Guillain-Barré Syndrome Following Viral Infections: Considerations for Future Treatment and Research

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As the world’s population grows in an explosive way, the circumstances we live in become more crowded than ever in human history. Although medicine and biotechnology have developed tremendously in the new century, the growing density of population has brought us unexpected challenges in public health. This not only causes the emergence of new viruses but also makes coinfection and super-infection more common than previously (Table 1). However, the symptoms of these infections, although severe and life threatening in extreme cases, share some common characteristics in outcomes. Many of them cause Guillain-Barré syndrome (GBS) and respiratory emergency. The case reported by Hariharan et al. has provided a good reference for the treatment outcomes of such conditions.

GBS is an autoimmune disorder, in which the immune system attacks the peripheral nervous system. It causes muscle weakness, due to damage to nerve cells and their supporting structures. Different types of GBS feature different types of immune attack. Although it is a relatively rare event, GBS could be life threatening, with bulbar and respiratory involvement. It is reported that infections, especially those that cause GBS and/or respiratory emergency, need proper treatment and that's where we should provide corresponding care to the patients. In Table 1, the main viruses causing pandemics in recent years are listed. One thing worth noticing is that most of these viruses can cause GBS and/or respiratory emergency. As the emerging viruses like Zika virus have no proper vaccines to prevent infection, under a condition when there is a new virus pandemic without proper vaccines, the treatment of a severe lethal syndrome becomes the focus of emergency. This paper may provide some valuable references when coping with emerging viruses that can cause GBS and/or respiratory emergency.

Traditionally, the method to treat respiratory emergency usually involves surgical tracheostomy. In this case, percutaneous dilatational tracheostomy (PCT) was performed instead of classical tracheostomy. Compared to the old method, PCT has a smaller size of incision and quicker recovery. Also, PCT is supposed to be a bedside procedure that can be performed by every physician, with less assistance and material. These traits fit the requirements when there is a breakout of viruses and large numbers of patients need to be taken care of. PCT could be a potential lifesaving method when facing certain future emerging virus attacks that cause respiratory emergency. Another critical method used in this case report is IV-Ig immune therapy. Based on the response of the patients while the treatments were going on, it is clear that IV-Ig here plays a key role in the patient’s recovery. However, this is not surprising, for IV-Ig immune therapy is already a routine method to treat GBS clinically.

In summary, although this case report provided a specific condition of combined chikingunya and Dengue infection, it could become very typical in future virus pandemics. The successful treatment of this condition provided valuable reference for emerging virus pandemics that may require a similar treatment for GBS and life-threatening breathing problems.

Abbreviations: GBS, Guillain-Barré syndrome; PCT, percutaneous dilatational tracheostomy.

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Table 1. Recent virus pandemics and their relationship to Guillain-Barré syndrome and respiratory distress syndrome

<table>
<thead>
<tr>
<th>Outbreaks</th>
<th>Year</th>
<th>May cause Guillain-Barré syndrome</th>
<th>May cause respiratory distress syndrome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe acute respiratory syndrome</td>
<td>2002–2003</td>
<td>Unknown</td>
<td>Yes1</td>
</tr>
<tr>
<td>Chikungunya</td>
<td>2006</td>
<td>Yes2</td>
<td>Yes3</td>
</tr>
<tr>
<td>Zika virus in Yap Island, Federated States of Micronesia</td>
<td>2007</td>
<td>Yes4</td>
<td>Unknown</td>
</tr>
<tr>
<td>H1N1 influenza</td>
<td>2009–2010</td>
<td>Yes5</td>
<td>Yes6</td>
</tr>
<tr>
<td>Measles in Congo</td>
<td>2010–now</td>
<td>Unknown</td>
<td>Yes7</td>
</tr>
<tr>
<td>Middle East respiratory syndrome</td>
<td>2012–now</td>
<td>Unknown</td>
<td>Yes8</td>
</tr>
<tr>
<td>Zika virus in French Polynesia</td>
<td>2013–2014</td>
<td>Yes9</td>
<td>Yes10</td>
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<tr>
<td>Chikungunya</td>
<td>2013–now</td>
<td>Yes2</td>
<td>Yes3</td>
</tr>
<tr>
<td>Ebola in West Africa</td>
<td>2013–now</td>
<td>Unknown</td>
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<td>Zika virus in Brazil and Colombia</td>
<td>2015–now</td>
<td>Yes12</td>
<td>Yes10</td>
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<tr>
<td>Dengue fever in Hawaii and tropical Asian islands</td>
<td>2015, 2017–now</td>
<td>Yes13</td>
<td>Yes14</td>
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</table>

References


