

Juvenile Myasthenia Gravis

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Myasthenia gravis (MG) is caused by abnormal immune reaction against components of the neuromuscular junction. The main manifestations of MG are fatigue, eyelid droopiness, double vision, swallowing



problems, nasal speech, shortness of breath, and muscle weakness. Juvenile myasthenia gravis (JMG) is applied to MG occurring between 0-19 years of age. JMG should be differentiated from neonatal MG, when antibodies from a myasthenic mother cause weakness in the baby; and from congenital myasthenia, which is caused by a genetic abnormality (mutation) in specific neuromuscular junction proteins. Congenital myasthenia usually manifests in the first year of life, but the onset of the symptoms maybe later, including adulthood.

Among Asians, MG presents by adolescence age in about 50%, most commonly between ages two and four. On the other hand, JMG accounts for only 10-15% of MG patients in the Western countries.

JMG can be diagnosed with a blood test which looks for antibodies against the acetylcholine receptors, AChR. This test is positive in 85-90% of patients who have generalized weakness, and in 50% of patients in whom the disease is limited to eyelid droopiness and/or double vision. About 30% of patients with JMG who test negative for antibodies to AChR test positively for antibodies to muscle specific tyrosine kinase (MuSK). Electromyography is often used to diagnose JMG, especially in patients who test negative to both AChR and MuSK antibodies. Cancer of the thymus (thymoma) is very rare in patients with JMG.

The treatment of JMG involves management of symptoms as well as treatment of the underlying immune disturbance. Pyridostigmine is the most commonly used medication to treat myasthenic symptoms, and may be adequate for mildly affected patients. Thymectomy (removal of thymus gland) may result in remission or reduced disease activity, and is often used in the affected adolescents. Thymectomy should probably be avoided in MuSK positive patients and very young JMG patients. Steroids (usually oral prednisone) are usually effective and are considered the first line immunomodulatory treatment in JMA. Steroid treatment - especially long term, high dose therapy - is associated with significant side effects. Therefore, immunosuppressants such as azathioprine, cyclosporine, mycophenolate, cyclophosphamide and tacrolimus are frequently used as steroid sparing agents, in order to decrease the dose of steroids or discontinue them. Long term treatment with immunosuppressants such as azathioprine is associated with increased risk of malignancy and infertility. Intravenous immunoglobulin (IVIG) and plasma exchange (PLEX) are commonly used in myasthenia exacerbations, i.e., when there is severe weakness causing respiratory failure and/or significant swallowing impairment. Less commonly, IVIG or PLEX are used on a regular basis in patients who have been intolerant or resistant to oral medications. Emerging treatments such as monoclonal antibodies provide the prospect of effective treatment of JMG with less pronounced side effects. Rituximab, which is given intravenously and is approved to be used in lymphoma and rheumatoid arthritis, has been successfully used in some patients with treatment refractory JMG.