Myasthenia Gravis

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Myasthenia Gravis (MG): chronic autoimmune disorder of the post-synaptic membrane at the neuromuscular junction in skeletal muscle

Causes:

- Autoimmune disorder
- Type II hypersensitivity reaction

Pathophysiology:

- Thymus considered source of autoantibody production
- Autoantibodies target and destroy postsynaptic nicotinic acetylcholine receptors of neuromuscular junction → decreased acetylcholine receptor function
- Acetylcholine cannot bind → normal action potentials cannot be generated in the adjacent muscle

Presentation

- Age of onset - 20-30 years old (typically female); 60-70 years old (typically male)
- Fluctuating muscle weakness in oropharyngeal and/or appendicular muscles - exacerbated by repetitive muscle use/ worse towards end of day
- Improves with rest
- Normal sensation and reflexes
- Drooping eyelids
- Double vision

Myasthenic crisis:

- Decreased respiratory muscle function → life-threatening respiratory failure
- Occurs spontaneously or secondary to surgery, infection, immunosuppressant medication withdrawal

Diagnosis

- CT scan of chest - to detect abnormalities of thymus
- Serological test - to detect presence of acetylcholine receptor antibodies
- Repetitive nerve stimulation study - decreased successive muscle action potential amplitude
- Tensilon test - prolongs acetylcholine presence in neuromuscular junction - rapid improvement in weakness
- Pulmonary function test - Reduced FVC suggests respiratory muscle compromise

Management

Sub-acute/chronic rehabilitation:

- Respiratory muscle training in pateints with impaired respiratory function - induces diaphragm hypertrophy + improved neural control of the respiratory muscles
- Low - medium intensity aerobic exercise & strength training - should be supervised and focus on large muscle groups
- Balance strategy training - includes standing stability on foam with eyes closed & tandem-walking with head turns +/- dual cognitive task
- Education regarding the fluctuating nature of their symptoms, including weakness and exercise-induced fatigue
- Teach pursed-lip breathing - splints airways open for longer - reduces pulmonary air trapping by reducing breathing rate and dyspnoea
- Functional electrical stimulation - low supporting evidence for this - may preserve the muscle mass of critically ill patients with active myasthenic crisis

Medical: IV immungolobulin, corticosteroids, avoidance of beta blockers & specific classes of antibiotics, acetylcholinesterase inhibitors and thymectomy for patients with thymoma

Want to learn more?

With AcePhysio the learning journey doesn't stop here! Take a look at our further reading recommendations below to become an expert in Myasthenia Gravis:

1. Davidson, L., Hale, L., & Mulligan, H. (2005). Exercise prescription in the physiotherapeutic management of Myasthenia Gravis: a case report. *NZ Journal of Physiotherapy*, 33(1). 13-18
2. Nastuk, M.A. (2013). Myasthenia gravis. Magill's Medical Guide, (Online Edition). Scheer, B.V., Valero-Burgos, E., & Costa, R. (2012). Myasthenia gravis and endurance exercise. Am. J. Phys. Med. Rehabil., 91(8). 725-727. Myasthenia Gravis Association. (n.d.). Exercise, Heat, & Nutrition.
3. Cortés-Vicente E, Gallardo E, Martínez MÁ, et al. Clinical characteristics of patients with double-seronegative myasthenia gravis and antibodies to cortactin. JAMA Neurol. 2016 Sep 1;73(9):1099-104