Clinical Manifestations, Serology and Epidemiology of Guillain-Barré Syndrome

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In 2005, Hughes et al gave a seminar in which Guillain-Barré syndrome consists of at least four subtypes of acute peripheral neuropathy. The histological appearance of the acute inflammatory demyelinating polyradiculoneuropathy (AIDP) subtype resembles experimental autoimmune neuritis, which is predominantly caused by T cells directed against peptides from the myelin proteins P0, P2, and PMP22. The role of T-cell-mediated immunity in AIDP remains unclear and there is evidence for the involvement of antibodies and complement. Strong evidence now exists that axonal subtypes of Guillain-Barré syndrome, acute motor axonal neuropathy (AMAN), and acute motor and sensory axonal neuropathy (AMSAN), are caused by antibodies to gangliosides on the axolemma that target macrophages to invade the axon at the node of Ranvier. About a quarter of patients with Guillain-Barré syndrome have had a recent Campylobacter jejuni infection, and axonal forms of the disease are especially common in these people. The lipo-oligosaccharide from the C jejuni bacterial wall contains ganglioside-like structures and its injection into rabbits induces a neuropathy that resembles acute motor axonal neuropathy. Antibodies to GM1, GM1b, GD1a, and GalNac-GD1a are in particularly implicated in acute motor axonal neuropathy and, with the exception of GalNacGD1a, in acute motor and sensory axonal neuropathy. The Fisher's syndrome subtype is especially associated with antibodies to GQ1b, and similar cross-reactivity with ganglioside structures in the wall of C jejuni has been discovered. Anti-GQ1b antibodies have been shown to damage the motor nerve terminal in vitro by a complement-mediated mechanism [(1)].

There were some reports about GBS in Taiwan. In 1993, Lin et at conducted an etiology registration study of 520 patients with generalized neuropathies from 5 medical centers mainly in northern Taiwan. There were 21 patients with GBS [(2)]. In 1994, Huang et al retrospectively reported seventy-two children with Guillain-Barré syndrome (GBS), diagnosed at 11 major teaching hospitals in Taiwan during the period 1986-1990 and roughly estimated the annual incidence of GBS in Taiwan as 0.66 per 100,000 and that the course of childhood GBS is relatively benign [(3)]. In 1997, Lyu et al reported 167 consecutive GBS patients who are seasonal preponderance in the Spring (March to May). Utilising clinical and electrophysiological data, these 167 patients with Guillain-Barré syndrome were subclassified; 82 (49%) had acute inflammatory demyelinating polyradiculoneuropathy (AIDP), 32 (19%) had Fisher syndrome (FS), and six (4%) had axonal forms of Guillain-Barré syndrome. The remaining 47 (28%) patients were unclassified [(4)].

In 2010, Pithadia et at documented a review about GBS [(5)] in which based on well-controlled population-based studies, the incidence of GBS in Europe is 1.2-1.9

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cases per 100,000, whereas worldwide, the incidence is 0.6-4 cases per 100,000. Atypical presentations, such as Fisher syndrome, are much less frequent, with an incidence of 0.1 per 100,000. Men are 1.5 times more likely to be affected than women, and the incidence increases with age from 1 per 100,000 in those aged below 30 years to about 4 cases per 100,000 in those older than 75 years [6]. In China, the incidence in adults is 0.66 cases per 100,000. About two thirds of GBS cases have an antecedent infection within six weeks prior to symptom onset, generally an upper respiratory tract infection or gastroenteritis. Although the pathological organism is not often identified, the usual infectious agents associated with subsequent GBS include Epstein-Barr virus, Mycoplasma pneumoniae, Campylobacter jejuni and cytomegalovirus. In China, summer epidemics of the AMAN form of GBS were found to be secondary to infection with Campylobacter jejuni. In addition to antecedent infections, GBS develops after vaccination. Concerns about vaccine-induced GBS were first raised following the 1976-77 influenza vaccinating season, when a statistically significant increased risk of GBS was reported within 6-8 weeks of receiving the "swine flu" vaccine. Subsequently, studies that investigated the relationship between GBS and influenza immunization reported low relative risks that were not statistically significant. A combined analysis of the 1992-93 and 1993-94 vaccine campaigns in the USA reported a marginally increased risk of GBS (1 extra case of GBS for every 1 million vaccines) following influenza vaccination during the 6 weeks following immunization, a result recently confirmed in a Canadian study. Further, GBS has been reported after immunization with the hepatitis vaccine and the meningococcal conjugate vaccine (MCV4) [7-14]. However, the incidence of GBS after immunization was not different from the background incidence of GBS, thereby precluding any firm conclusions about the significance of these findings.

In 2012, Wang et al reported a relationship between influenza vaccines and Guillain-Barré syndrome-associated antiganglioside antibodies. Although the correlation between antiganglioside antibody cross-reactivity and glycosylation of viruses suggests the role of shared carbohydrate epitopes, no correlation was observed between hemagglutinin-inhibition titers and the induction of antiganglioside antibodies after influenza vaccination [15].

In 2011, Dr. Sejvar et al from Centers for Disease Control and Prevention (CDC) in USA reported a systemic review and meta-analysis of population incidence of Guillain-Barré syndrome (GBS) in Western countries. They performed a meta-analysis of articles on GBS incidence by searching Medline (1966-2009), Embase (1988-2009), Cinahl (1981-2009) and CABI (1973-2009) as well as article bibliographies. They included studies from North America and Europe with at least 20 cases, and used population-based data, subject matter experts to confirmed GBS diagnosis, and accepted GBS case definition. In the data of 1643 cases and 152.7 million person-years of follow-up, they found that GBS incidence increased by 20% for every 10-year increased in age; the risk of GBS was higher for males than females [16].

The varieties of clinical manifestations, epidemiology, electrophysiological findings, pertinent ganglioside antibodies and treatments of GBS were reported in several literatures. The relationship between influenza vaccines and Guillan Barré syndrome was still in debate. There is no biological marker to reliably diagnose GBS. Nevertheless, the application of syndrome-based case definitions utilizing expert neurologist chart review is superior to relying on administrative data such as hospital discharge (International Classification of Diseases) codes, which are less specific and often overestimate true incidence. The multidimentional appearances of Guillain Barré syndrome are needed to be further clarified in Taiwan.

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