Objective. To study the epidemiology of multiple sclerosis in Hong Kong Chinese.

Design. Cross-sectional questionnaire survey.

Setting. Neurology and paediatric neurology departments in Hong Kong from January through June 1999.

Participants. All confirmed multiple sclerosis patients.

Main outcome measures. Demographic data, investigation results, Kurtzke’s Expanded Disability Status Scale during the last follow-up visit, number of relapses between 1997 and 1998, and treatments used/currently in use.

Results. Fifty-three Chinese multiple sclerosis patients were identified. The prevalence was thus estimated to be 0.77 per 100,000 population. This low prevalence was also noted in other multiple sclerosis studies from South-East Asia (range, 0.8-4 per 100,000 population). The female to male ratio among the Chinese multiple sclerosis sufferers was 9.6:1, a figure somewhat higher than that reported in the other studies from South-East Asia (range, 3.2-6.6:1). The Chinese multiple sclerosis patients in this study also had a high spinal cord involvement (66%) and a low presence of cerebrospinal fluid oligoclonal banding (40%). These findings were different from those in Caucasian multiple sclerosis patients.

Conclusion. Multiple sclerosis in Hong Kong Chinese has a low prevalence, a high female to male ratio, and a low cerebrospinal fluid oligoclonal banding presence.

Introduction

Multiple sclerosis (MS) is a particularly devastating disease of the central nervous system (CNS), as it strikes predominantly young adults during their most productive years. Even when patients are asymptomatic, they cannot predict when their condition will relapse again. The use of interferon and other immunomodulating therapies has been shown to be effective in the treatment of MS. For
example, studies have clearly shown that patients on interferon treatment have significantly longer mean symptom-free periods, shorter hospitalisation stays, and less burden of disease according to magnetic resonance imaging (MRI) brain scans.1-4 However, these trials involved Caucasian MS sufferers, and to date there have been no controlled trials of interferon treatment in Chinese MS sufferers. Although it is tempting to assume that Chinese MS patients will respond to interferon treatment in the same way as their Caucasian counterparts, a study in Japan has shown that not only do Asians have a lower prevalence of the disease, but also a different pattern, suggesting heterogeneity in the immunogenetic background.5 Accordingly, this survey was designed to study the prevalence of MS in Hong Kong Chinese and to characterise the clinical features of the disease.

Methods

Between January and June 1999, a territory-wide, cross-sectional survey of MS patients in Hong Kong was carried out among all neurologists and some paediatric neurologists who look after paediatric MS patients. Questionnaires concerning patients’ demographic and clinical characteristics were compiled. Investigation results including computed tomography (CT), MRI, evoked potential studies, and lumbar puncture studies (cerebrospinal fluid [CSF] oligoclonal banding) were also documented. Patients’ clinical status, ie degree of neurological impairment, were assessed using Kurtzke’s Expanded Disability Status Scale (EDSS).6 The number of relapses patients experienced over a 2-year period (1997-1998) were recorded, as were their past and present treatment.

In some hospitals where there was no neurologist, the questionnaires were sent to physicians with an interest in neurology. To ensure that they were fully completed, the questionnaires were followed-up by telephone. Hospital visits and reviews of case notes were carried out on demand to confirm the diagnosis and current status of MS sufferers. Patients remained anonymous throughout the data collection process, thereby protecting their privacy, and only those who had been followed-up in the 2 years prior to the study (ie 1997-1998) were included in the survey.

Results

Fifty-three Chinese MS patients were identified, of whom 48 were women and five were men. Fifty-one patients already had their diagnoses established by neurologists, while the two remaining MS sufferers had their diagnoses confirmed after neurologists had the opportunity to review their hospital records. Two non-Chinese (Caucasian) MS patients were also identified, but were not recruited to this survey.

The patients’ demographic and clinical characteristics (Tables 1 and 2), evoked potential and CSF oligoclonal banding results (Table 3), and use of immunomodulating therapies (Table 4), are summarised. Two patients had a family history of the disease. For each patient, the clinical course of the disease was classified according to the criteria suggested by Poser et al:7 relapsing-remitting type; secondary progressive type; primary progressive type; or progressive relapsing type.

Investigations

Fifty-two of the 53 patients had MRI and/or CT scans of the brain/spinal cord. Of these, 46 (ie 88% of the total number of patients and 87% of the number with scans) had...
abnormalities that were compatible with the diagnosis of MS. These patients belonged to the clinically definite diagnostic group that had laboratory-supported evidence. The remaining seven patients belonged to the clinically possible diagnostic group, because some investigations, such as MRI, were not performed. Thirty-five patients had paraesthesia at the onset of their disease indicating spinal cord involvement. Nineteen (36%) patients had selective involvement of their optic nerves and spinal cords. Of these, four (7.5%) had normal MRI brain scans, and were included because they satisfied the diagnostic criteria.

The questionnaire revealed that only 25 (47%) of the 53 patients had their CSF sent for oligoclonal banding, a test that helps confirm the diagnosis of MS. Of these, 10 (40%) had banding present, namely: four (40%) out of 10 patients who presented during a relapsing phase of their disease; and six (40%) out of 15 patients who presented during a non-relapsing phase of their disease.

**Clinical status**

The mean EDSS was 3.0 (range, 0-8.0) at the time of diagnosis, increasing to 3.6 (range, 0-8.5) by the last follow-up visit. In other words, these MS patients, who on average started with moderate disability were more disabled after 2 years, although they still remained ambulatory. The mean number of relapses during the 2-year period (1997-1998) was 1.1.

**Discussion**

Hong Kong has a population of 6.8 million people, of whom more than 99.7% are of southern Chinese origin. This study thus shows that the prevalence of Chinese MS sufferers is at least 0.77 per 100,000 population. There are 42 hospitals in Hong Kong, of which 11 are general hospitals receiving referrals. For complicated diseases, such as MS, patients will most likely be referred to these hospitals. Hence, we targeted all the neurologists at these 11 referral hospitals and followed-up our questionnaires by telephone.

In the event, the neurologists and their hospital notes provided a comprehensive catchment for all MS patients in Hong Kong. At the time the survey was conducted (1999), there were 35 neurologists in Hong Kong. This group formed a small scientific community characterised by frequent academic and social meetings. Moreover, they had a track record of frequent, successful collaborative studies for diseases, such as epilepsy, stroke, tuberculous meningitis, and Creutzfeldt-Jacob disease. Added to this, all relevant records in public hospitals had been computerised and coded using the International Classification of Disease coding system. When MS patients were at an advanced stage of their disease, ie with high EDSS step and much debilitation, they were cared for by the out-reach medical staff of public hospitals, the Community Geriatric Ambulatory Team.

It is possible that information from one neurologist who looked after another two MS patients was overlooked. When we cross-checked our data with the only MS patient support group in our locality, the number of participants was small, and all were under the care of (known) neurologists.

The Chinese MS patient population is a very specific and highly selected group. Because of its small size, we tried to identify every individual through stringent diagnostic criteria, and then only to count those who were being actively followed-up, as this would provide maximum patient information. Those MS sufferers who did not attend any follow-up, or who were being followed-up under the care of private practitioners, would thus have been beyond the reach of our survey. However, we believed this number to be very small, as the treatment provided by public hospitals was relatively inexpensive and also of a high standard.

A study reported by Yu et al in 1989 found that the prevalence of MS in Hong Kong Chinese was 0.88 per 100,000 population. Hence, the local prevalence of MS in Chinese appears to have remained persistently low over the intervening 10-year period. Our study also showed a high female to male ratio of MS sufferers (9.6:1). In 1999, the female to male ratio among the general population of Hong Kong was 49.7:50.3. This combination of a low prevalence of MS and a high female to male ratio has also been observed in several other South-East Asian cities/countries (Table 5). In each case, the female to male ratio is much higher than in western MS, where it is about 1.5:1. We thus conclude that low prevalence and high female to male ratio are two characteristics of MS in Asians. The prevalence of MS in the West varies from 5-25/100,000 in Italy to 59-103/100,000 in Sardinia. Comparatively, Asian MS has a much lower prevalence.

Notably, less than half of the patients had their CSF sent for oligoclonal banding, which was present in 40%, regardless of whether they were in a relapsing or non-relapsing phase of their disease. This figure is much lower than that reported for western MS, in which about 80% to 90% of patients show positive banding. However, positive banding in the CSF is not a pathognomonic feature for MS, and nowadays many patients will be investigated with MRI instead of a lumbar puncture.

Most (72%) patients in this study had relapse-remitting-type MS, of whom a further majority (71%) had EDSS steps between 0 and 5.0, meaning that they remained ambulatory. Caucasian MS patients with these disease characteristics

<table>
<thead>
<tr>
<th>City/country</th>
<th>Prevalence (per 100,000 population)</th>
<th>Female/male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hong Kong</td>
<td>0.77-0.88*</td>
<td>9.6:1*</td>
</tr>
<tr>
<td>Malaysia†</td>
<td>2</td>
<td>6.6:1</td>
</tr>
<tr>
<td>Thailand‡</td>
<td>2</td>
<td>4:1</td>
</tr>
<tr>
<td>Japan§</td>
<td>4</td>
<td>2.1:1*</td>
</tr>
<tr>
<td>Taiwan‡‡</td>
<td>0.8</td>
<td>3.2:1</td>
</tr>
</tbody>
</table>

* Data from this study
are generally expected to benefit from receiving immuno-
modulating therapy. Whether this is also true for their
Chinese counterparts depends, of course, on the degree of
similarity between the two disease types.

Conclusions

This study has shown that the prevalence of MS in Hong
Kong Chinese was at least 0.77 per 100 000 population.
Taken together with the observed high female to male
ratio of sufferers and low CSF oligoclonal banding pres-
ence compared to that observed in western MS, these
findings may imply heterogeneity in the immunogenetic
background of the disease. Accordingly, the response of
Chinese MS patients to interferon treatment will be import-
ant to note. Given the small number of patients identified,
a randomised, placebo-controlled trial to test the efficacy
of interferon among Chinese MS sufferers in Hong Kong is
not feasible. Collaboration with other areas and countries
is necessary.

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References

1. The IFNB Multiple Sclerosis Study Group. Interferon beta-1b is
effective in relapsing-remitting multiple sclerosis. I. Clinical results
of a multicenter, randomized, double-blind, placebo-controlled trial.
2. Paty DW, Li DK. Interferon beta-1b is effective in relapsing-remitting
multiple sclerosis. II. MRI analysis results of a multicenter,
randomized, double-blind, placebo-controlled trial. Neurology 1993;
3. The IFNB Multiple Sclerosis Study Group and The University
of British Columbia MS/MRI Analysis Group. Interferon beta-1b in the
treatment of multiple sclerosis: final outcome of the randomized
4. PRISMS (Prevention of Relapses and Disability by Interferon beta-1a
Subcutaneously in Multiple Sclerosis) Randomised double-blind
placebo-controlled study of interferon beta-1a in relapsing/remitting
5. Kira J, Kanai T, Nishimura Y, et al. Western versus Asian types of
multiple sclerosis: immunogenetically and clinically distinct disorders.
6. Kurtzke JF. Rating neurological impairment in multiple sclerosis:
an expanded disability status scale (EDSS). Neurology 1983;33:
1444-52.
7. Poser CM, Paty DW, Scheinberg L, et al. New diagnostic criteria for
8. Yu YL, Woo E, Hawkins BR, Ho HC, Huang CY. Multiple sclerosis
9. Tan CT. Multiple sclerosis in Malaysia. Neurol J Southeast Asia
1997;2:1-5.
10. Vejjajiva A. Multiple sclerosis in Thailand. Neurol J Southeast Asia
11. Kuroiwa Y, Hung TP, Landsborough D, Park CS, Singhal BS. Multiple
12. Hung TP, Landsborough D, Hsi MS. Multiple sclerosis amongst
13. Rosati G. Descriptive epidemiology of multiple sclerosis in Europe
1645-74S.
14. Lau KK, Lee PO, Chan KY, Chan YW, Chin KF. Interferon treatment
for multiple sclerosis patients in Hong Kong. HKMJ 2000;6:221-3.