Study of Influenza Disease Burden among Children in Suzhou, China

Changpeng Liu1, Yongdong Yan2, Shuang Feng1, Liling Chen2, Yu Xia1, Genming Zhao1, Jun Zhang1, Tao Zhang1

1Department of Epidemiology at School of Public Health, Fudan University, 2Zhejiang University Affiliated Children’s Hospital 3Zhejiang CDC

Site presentation

The study was carried out in Suzhou University Affiliated Children Hospital (SCH) in Suzhou, China. Suzhou is a major city located in the southeast of Jiangsu Province in eastern China. It is one of the key cities in the Yangtze Delta, having an area of 8,488 km² and a population of approximately 12 million people. Suzhou consists of 5 municipal districts and 5 county-level cities. SCH is a comprehensive tertiary hospital for children, has a capacity of about 1000 beds. Annually, there are 560,000 outpatient visits including emergency visits and about 38,000 hospitalizations per year.

Since 2011, a enhanced surveillance on severe acute respiratory infection was carried out SCH. These provided a strong support for this GHSN project.

Methods

Inclusion

Pediatric patients (<14 years old) from respiratory wards with acute respiratory infection were included in the study, if they were residents in Suzhou or living in Suzhou longer than 6 months. In order to compare the differences between children in compliance with ILI definition (An acute respiratory infection with: measured fever of ≥ 38 C; cough or sore throat ; with onset within the last 7 days) or not, we included all the children except they were excluded by the following criteria.

Exclusion criteria

1. Institutionalized
2. Non-resident or not belonging to the predefined population in Suzhou
3. Hospitalized in the previous 3 days

Sample collection, management and laboratory procedures

A nasopharyngeal swab or aspirate was obtained from all enrolled children after obtaining informed consent.

All samples were aliquot in the SCH laboratory. Respiratory syncytial virus (RSV), Parainfluenza I,II,III, and Adenovirus were detected by direct immunofluorescence assay; Rhinovirus and Bocavirus were detected by PCR in SCH. Another aliquot was sending to Suzhou CDC’s reference laboratory with cold chain within 6 hours, to detect influenza virus (A/H1N1 and H3N2), and B(Yamagata, Victoria) by Real-time RT-PCR.

Data analysis

A descriptive analysis of the frequency of laboratory results by epidemiological week, age group, and comorbidities was conducted.

Results

A total of 1459 patients admitted to the respiratory wards in SCH with symptoms of respiratory infection were carefully screened. After opening the case report form, 193 patients were excluded because 120 patients were not residents in Suzhou, 3 patients were institutionalized, 70 patients were admitted to hospital for the same disease within 30 days. Finally, 1266 patients were included into data analysis. (Figure 1)

When comparing the positive rates among children with ILI or not, there were significant differences across influenza and RSV (p<0.001). As for the rhinovirus, parainfluenza virus, bocavirus and adenovirus, the differences were not statistically significant among children that were admitted more or less than seven days from the onset (P>0.05). (Table 2)

Table 3. The positive rate of children that were admitted more or less than seven days from the onset

<table>
<thead>
<tr>
<th>The interval from onset to admission</th>
<th>0~7/7 days (N=653)</th>
<th>8~14/7 days (N=613)</th>
</tr>
</thead>
<tbody>
<tr>
<td>influenza</td>
<td>105 (13.2)</td>
<td>84 (20.4)</td>
</tr>
<tr>
<td>A/H1N1</td>
<td>64 (7.5)</td>
<td>66 (16.0)</td>
</tr>
<tr>
<td>A/H3N2</td>
<td>7 (0.8)</td>
<td>20 (5.0)</td>
</tr>
<tr>
<td>B(Yamagata)</td>
<td>258 (39.5)</td>
<td>13 (6.6)</td>
</tr>
<tr>
<td>B/Victoria</td>
<td>10 (1.2)</td>
<td>30 (7.0)</td>
</tr>
<tr>
<td>Respiratory syncytial virus</td>
<td>186 (21.9)</td>
<td>22 (5.3)</td>
</tr>
<tr>
<td>Rhinovirus</td>
<td>68 (8.0)</td>
<td>32 (7.8)</td>
</tr>
<tr>
<td>Parainfluenza virus</td>
<td>34 (4.0)</td>
<td>34 (4.0)</td>
</tr>
<tr>
<td>Bocavirus</td>
<td>40 (4.7)</td>
<td>13 (3.2)</td>
</tr>
<tr>
<td>Adenovirus</td>
<td>70 (8.8)</td>
<td>81 (13.9)</td>
</tr>
</tbody>
</table>

The positive rate of influenza and RSV (p<0.001) among children admitted more or less than 7 days from the onset were significant different. (Table 3)

Key aspects & challenges

- In 2017-2018 influenza season, the average positive rate of influenza virus was 12.5% in Suzhou, China. In this season, the dominant prevalent virus was influenza A/H1N1, which peaked in January.
- The vaccination rate of influenza vaccine is low, it’s hard to estimate the VE because the number of cases is too small.
- To identify more influenza infective cases, we improved our surveillance system and the workload increased. In addition, it took us more than one month to complete the case report form, which lead to delay in uploading data online.

Contact: Tao ZHANG, 86-13585834192, lzhang@shmu.edu.cn
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