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Visual recovery in optic neuritis after corticosteroid versus mecobalamin treatment*

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Objective : *To compare the effects on visual recovery between corticosteroid and mecobalamin in patients with acute optic neuritis.*

Setting : *Neuro-ophthalmology Clinic, King Chulalongkorn Memorial Hospital.*

Research design : *Retrospective interventional case series.*

Methods : *A retrospective chart review from June 1999 to June 2001 was done. Thirty-eight eyes (26 patients) with acute optic neuritis were recruited. Eighteen eyes (12 patients) received standard corticosteroid regimen, whereas 20 eyes (14 patients) received mecobalamin (Methycobal) 500 mg tid. Visual acuity at baseline, 1 week, 1, 3 and 6 months were evaluated. Data were analysed by Chi-square test.*

Results : *The mean age was 31.1 years (SD 13.44). Male to female ratio was 1:8. The diagnoses were retrobulbar optic neuritis in 76.3 %, and papillitis in 23.7 %. All patients presented with loss of vision. Fourteen per cent had pain on eye movement. After treatment, vision improved in both groups, but there was no statistical significant difference (p = 0.569, 0.815, 0.986 and 0.220).*

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Conclusion : *In acute optic neuritis, standard regimen of corticosteroid treatment revealed similar visual recovery to mecobalamin treatment during the first six months.*

Key words : *Optic neuritis, Visual recovery, Methycobal, Mecobalamin.*

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พริมา หิรัญวิวัฒน์กุล, สุกัญญา ฉิมสุนทร, อรุณี เลิศชวนะกุล. การฟื้นคืนของการมองเห็นในผู้ป่วยประสาทตาอักเสบหลังได้รับการรักษาด้วยยาในกลุ่มสเตียรอยด์ และยาเมโคบาลามีน. จุฬาลงกรณ์เวชสาร 2546 ก.ค; 47(7): 393 - 400

วัตถุประสงค์ : *เพื่อศึกษาเปรียบเทียบผลการฟื้นคืนของการมองเห็นหลังได้รับการรักษาด้วยยาสเตียรอยด์ และเมโคบาลามีนในผู้ป่วยประสาทตาอักเสบเฉียบพลัน*

รูปแบบการศึกษา : *การศึกษาย้อนหลัง ในกลุ่มผู้ป่วยที่ได้รับการรักษา*

วิธีการศึกษา : *ศึกษาข้อมูลย้อนหลังจากเวชระเบียนผู้ป่วยประสาทตาอักเสบเฉียบพลัน ตั้งแต่ปี พ.ศ. 2542-2544 โดยรวบรวมผู้ป่วยได้ 26 คน 38 ตาได้รับการรักษาด้วยยาสเตียรอยด์ตามมาตรฐานการรักษา 18 ตา (12 คน) ส่วนอีก 20 ตา (14 คน) ได้รับเมโคบาลามีน 500 มิลลิกรัม วันละ 3 ครั้ง นำระดับความสามารถในการมองเห็นของผู้ป่วยที่ 1 สัปดาห์ 1, 3 และ 6 เดือนหลังได้รับการรักษามาวิเคราะห์และประเมินผลการรักษา*

ผลการศึกษา : *ผู้ป่วยมีอายุเฉลี่ย 31.1 ปี (ส่วนเบี่ยงเบนมาตรฐาน 13.44) พบผู้หญิงมากกว่าผู้ชาย 1.8 เท่า ร้อยละ 76.3 เป็นการอักเสบของประสาทตาส่วนหลัง มีขั้วประสาทตาบวมเพียงร้อยละ 23.7 ผู้ป่วยทั้งหมดมีอาการตามัวลง และมีเพียงร้อยละ 14 ที่มีอาการปวดตาเวลากลอกตา หลังให้การรักษาพบว่าการมองเห็นฟื้นคืนได้ทั้งสองกลุ่มและพบว่าไม่มีความแตกต่างกันในทางสถิติ*

สรุปผล : *ในการรักษาผู้ป่วยประสาทตาอักเสบเฉียบพลัน ยาสเตียรอยด์ที่ใช้ในการรักษาปัจจุบันให้ผลการฟื้นคืนของการมองเห็นเท่ากับยาเมโคบาลามีนในช่วง 6 เดือนแรก*

Acute mono-symptomatic optic neuritis is common in young adults, especially in women. Although most cases of optic neuritis have spontaneous recovery without treatment, some patients progressed to Clinical Definite Multiple Sclerosis (CDMS). Multiple sclerosis may lead to disability later in life.

Visual acuity in optic neuritis varies from 20/20 to no light perception. Other visual function such as color vision, contrast sensitivity and visual field are also affected. Abnormal visual perception disturbs the patient's life activities and works. The Optic Neuritis Treatment Trial (ONTT) found that intravenous methylprednisolone (IV MP) plays a role in hastening visual recovery and reducing the progress of the CDMS in the first 2 years.[1,2] However, IV MP is useful in patients with high risk MS that evaluated by MRI.[3-5] Optic neuritis in Asia has low association with MS.[6] Rapid visual recovery is the preferred outcome. However, IV MP has several side effects such as psychotic depression or acute pancreatitis.[7] Therefore we tried to look for another medication that has equal or higher efficacy than methylprednisone but with fewer side effects.

Mecobalamin is a B_{12} containing coenzyme with an active methyl base. It is one of the most active forms of B_{12} homologs in the body with respect to nucleic acid, protein and lipid metabolism. It is a cofactor in the enzyme methionine synthase that functions to transfer methyl groups for the regeneration of methionine from homocysteine.[8] Akaike A, *et al.* showed efficiency on reducing glutamate cytotoxicity.[9] The agent is used for regeneration or remyelination of peripheral nerve such as diabetic, drug induced or alcoholic neuropathy.[10,11] High dose of vitamin B_{12} can improve abnormal visual and auditory evoked potentials of the brainstem in chronic progressive MS.[12] We tried to study the effectiveness of the agent in central neuropathy such as optic neuritis.

Patients and methods

From the retrospective chart review of acute optic neuritis at Neuro-ophthalmology Clinic, King Chulalongkorn Memorial Hospital from June 1999 – June 2001, we recruited patients who had definite diagnosis of acute optic neuritis with onset less than 1 week; abnormal optic nerve function (visual acuity, visual field, contrast sensitivity and color vision) and abnormal visual evoked potentials (VEP). Patients who had known causes of optic neuritis and pre-existing ocular disease were excluded. The subjects were divided into 2 groups, namely: corticosteroids treatment group (18 eyes of 10 patients) wherein the patients received intravenous methylprednisolone 250 mg every 6 hours then oral prednisolone 1 mg/kg/day for 11 days, and mecobalamin group (20 eyes of 16 patients) wherein the patients received mecobalamin 500 μg 3 time-a-days for 3 months. Their visual acuity, color vision and contrast sensitivity were recorded as outcomes of the treatment. However, visual acuity was the main outcome for statistic analysis. These outcomes were observed at 1st week, then 1st, 3rd and 6th months after treatment. We defined visual recovery in cases, who had visual acuity better than 20/40, because all patients had initial acuity below 20/40. Variables were compared by Chi-square test.

Results

Thirty-eight eyes from 26 patients who

presented with definite acute optic neuritis were recruited in the study. The female patients had more frequent attack than their male counter part for 1.8 times. Seventeen patients aged between 19 and 42 years (ranged 7 – 61; mean 31.1, SD 13.44). In the corticosteroids group; 58.3 % are female, the mean age of this group is 23.91 (range 7-51; SD 13.67). In the mecobalamine group, 64.3 % are female; the mean age of this group is 37.29 (range 25-62; SD 10.03). All patients presented with acute visual loss; 14 % had ocular pain on eye movement. Clinical assessment found relative afferent pupillary defect in unilateral or first eye-attack cases. Twenty-nine eyes (76.3 %) showed normal optic disc appearance. Before receiving the treatments, most patients had visual acuity below 20/50 in both groups (Table 1). We collected the results from data of 1stweek, and 1st, 3rd and 6th months after treatments as shown in Table 2. Yates' corrected chi-square and Fisher's exact test were used for data analysis. From the data it was found that the recovery of visual acuity to the level better than 20/40 are similar in both groups, and have no statistical significance throughout the follow-up period (p = 0.569, 0.815, 0.986 and 0.220). However, the visual acuity of some patients (4/18) in the first group recovered to 20/20 which was not found in the other group during their first month of treatment (p = 0.120).

Moreover, we found that the recovery of color vision and contrast sensitivity gradually recovered to normal in 3 months (p = 0.836 and 0.501) and patients in the steroids treatment group recovered faster during the first six month (p = 0.043 and 0.446).

Table 1. Visual acuity before treatment of optic neuritis in each group of the patients.

Visual acuity before treatment	Corticosteroids group [number of patients (%)]	Mecobalamin group [number of patients (%)]
20/40 or better	0	0
20/50 – 20/200	2 (11.1)	6 (30.0)
Less than 20/200	16 (88.9)	14 (70.0)

Table 2. Visual outcomes on each treatment.

Visual acuity recovery after	Corticosteroids group [number of patients (%)]				Mecobalamin group [number of patients (%)]			
treatment	1 week	1 month	3 month	6 month	1 week	1 month	3 month	6 month
20/20 or better	4 (22.2)	4 (22.2)	7 (38.8)	9 (50.0)	0	0	3 (15.0)	7 (35.0)
20/25 – 20/40	3 (16.7)	2 (11.1)	2 (11.1)	6 (33.3)	5 (25.0)	7 (35.0)	6 (30.0)	5 (25.0)
20/50 – 20/200	6 (33.3)	10 (55.6)	7 (38.8)	0	3 (15.0)	8 (40.0)	10 (50.0)	6 (30.0)
Less than 20/200	5 (22.8)	2 (11.1)	2 (11.1)	3 (16.7)	12 (60.0)	5 (25.0)	1 (5.0)	2 (10.0)

Table 3. Contrast sensitivity of the patients after treatment.

Contrast sensitivity test	Corticosteroids group [number of patients (%)]		Mecobalamin group [number of patients (%)]	
	3 months	6 months	3 months	6 months
Normal	6 (33.3)	13 (72.2)	4 (20.0)	11 (55.0)
Abnormal	11 (61.1)	5 (27.8)	16 (80.0)	9 (45.0)
Not applicable	1 (5.6)	0	0	0

Table 4. Color vision of the patients after treatment.

Color vision test	Corticosteroids group [number of patients (%)]		Mecobalamin group [number of patients (%)]	
	3 months	6 months	3 months	6 months
Normal	6 (33.3)	14 (77.8)	5 (25.0)	8 (40.0)
Abnormal	12 (66.7)	4 (22.2)	15 (75.0)	12 (60.0)

Discussion

From Optic Neuritis Treatment Trial (ONTT), we learned many things about visual recovery course of optic neuritis. Visual acuity recovered to 20/40 or better occurred in 95 % of the untreated patients after the first year.[13,14] After five years of follow-up 87 % of the patients had visual acuity (VA) 20/25 or better.[15] The patients who received IV MP (standard regimen) had faster recovery within 4 days.[1, 13, 16] But the final acuity was not different from placebo after 6 months.

The characteristic of optic neuritis predominates in the young adult female. The patients' age and sex are the important factors for the diagnosis of optic neuritis or anterior ischemic optic neuropathy in the elder. A 62-year-old female patient who had been treated with mecobalamin, showed abnormal optic nerve function and sign of demyelination of both optic nerves on VEP. She recovered from finger counting to 20/70 in 2 weeks after attack. Then we recruited the case into the study. In this study, mecobalamin was chosen to compare with the standard treatment of corticosteroids. After the data were collected and analyzed, we found that the recovery of visual acuity in both groups was not different in 6 months of follow-up. Most patients started to recover within the first month. Early onset of the disease was observed within the first week. Nevertheless, visual acuity improved to 20/20 in the corticosteroids treatment group in the first week but was not found in the other group. When compared to the results of ONTT, the outcome of mecobalamin treatment was equal to placebo, and there was not significant difference when compared with IV MP. Mecobalamin 1500 μg/day improved peripheral nerve demyelination but it was not effective for central

neuropathy as in optic neuritis. Regarding the results of color vision and contrast sensitivity, the patient's performance gradually recovered in the study. The color vision in the corticosteroids treatment group was better and significantly different than the mecobalamin group. This result is similar in ONTT.

A major limitation of the study is that it was conducted as a retrospective study. The initial visual acuity, patients' age and sex were not absolutely similar in both groups. The patients in the standard treatment group had worse baseline vision. However, the visual recovery of patients in both groups was not different in long-term follow-up. In agreement with ONTT, the study found that corticosteroids treatment was useful for patients who needed fast visual recovery but the treatment had no effect on visual outcome in long-term follow-up.

In conclusion, we did not find any difference of visual recovery in acute monosymptomatic optic neuritis between corticosteroids (ONTT recommended dose) and mecobalamin treatment in the first six months. But the visual recovery started faster in the corticosteroid group than the mecobalamin group. Therefore IV MP had more benefit to those who need rapid recovery of sharp vision in the first month.

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