral optic neuritis arises as a sudden decrease in bilateral vision. Bilateral optic neuritis is usually thought to be only affecting children, often caused by viral infections, and not related to multiple sclerosis. In contrast, adult's bilateral optic neuritis is rare especially in individuals without systemic inflammation or autoimmune disorders. Most cases of bilateral optic neuritis occur non-simultaneously (within 3 months), while about 7% of bilateral cases occur simultaneously [2]. Magnetic Resonance Imaging (MRI) examination usually shows bilateral enhancement in the intra orbital optic nerve. Other investigations that can be performed are Computed tomography (CT) scan and cerebrospinal fluid examination in suspected cases of infection (to assess the presence of cells).

Visual recovery in bilateral optical neuritis is important regardless of treatment. Optic neuritis is known to be highly responsive to high-dose corticosteroids. Methylprednisolone 250 mg intravenously given every 6 hrs for 3 days (total 12 doses) and followed by tapering dose 0.8 mg/kg/day for 11 days.

Some reports illustrate the course, recovery, and outcome (visual acuity) after optic neuritis. Patients are treated with high-dose corticosteroids. We recently noted an increase in the number of adult

patients without systemic autoimmune or neurologic diseases diagnosed with bilateral optic neuritis by documenting the patients' clinical profile [3]. The effectiveness of corticosteroid therapy, visual recovery time, visual outcome and neurologic symptoms were followed up for 3 months.

### Methods

We conducted a retrospective study of patients diagnosed with bilateral optic neuritis from January 2016 to April 2017. Patients were included if they experienced symptoms such as acute bilateral dysfunction diagnosed by optic nerve abnormalities, complete ophthalmological examination, laboratory analysis and brain CT scan were performed at the time of symptoms appear, and follow up for at least 3 months [4]. Exclusion criteria includes previously known multiple sclerosis, previous optic neuritis or myelopathy, systemic abnormalities known to be associated with optic neuropathy, use of drugs associated with toxic optic neuropathy, previous history of uveitis, systemic neoplasms, or known intracranial abnormalities.

Visual acuity examination is done for each eye on arrival and at 3 days of follow up, 2 weeks, and 3 months [5]. Visual acuity is assessed by using Snellen chart. Perimetry is performed by analysis of Humphrey (Humphrey Instruments, San Leandro, CA, USA) (Program 30-2) with the mean deviations recorded in decibels (dB) as outcome measures. Color vision impairment was assessed using the Farnsworth 28 Hue color plate. The presence or absence of orbital pain when moving is also documented. The examination of contrast sensitivity was assessed with the Pelli-robson chart. Neurologic examination is performed at baseline and at least for 3 months. All

patients were performed a brain CT scan and an orbital CT scan. Each patient underwent laboratory tests including routine blood tests, electrolytes and blood chemistry.

All patients were admitted to hospital and received intravenous methylprednisolone 250 mg per 6 hrs for 3 days followed by oral prednisone 1 mg/kg BW/day for 11 days [6,7]. For about 11 days followed by a gradual reduction in the dose according to clinical conditions. We analyzed eyesight for worse eyes at the beginning, determined with sharp eyesight followed by color vision and contrast sensitivity.

### Results

Demographic and presentation evaluations (Table 1), there were 9 patients with age range 21-45 years who met the study criteria that came to neuro-ophthalmology clinic in M. Djamil Hospital, Padang. There are 4 men and 5 women with an age range of 21-45 years. 8 patients had no prior history and were considered to have an unknown etiology (89%), whereas 1 patient (11%) had a previous history of viral infection. 6 patients (100%) experienced bilateral pain with eyeball movement. Laboratory tests show normal results in almost all patients.

Visual acuity of both eyes ranging from finger counting (finger counting) to hand movements with complaints of a sudden vision loss [8]. All eyes have abnormal color vision during examination with color plate and decreased contrast sensitivity with varying severity. Visual field defects are varied and non-specific, such as central scotoma, quadrantanopia, general depressed, and multiple focal scans. An orbital CT scan examination is within normal limits in all patients.

S.No	Age	Sex	Visual Activity before Treatment		Visual Activity after 3 days treatment		Visual Activity after 2 weeks treatment		Visual Activity after 3 months treatment	
			RE	LE	RE	LE	RE	LE	RE	LE
1	30	F	3/60	5/60	6/9	1/60	6/7.5	6/9	6/6 f	6/7.5
2	21	F	1/300	4/60	6/21	6/9	6/12	6/6	6/10	6/6
3	41	F	1/300	1/60	1/60	6/6f	1/60	1/60	1/60	1/60
4	30	F	1/60	3/60	6/9	6/7.5	6/7.5	6/7.5	6/6	6/6
5	39	M	2/60	3/60	6/6f	6/12	6/6 f	6/6 f	6/6	6/6
6	23	M	2/60	2/60	6/7.5	6/7.5	6/6	6/6	6/6	6/6
7	45	M	1/300	2/60	6/12	6/6 f	6/7.5	6/6	6/6	6/6
8	43	F	1/300	1/60	6/7.5	6/60	6/6 f	6/6 f	6/6	6/6
9	35	M	1/60	1/300	6/6f	6/9	6/6	6/6	6/6	6/6

F: Female count; M: Male count

Table 1: Demographic and presentation evaluations.

An ophthalmologic examination (visual acuity, color vision, and contrast sensitivity) was continued at 3 months of follow up for all patients [9,10]. Most patients experience a sharp increase in vision to near normal, as well as color vision and contrast sensitivity. One patient, case 3, did not experience a sharp increase in vision because the patient came too late and the visual acuity decrease was permanent. None of the patients had symptoms of ongoing

neurological dysfunction and a normal clinical neurologic examination at the last evaluation, which was performed for 3 months.

### Discussion

All patients who met the inclusion criteria shows that female patients were more than men, with a ratio of 2:1. This is related to

some previous studies which found that optic neuritis is more common in women. Acute vision loss is the main clinical symptom in all patients, according to typical symptoms of optic neuritis. In addition, orbital pain when moved is also a symptom of the most complained by the patient. Color vision and contrast sensitivity vary with all patients.

Although the presentation and severity of visual impairment in cases of bilateral optic neuritis is quite dramatic, the visual recovery is excellent in almost all patients except in one patient. A marked asymmetric decrease of visual acuity occurs in one patient (case 2). Examination of orbital CT scans and brain CT scans are within normal limits in all patients.

The absence of RAPD in almost all patients with bilateral optic neuritis results from bilateral afferent dysfunction. Cases with RAPD may be due to an unequal dysfunction between the affected optic nerve. The etiology of infection, usually virus, is associated with bilateral optic neuritis in children and unilateral demyelination optic neuritis, but systemic processes are not generally present in our patients.

Corticosteroids are the first choice in the management of bilateral optic neuritis. All patients were treated with high-dose corticosteroids based on Optic Neuritis Treatment Trial (ONTT). Based on the severity of vision loss and the profile of corticosteroid side effects, we chose to treat patients intravenously followed by oral corticosteroids. Our findings support previous reports suggesting that bilateral optic neuropathy suspected due to inflammatory processes, has a generally good prognosis and is responsive to high-dose corticosteroid therapy.

#### Conclusion

Bilateral optic neuritis without myelopathy occurs more frequently in adults than previously thought. Diagnosis and therapeutic approach in patients with symptoms and signs of optic neuritis should be

performed thoroughly in both patients with and without systemic abnormalities or previous autoimmune disorders. Bilateral visual impairment improves with corticosteroids without additional immunomodulatory therapy. The sequelae of neurological abnormality or recurrent visual loss may occur, so follow up should be 6 to 12 months. Idiopathic acute bilateral optic neuritis is a rare case that needs further study, especially its treatment with corticosteroid therapy to improve visual outcome.

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