Original Article

Clinical Analysis of the Etiology of Optic Neuritis in Patients at Different Ages in China

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Abstract

Purpose: To determine the etiology of optic neuritis in patients of different ages in China.

Methods: Records of optic neuritis patients who were hospitalized in the Department of Neuro-ophthalmology, General PLA Hospital, Beijing, between January 1, 2011 and December 31, 2011 were retrospectively reviewed.

Results: A total of 132 patients were divided into three groups by age. The percentage of patients aged ≤16 years, 16-45 years and >45 years were 17.4% (23/132), 54.6% (72/132), and 28.0% (37/132) respectively. The distribution of etiologies differed significantly among the three groups (χ^2=23.2, P=0.026). The percentage of idiopathic demyelinating optic neuritis was the highest in the 16-45 group (44.4%), and the proportion of neuromyelitis optica was the highest in the ≤16 years group. Infectious optic neuritis was more frequently seen in patients aged ≤16 years and >45 years. The source of infection was viral (n=2), nasosinusitis (n=1) and bacterial (n=1) in the ≤16 years group and neurosyphilis (n=3) and na sosinusitis (n=1) in the >45 years group. The percentage of paraneoplastic syndrome in the >45 years group was 8.11% (3/37).

Conclusion: The etiology of optic neuritis in patients at various ages differed significantly. (***Eye Science 2012; 27:98-101***)

Keywords: optic neuritis; etiology; age

The etiology of optic neuritis is so complex that patients of different races from various regions present with their own clinical characteristics. No previous study has discriminated the etiology of optic neuritis according to patient sage. Though previous studies have reported the clinical characteristics of young and adult patients with optic neuritis, no investigations have compared the etiology between these two populations specifically. In the current study, the clinical data from 132 patients with optic neuritis at different ages were statistically compared to better illustrate the underlying etiology of optic neuritis.

Patients and methods

Patients' information

The clinical data, including age, gender, region, relevant etiology, etc, from optic neuritis patients admitted to the Department of Neuroophthalmology, PLA General Hospital, between January 1, 2011 and December 31, 2011, were retrospectively reviewed. The patients were followed up at least once at outpatient clinics or by telephone with a time interval of 3 to 12 months.

Grouping method

Participants were divided into three groups according to their ages: <16 years, 16-45 years and >45 years groups. The clinical factors of disease were compared among the three groups.

Diagnosis criteria

The diagnosis of optic neuritis was confirmed by the criteria[1] proposed by Zhang: 1. Acute visual loss or visual field defects accompanied with or without eye pain. 2. No sign of compressive, vascular, metabolic, infiltrative, toxicity or genetic optic nervous lesions. 3. Retina or other factors-induced visual loss was excluded. 4. At least one of the following abnormal symptoms occurred: relative afferent pupillary defect (RAPD), nerve fiber bundle-related visual field defects, and visual evoked potential abnormality.

Statistical analysis

SPSS13.0 statistical software was used for data

DOI: 10.3969/j.issn.1000-4432.2012.02.010

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analysis. Descriptive analysis was performed to determine the percentage of different groups and regional characteristics. The underlying etiology and the percentage of monocular or binocular involvement were analyzed by chi-square test.

Results

In total, 143 patients with optic neuritis satisfied the diagnosis criteria, 132 of whom completed the follow-up and participated in this study: 23 patients aged <16 years (17.42%), 72 were aged between 16 and 45 years (54.55%), and 37 were aged >45 years (28.03%). The patients came from different parts of China: northern China (n=58, 43.9%), eastern China (n=26, 19.7%), northeastern China (n=21, 15.9%), central China (n=13, 9.8%), northwestern China(n=6, 4.5%), southwestern China(n=4, 3.0%), and southern China (n=4, 3.0%), generally reflecting the etiology of optic neuritis in the whole Chinese population.

Monocular and binocular involvement analysis indicated that the percentage of binocular involvement was the highest in children, though no statistical significance was noted among the three groups (Table 1).

Table 1 Comparison of the percentages of monocular and binocular involvement in different groups

Groups	Monocular		Binocular		Total
	No. of cases	Percentage (%)	No. of cases	Percentage (%)	
<16 years group	9	39.13	14	60.87	23
16–45 years group	33	45.83	39	54.17	72
> 45 years group	19	50.00	19	50.00	38
Total	61	45.86	72	54.14	133

Note: χ^2 = 0.527, P=0.768

Among the three groups, the percentage of female patients was significantly higher compared with that of male counterparts (Figure 1).

The etiology of optic neuritis differed significantly among the three groups (χ^2=23.165, P=0.026). Among the three groups, idiopathic demyelinating optic neuritis and optic neuritis with unknown reasons were the most frequently seen, accounting for 52.17% in the <16 years group, 68.05% in the 16-45 years group, and 62.87% in the >45 years group. The incidence of idiopathic demyelinating optic neuritis was the highest in the 16–45 years group (44.44%). The proportion of optic neuritis in the <16 years group was significantly lower than those in the other two groups. Infective optic neuritis frequently occurred in the <16 years and >45 years groups. In the <16 years group, the specific sources of infection were virus (n=2), nasosinusitis (n=1), and bacterin (n=1); those in the >45 years group were neurosyphilis (n=3) and nasosinusitis (n=1). The incidence of paraneoplastic syndrome in the >45 years group was 8.11% (3/37).

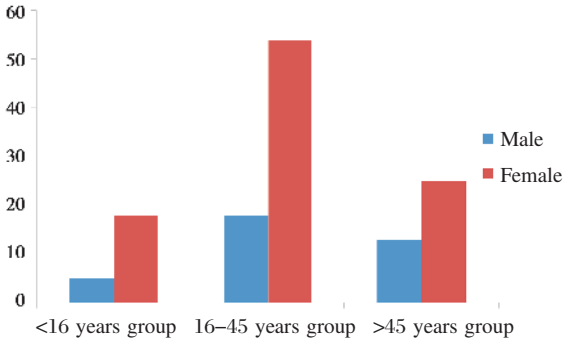

Figure 1 Comparison on gender composition among the three groups

Discussion

In patients aged <16 years, the proportion of neuromyelitis optica, especially binocular neuromyelitis optica, is significantly higher compared with those in the other groups, suggesting that neuromyelitis optica might manifest early in childhood and in patients with binocular optic nerve diseases. During this period, aquaporin-4 antibody detection and MRI of spinal cord should be timely performed to provide explicit diagnosis. The suspected cases should be followed up to observe the patients' condition.

A clinical investigation of Turkish children with optic neuritis[2] revealed that, among 31 children, nine cases were diagnosed as multiple sclerosis, three cases as neuromyelitis optica, and four cases as infective optic neuritis. In this study, one case was diagnosed as multiple sclerosis, five cases as neuromyelitis optica, and four cases as infective optic neuritis, indicating that the incidence of neuromyelitis optica among Chinese children with optic neuritis may be higher than that in western nations.

Table 2 Comparison on the etiology of optic neuritis among the three groups

Groups	Idiopathic demyelinating optic neuritis		Multiple sclerosis		Neuromyelitis Optica		Paraneoplastic syndrome	
	Number of cases	Percentage(%)	Number of cases	Percentage(%)	Number of cases	Percentage(%)	Number of cases	Percentage(%)
<16 years group	7	30.43	1	4.35	5	21.74	0	0.00
16–45 years group	32	44.44	7	9.72	8	11.11	0	0.00
>45 years group	13	35.14	5	13.51	2	5.41	3	8.11
Total	52	39.39	13	9.85	15	11.36	3	2.27

Groups	Infective optic neuritis		Inflammatory optic neuritis		Alternative optic neuritis		
	Number of cases	Percentage (%)	Number of cases	Percentage (%)	Number of cases	Percentage(%)	Total
<16 years group	4	17.39	1	4.35	5	21.74	23
16–45 years group	1	1.39	7	9.72	17	23.61	72
>45 years group	4	10.81	1	2.70	9	24.32	37
Total	9	6.82	9	6.82	31	23.48	132

* Note: χ^2=23.165, P=0.026

Previous studies reported that infection is considered the primary cause of children optic neuritis[3], which is inconsistent with the results in current study, probably because the participants originated from different hospitals. Moreover, the patients suffering from optic neuritis post-infection recovered after receiving proper treatment at local hospitals, which possibly decreased the incidence of infective optic neuritis in this clinical trial. However, it is urgently required to conduct multi-center epidemiological study for children with optic neuritis to further clarify the underlying etiology of optic neuritis.

For the optic neuritis patients aged >45 years, the incidence of tumor-related optic neuritis (paraneoplastic syndrome) increased compared with those in other groups. Among the 45 patients in the >45 years group, three cases were diagnosed with paraneoplastic syndrome. In addition, one had a history of carcinoma, and the other two patients were found to have malignant tumors during hospitalization (one case with small cell lung cancer and the other case with lymphoma).

The incidences of infective optic neuritis in the >45 years and <16 years groups were higher than that in the 16–45 years group. However, the source of infection differed between the >45 and <16 years groups. In the >45 years group, 3 of 4 infective optic neuritis patients had neurosyphilis, whereas most patients aged <16 years had virus infection and ethmoid sinus inflammation.

In all groups, idiopathic demyelinating optic neuritis and optic neuritis with unknown reasons are the dominant reasons. However, the participants in this study were not followed up. However, long-term follow-up should be performed to analyze the etiology of optic neuritis, especially the progress from idiopathic demyelinating optic neuritis to multiple sclerosis or neuromyelitis optica and the diagnosis of inflammatory optic neuropathy, etc. According to the survey by Chang[4] from Taiwan, only 18.6% of cases with idiopathic demyelinating optic neuritis evolved into multiple sclerosis after over 5-year follow-up, while the figure reported by American Research Group of optic neuritis was 36.0%. Hence, the etiology of optic neuritis among the Chinese population remains to be investigated.

Moreover, gender and affected eyes (monocular/binocular) did not differ among different groups. However, more female patients had optic neuritis compared with male counterparts in all groups, indicating that optic neuritis is more likely to affect female subjects of all ages than male ones. Previous studies found that the incidence of binocular optic neuritis in children was higher than those in other patients, whereas no statistical significance was noted between <16 years group and the remaining groups. The results revealed that the percentage of binocular optic neuritis for all groups was high (up to 60.87%).

Conclusion

The etiology of optic neuritis differs among patients of various ages. For the children affected by optic neuritis, the proportion of neuromyelitis optica

and infective optic neuritis is relatively high. Sources of infection include virus, vaccination, and nasosinusitis. In the >45 years group, the percentage of infective optic neuritis is higher compared with that in the 16–45 years group, while syphilis is the most common infection factor. In addition, paraneoplastic syndrome should be precluded for old patients with optic neuritis.

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