Guillain-Barre Syndrome Following PCV Vaccine

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Received Date: January 19, 2017, Accepted Date: April 21, 2017, Published Date: April 28, 2017.

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Abstract

Guillain-Barre syndrome (GBS) is a rapid-onset muscle weakness caused by the immune system attacking the peripheral nervous system. Although the cause of GBS remains elusive, one theory is that this disorder is an autoimmune reaction to vaccination. The association of GBS following pneumococcal vaccine remains to be studied. This case report highlights a woman who was able to sit up on a chair and respiratory failure completely resolved. Patient continued to improve on her muscular weakness but did express moving forward, she could tolerate more aggressive physical therapy.

Introduction

Guillain-Barre Syndrome (GBS) is a neurological disorder causing acute flaccid paralysis and characterized by varying degrees of weakness, sensory abnormalities and autonomic dysfunction. At present, GBS occurs worldwide with an incidence of 1 to 2 per 100,000 per year [1,2] and continues to be a life threatening disorder. Mortality rates in Europe and North America vary between 3% and 7% [3-6] mainly from an acute progressive stage of ventilator insufficiency, respiratory failure or autonomic dysfunction including arrhythmias. Although the cause of GBS remains to be clearly understood, previous literature indicated an association between vaccinations and GBS. Most notably, the evidence for a causal association is strongest for the swine influenza vaccine that was used in 1976-1977 [7-11] but subsequent evidence found little or no association [12]. The association of GBS following pneumococcal vaccine remains to be one of the vaccinations with sparse previous literature. Here we have a case of a woman with a diagnosis of Guillain-Barre followed by paralysis after the administration of PCV vaccine.

Discussion

Guillain Barre is an immune disorder resulting from autoimmune antibodies that cross-react with epitopes on peripheral nerves, leading to limb weakness. Early initiation of intravenous immunoglobulin (IVig) or plasma exchange is of proven benefit especially in those with rapidly progressive weakness [14]. Recently, IVig has replaced plasma exchange in many treatment centers due to its convenience and availability. Hence, IVig was administered over plasma exchange in this case.

GBS is commonly linked to different infections, particularly Campylobacter jejuni enteritis, however unwanted autoimmune does not arise in most individuals (> 99%) exposed to C. jejuni [15]. The major mechanism resulting in the autoimmunity by adjuvant vaccinations has been proposed to be due to the epitopes of a vaccine that initiates the development of antibodies and/or T cells that could cross-react with epitopes on myelin or axonal
glycosidase GM1 was not detected in subjects infected with or vaccinated against the H1N1 virus [17], but they were detected in a patient who developed GBS associated with the pandemic influenza vaccine [18]. There were far fewer cases reported with GBS development after administration of the pneumococcal vaccine however.

Streptococcus pneumonia cause invasive pneumococcal diseases (IPD), such as bacteraemia and meningitis, non-invasive infections, such as acute otitis media, sinusitis and mastoiditis, and pneumonia, which can be either invasive (bacteremic pneumonia) or non-invasive (non-bacteremic pneumonia). They are polysaccharide-encapsulated, gram positive, lancet-shaped organisms and pneumococcal vaccines rely on these capsules to induce a serotype-specific immune response. There are two types of pneumococcal vaccines, plain and conjugated, that have different mechanisms. The plain polysaccharide vaccines are T-cell independent antigens that cross-link B-cell receptors inducing immediate differentiation to plasma cells then antibodies. In contrast, conjugated vaccines elicit a T-cell dependent response. The polysaccharide conjugated to a carrier protein uses MHC class-II dependent response to present the carrier protein to carrier-peptide-specific helper T cells. This leads to enhancement of the B-cell immune response, so that the antibody response is of greater specificity and functionality [19]. One paper indicated that the GM1-specific B cells pre-exist in peripheral blood and respond to T cell dependent stimulation in Guillain-Barré syndrome and multifocal motor neuropathy [20]. Thus, it can be inferred that the conjugated vaccine produces the enhanced B-cell immune response leading to autoimmune reaction to the peripheral nerves.

Despite the adverse event highlighted in this case, overall incidence of serious adverse events ranged from 1.2% to 5.8% among persons vaccinated with PCV13, and 2.4% to 5.5% among persons vaccinated with PPSV23 1–6 months from initial dose. Common adverse reactions reported with the vaccines were pain, redness, fatigue, headache, chills, generalized muscle pain, and joint pain [21]. The low numbers of reported GBS cases that were temporally associated with vaccinations, including PCV, indicates that conjugated vaccines are safe. Lower hospital prevention of deep vein thrombosis and physical rehabilitation in the acute and sub-acute setting [29]. Although systemic reviews have shown that intravenous immunoglobulin (IVIg) lead to quick recovery of GBS patients, concomitant use with other treatments such as ventilation, prevention of deep vein thrombosis and physical rehabilitation have been recommended and effective [24–28]. Lower hospital mortality and improvement in survival have been documented for GBS patients receiving physiotherapy and high-intensity rehabilitation in the acute and sub-acute setting [29]. Although there have been major strides in the management and treatment of Guillain-Barre syndrome, there are still many unresolved issues surrounding pathogenesis. All reported cases of GBS are thus crucial in the determination of the causes of GBS and achieving a good, long-term outcome.

References


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