Disease modifying therapy in multiple sclerosis in the upcoming years

Christian Philipp Kamm

Just 20 years ago, in 1993, the first immunomodulatory drug (interferon beta-1b; Betaseron®/Betraferon®) was approved for the therapy of relapsing-remitting multiple sclerosis (RRMS), turning multiple sclerosis (MS) into a treatable disease. This achievement was due to a better understanding of the immunological pathomechanisms responsible for the inflammatory disease processes that damage the central nervous system, ultimatively leading to disability. In the following decade, two other interferon beta compounds (interferon beta-1a; Avonex®, Rebif®) and glatiramer acetate (Copaxone®), a synthetic copolymer, were approved in the treatment of RRMS. These agents, nowadays called "basic therapeutics" reduce the annualised relapse rate by approximately 30% without the risk of severe side effects.

In the following years up to today, tremendous research activity has resulted in the development of numerous drugs that have proved to be effective in RRMS. Natalizumab (Tysabri®), the first humanised monoclonal antibody for the treatment of MS, which reduces the annualised relapse rate by 68%, was approved in 2007. In 2011, fingolimod (Gilenya®) was approved as the first oral disease-modifying agent, which reduces the annualised relapse rate by 54%. Furthermore, several new drugs have lately been proved in randomised controlled Phase III trials to be effective in RRMS, and are either recently approved in some countries or expected to be approved in the near future. Even more drugs are currently being studied in laboratories and early clinical trials. Therefore, one can truly speak of a "new era" in the treatment of MS as these new therapeutic options, with up to 12 drugs available at the end of 2014, will certainly lead to better care of MS patients.

However, it must be said that none of the approved and upcoming drugs support the regeneration of damaged tissue or substantially improve the degenerative disease process, which explains their lack of efficacy in the progressive types of MS (primary progressive MS [PPMS]; secondary progressive MS [SPMS]).

With regard to the growing number of therapeutics with their different modes of action, application methods, efficacy, tolerability and safety profiles, a future challenge will be to choose the most efficacious, safe, tolerable and suitable drug for the individual patient. This is especially important as higher efficacy of these drugs tends to be accompanied by rare, but serious, adverse events. For example, MS patients treated with the highly effective drug natalizumab have an overall risk of 2.97‰ of developing progressive multifocal leucencephalopathy (PML), a JC-virus infection of the brain that is lethal in 20% of patients and leads to considerable neurological impairment in most survivors. However, risk stratification is possible, facilitating the usage of natalizumab in the individual patient.

In this issue, [1] Anastasia Zekeridou and Myriam Schluep give an overview of the approved and upcoming therapies in MS with emphasise on the therapeutic implementations of these drugs in future treatment algorithms and in the treatment of the individual patient.

Reference

1 Zekeridou A, Schluep M. New treatment options and complications in multiple sclerosis. Swiss Arch Neuol Psychiat. 2013;7:232–5.