AN OUTBREAK OF GUILLAIN-BARRE SYNDROME IN THE NORTH WEST OF IRAN

Authors:
Mohammad Barzegar
Saeed Dastgiri
Mohammad Hassan Karegar Maher
Ali Varshochiani

Address:
Dr Saeed Dastgiri
Research Centre for Infectious diseases and National Public Health Management Centre
School of Medicine
Tabriz University of Medical Sciences
Tabriz
Iran
Tel: 0098 411 336 4668
Fax: 0098 411 336 4672
Email: saeed.dastgiri@gmail.com
ABSTRACT

Background: This study was carried out to investigate the incidence, annual time trend and possible outbreak of Guillain-Barre syndrome in children in the north west of Iran.

Methods: In this population-based cross sectional research, epidemiological and clinical features of 143 cases with Guillain-Barre syndrome between 2001 and 2006 were studied. The setting of the study was Tabriz Children Medical Centre, the major University-Hospital located in Tabriz city of the East Azarbaijan province covering whole region. Data collected included age, gender, chronological information, preceding events, functional grade of motor deficit.

Results: The mean age (standard deviation) of subjects was 5.4 (3.4). The male / female ratio was 1.3. The average annual incidence rate was 2.27 per 100 000 population of 15 years children (CI95%: 1.9-2.6). The majority of cases occurred in March, July and November and the highest proportion of the syndrome was observed in spring (29 percent, P>0.10).

Conclusions: The results indicated that an outbreak might have occurred in 2003 in the region. We concluded that a monitoring and surveillance system for Guillain-Barre syndrome is essential to set up in this region.

Key words: Guillain-barre syndrome, Epidemiology, Outbreak, Iran.
BACKGROUND

Guillain-Barre syndrome is an autoimmune disorder of peripheral nervous system causing progressive weakness and areflexia. Since the marked decline in poliomyelitis incidence, the syndrome is now the most common cause of acute flaccid paralysis in many countries (1). Epidemiologic studies have reported an annual incidence of 0.1-5 (per 100 000 population) from different, mostly developed, countries (2-12).

Although the disease is considered to be sporadic without significant variation over time, some studies have shown annual and seasonal trends (7, 9, 13-15).

The aim of this study was to determine the incidence and annual time trend of Guillain-Barre syndrome in children less than 15 years investigating whether an outbreak of this disease has occurred over the last few years in the north west of Iran.

METHODS

In this population-based cross sectional research, medical history and clinical diagnosis of 143 cases with Guillain-Barre syndrome between 2001 and 2006 were studied. The setting of the study was Tabriz Children Medical Centre, is the largest children medical center in the north-west area of Iran. This medical centre is a 200-bed acute care university hospital providing tertiary referral care for critically ill patients. The local policy is that all possible cases of Guillain-Barre syndrome should be referred to this hospital. All subjects were visited by expert child neurologist, and were then diagnosed and ascertained based on the criteria defined and introduced by Asbury and Cornblath (1).

Data collected included age, gender, chronological information, preceding events, functional grade of motor deficit and duration of illness. The functional grade of
motor deficit was calculated according to the standard Guillain-Barre syndrome score as follows: 0: healthy, 1: minor signs and symptoms and is capable of running; 2: able to walk 5 meters without assistance, but is unable to run. 3: able to walk with assistance, 4: confined to bed or chair bound, 5: requires assisted ventilation, and 6: died (16).

Poliovirus infection was excluded by cultures that are routinely performed for patients with acute flaccid paralysis as a requirement of the national program of poliomyelitis eradication.

Incidence rates and descriptive statistics were calculated to document the epidemiological features of the Guillain-Barre syndrome in the area. Data from the Ministry of Health, Statistics Office, were used to estimate the expected frequencies of the syndrome in the East Azarbaijan province to assess the occurrence of outbreak in the region.

RESULTS

Between 2001 and 2006, one hundred forty three cases of Guillain-Barre syndrome were diagnosed and ascertained in Tabriz Children university-hospital of Tabriz University of Medical Sciences, East Azarbaijan province, Iran.

Table-1 shows the basic characteristics of the study subjects. The mean age (standard deviation) of cases was 5.4 (3.6) years (range: 1-15 years). The male / female ratio was 1.3. The functional grade of motor deficit was scored 4 in the majority of the cases (67.1%). Fifteen patients (10.5%) received assisted ventilation, and two (1.4%) died.

Based on general population of the area, the average annual incidence rate was 2.27 per 100 000 population of 15 years children (CI95%: 1.9-2.6) in the area. The average
number of patients with Guillain-Barre syndrome per year ranged from 1.5 to 3.5 per 100 000 population of 15 years children.

There was a marginal significant variation in the trend in incidence rates (per 100 000 population of 15 years children) of Guillain-Barre syndrome between 2001 and 2006 indicating that an outbreak might have occurred in 2003 in the region (Figure 1). The same trend was observed for the year 2003 when the observed frequencies of the syndrome at the same region were compared to the expected values (Figure 2).

Figure 3 shows the occurrence of the Guillain-Barre syndrome in the north west of Iran by calendar months. The majority of cases occurred in March, July and November in the whole study period. The lowest and highest proportion of the syndrome occurred in summer (19.6 percent) and spring (28.7 percent), respectively (P>0.10).

DISCUSSION

We investigated the incidence, annual time trend and occurrence of Guillain-Barre syndrome in children in the north west of Iran.

Tabriz Children Hospital is the reference inpatient center for child neurology in the north-west of Iran. Therefore it is unlikely that patients with suspected Guillain-Barre syndrome were not visited/diagnosed/ascertained at this medical centre. However it is possible that some cases may have been missed, especially those with minor clinical signs and symptoms (grade 1) not requiring hospitalization. In our research, clinical features and incidence rate were similar to those reported from other studies (2-4, 7, 8, 10, 12-14). The highest incidence in the year 2003 was not related to any detectable pathogen agent as campylobacter jejuni is not routinely detected in this hospital.
However in an investigation carried out by authors from January 2003 to March 2005 in the same region, serological evidence of recent campylobacter jejuni infection was found in about half of children with Guillain-Barre syndrome (17).

Outbreaks of the disease have been reported from different areas in the last few decades. Investigators from Greece have reported an outbreak in year 2002 (7). A similar feature was studied/reported in Sweden in 1985 and 1992 (18). An increased incidence of Guillain-Barre syndrome in the USA for 1976 was attributed to "swine flu" vaccines (19). Another study from Caribbean island of Curacao showed that incidence rose sharply from 1.62 (per 100,000) between 1987 and 1991 to 3.10 (per 100,000) between 1992 and 1999 (20).

Although the disease is considered to be sporadic without significant variation between seasons and months, small clusters occurred in March, July and November and the highest proportion of the syndrome was observed in the spring. Small clusters have been associated with outbreaks of bacterial enteritis caused by contaminated water. A research report from China indicated that summer epidemics of the syndrome might be caused by campylobacter jejuni infection (21). In a study from Saudi Arabia, analysis of seasonal incidence has also shown that 40% of the cases occurred in the cold seasons with the highest peak in February (14).

The percentage of antecedent infectious disease in the subjects in our investigation was almost similar to the average proportions reported from previous studies (2-57, 8, 10-17).

In the time period of 2002-3, a similar high frequency of Guillain-Barre syndrome was reported from the whole country (including neighboring provinces of study area) in Iran. In seeking to explain this pattern, possible impact of some environmental
causal or influencing factors can not be ruled out. More studies are needed to investigate the etiology of this time pattern.

CONCLUSIONS

In conclusion, this study showed an unexpected occurrence of Guillain-Barre syndrome in the area and the whole country for 2003 indicating the necessity of an epidemiological surveillance system in the region for proper intervention in possible outbreaks in the future.

Competing interests: the authors have no financial or personal relationships with other people or organizations that could pose a conflict of interest in connection with the present work. Tabriz University of Medical Sciences supported the whole project.

Authors’ contributions: Mohammad Barzegar and Saeed Dastgiri designed this study and reviewed the data. Ali Varshochiani coordinated the data collection. Mohammad HK Maher and Saeed Dastgiri generated and analyzed the statistical data. All authors contributed to the writing of the paper.

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### Table 1- Basic characteristics of the study subjects with Guillain-Barre syndrome

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
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<tbody>
<tr>
<td><strong>Age (years)</strong></td>
<td>5.4</td>
<td>3.6</td>
<td>1</td>
<td>15</td>
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<tr>
<td><strong>Gender</strong></td>
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<tr>
<td>Male</td>
<td>81</td>
<td>56.5</td>
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<tr>
<td>Female</td>
<td>62</td>
<td>43.5</td>
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<td><strong>Preceding events</strong></td>
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<tr>
<td>Upper Respiratory Infection</td>
<td>75</td>
<td>52.4</td>
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<tr>
<td>Gastroenteritis</td>
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<td>14</td>
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<tr>
<td>Other</td>
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<tr>
<td>None</td>
<td>44</td>
<td>30.8</td>
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<tr>
<td><strong>Seasonal incidence</strong></td>
<td></td>
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<tr>
<td>Spring</td>
<td>41</td>
<td>28.7</td>
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<tr>
<td>Summer</td>
<td>28</td>
<td>19.6</td>
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<tr>
<td>Autumn</td>
<td>38</td>
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<tr>
<td>Winter</td>
<td>36</td>
<td>25.2</td>
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<td><strong>Functional grading of disease</strong></td>
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<tr>
<td>2</td>
<td>8</td>
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<tr>
<td>6</td>
<td>2</td>
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Figure 1- Incidence of the Guillain-Barre syndrome in the north west of Iran (per 100,000 of 15 years population)
Figure 2- Observed and expected frequency of the Guillain-Barre syndrome in the north west of Iran
Figure 3- Occurrence of the Guillain-Barre syndrome in the north west of Iran by calendar months