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Optic neuritis in China

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Background and Objectives: Optic neuritis is well studied in Western countries. Idiopathic demyelinating optic neuritis (IDON) is considered to be a *forme fruste* of multiple sclerosis (MS), and has similar pathogenesis with MS. According to Optic neuritis Treatment Trial (ONTT), the cumulative conversion rate of IDON to MS is 30% in 5 years, 50% in 15 years from the first attack of IDON. Initial brain MRI abnormalities significantly increased the likelihood of development of MS. In the English literature, there are very few studies of IDON in mainland China. Our study aimed to describe the clinical features of a group of IDON patients in China, and to investigate its conversion rate to multiple sclerosis (MS) or neuromyelitis optica (NMO).

Methods: The clinical charts of patients with discharged diagnosis of IDON during 2002 to 2007 were reviewed retrospectively. Only patients with good clinical data were included. The inclusion criteria of IDON were: 1. acute visual loss; 2. abnormal visual field test; 3. abnormal visual evoked potential and/or relative afferent pupil defect (RAPD); 4. At least one eye had visual acuity better than 20/40 at 12 weeks from onset. The exclusion criterion was optic neuropathy due to other causes or visual loss due to other ocular or intracranial diseases. All patients were telephoned and advised to come back for follow-up clinical assessment. For those who did not come back, we collected their clinical information as recorded by their local doctors, including the most recent measurement of visual acuity, whether there was any more attacks and if there were, the dates, symptoms and signs of these relapse, as well the results of any MRI study. Patients with any of the following conditions were excluded from the final data collection: those who met the IDON diagnostic criteria but had other neurological symptoms before the optic nerve attack or those could not be followed up or could not provide reliable clinical information. The revised McDonald criteria of MS and NMO criteria of 1999 were adopted. χ^2 test was applied to analyze the relationship between the clinical features and conversion rate to MS or NMO.

Results: A total of 273 charts were reviewed. Eighty-eight cases were excluded because the required clinical data were not complete, or neurological lesions other than optic nerve lesion were noted before the onset of optic neuritis. The other 78 cases were excluded because reliable follow-up data were not available. Eventually 107 IDON cases were included.

1. *Baseline data:* Patients came from 23 provinces of Mainland China, mostly from the northern area. There were 58 (54.2%) female and 49 male, with age ranged from 6 to 59 years old, averaged 25.3 years old. Bilateral simultaneous or consecutive onset was reported in 51cases (47.7%). The attack was the first in 68 cases. Swollen discs were found in 43% of a total of 158 affected eyes. Visual acuity worse than 20/200, between 20/200 and 20/50, 20/40 or better were found in 90 (57%), 50 (31.6%) and 18 (11.4%) of the 158 affected eyes. All 107 patients had brain MRI and abnormal signals in white matter on T2 weighted MRI were reported on 33 (30.8%) cases. Spinal MRI was done in 3 cases and none of them showed any abnormality. All patients had cerebrospinal fluid (CSF) analysis, 22 of which were abnormal, including positive oligoclonal bands and elevated myelin basic protein. Transient neurological deficits other than visual loss were reported in 20 cases (18.7%) during hospitalization.

2. *Follow-up data:* Follow-up time ranged from 6 months to 5 years from the first attack of optic neuritis, averaged 3.5 years. Clinical follow-up including neurological and eye examinations

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were done in 28 cases (26.2%), while the follow-up data of the other 79 cases were acquired by telephone. Brain and spinal MRI were done on 18 and 1 cases at follow up respectively. Visual acuity of most patients improved significantly, with 136 (86.1%) of 158 affected eyes had visual acuity better than 20/40. Only 7 eyes (4.4%) remained poor on testing with visual acuity worse than 20/200. A total of 12 cases (11.2%) converted into MS or NMO during follow up, including 10 women (83.3%) and 2 men. All 12 cases met the revised McDonald criteria for MS, of which 4 cases met NMO criteria of 1999. Statistical analysis found than women had higher conversion rate (10 of 58, 17.2%) than men (2 of 49, 4.1%, $P<0.05$). Higher conversion rate was also found in recurrent IDON compared with first-attack cases (23.1% vs 4.4%, $P<0.01$). Conversion rate of patients with initially abnormal brain MRI was 18.2%, higher than those with normal MRI (8.1%), but this was not statistically significant. Similar finding was noted between unilateral (13.8%) and bilateral simultaneously or consecutive optic neuritis (7.8%). No difference was found in comparing patients with or without swollen disc, or those with different extent of vision loss.

Conclusion: In our group of patients consisted of both unilateral and simultaneously bilateral affected optic neuritis, severe visual loss was common, but most improved significantly. While 57% of affected eyes had initial visual acuity of worse than 20/200, nearly 90% of affected eyes had final visual acuity better than 20/40 at follow up. “MS-like” abnormal signals in white matter on T2 weighted MRI were found in about 30% of patients at the onset of optic neuritis. About 20% of patients had abnormal CSF analysis. During an average of 3.5 years of follow-up, 12 cases (11.2%) converted into MS or NMO, of which 4 met both MS and NMO criteria. Significantly higher conversion rate was found in female and recurrent IDON patients, (women 17.2% vs men 4.1%, $P<0.05$; recurrent IDON 23.1 vs isolated IDON 4.4%, $P<0.01$). Patients with abnormal initial brain MRI showed higher conversion rate than those with normal brain MRI, but this was not statistically significant. Conversation rate was also insignificantly higher in unilateral IODN when compared with those with simultaneously bilateral or consecutive onset. Even though our patients came from many provinces across China, this study only described clinical features and outcomes of IDON patients in one hospital in China. A more detailed follow-up and a prospective, multiple-centre study would produce more accurate information on optic neuritis in China.