Myasthenia Gravis Testing

Last Literature Review: April 2019 Last Update: May 2023

The presence of acetylcholine receptor (AChR) antibodies that block or destroy receptors for the neurotransmitter acetylcholine traditionally defined myasthenia gravis (MG), an autoimmune disease caused by antibodies to neuromuscular and intramuscular elements impairing function and leading to muscle weakness and fatigue. However, this definition has expanded to include the presence of other autoantibodies, including muscle-specific kinase antibodies (MuSK).

Disease Overview

Incidence

3-30 per million/year

Prevalence

14-20/100,000 in U.S.

Age of Onset

- Mean age of onset
  - Females: 28 years
  - Males: 42 years
- Individuals <50 years: female predominance
- Individuals >60 years: no gender predominance
- Incidence rate increases with age for both genders

Symptoms

Main symptom: sporadic, fatigable muscle weakness

- Begins with mild weakness in limited muscle groups
  - Initially and most severely affects in ocular and bulbar muscles
  - 40% of individuals only experience weakness in ocular muscles initially
- Almost always progresses to weakness of multiple muscle groups within first year
  - 16% of individuals only experience weakness in ocular muscles after first year
  - Most serious condition results when respiratory muscles are affected, which may result in myasthenic crisis

Diagnostic Issues

- AChR antibody
  - Specific for MG
  - Presence does not correlate with disease severity
  - Detected in ~85% of patients with MG
  - Not detected in ~15% of patients (predominantly female) with MG who
    - Experience weakness in respiratory and bulbar muscles
    - Have antibodies against other neuromuscular junction proteins
- MuSK antibodies
  - Detected in ~6% of patients with MG
  - Should be assessed when patient is seronegative for AChR antibodies

Featured ARUP Testing

Acetylcholine Receptor Antibody Reflexive Panel 2001571

Method: Quantitative Radioimmunoassay/Semi-Quantitative Flow Cytometry

- Diagnose MG or confirm a clinical diagnosis of MG
- Preferred reflexive panel for MG diagnosis

Acetylcholine Receptor Antibodies and Striated Muscle Antibodies Reflexive Panels, and Titin Antibody 2005639

Method: Quantitative Radioimmunoassay/Semi-Quantitative Enzyme-Linked Immunosorbent Assay/Semi-Quantitative Indirect Fluorescent Antibody/Semi-Quantitative Flow Cytometry

Acceptable panel for MG diagnosis

Muscle-Specific Kinase (MuSK) Antibody, IgG by CBA-IFA with Reflex to Titer, Serum 3006198

Method: Semi-Quantitative Cell-Based Indirect Fluorescent Antibody

Secondary diagnostic testing for patients with generalized or ocular MG and no detectable antibodies to AChR

Acetylcholine Receptor Binding Antibody with reflex to Muscle-Specific Kinase (MuSK) Ab, IgG 3001868

Method: Quantitative Radioimmunoassay (RIA)

Diagnose MG or confirm a clinical diagnosis of MG

Myasthenia Gravis Reflexive Panel 3001869

Method: Quantitative Radioimmunoassay (RIA)/Semi-Quantitative Flow Cytometry

Extended panel for MG diagnosis

Autoimmune Neuromuscular Junction Reflexive Panel 3003017

Method: Quantitative Radioimmunoassay/Qualitative Radiobinding Assay/Semi-Quantitative Flow Cytometry/Semi-Quantitative Indirect Fluorescent Antibody

Acceptable panel for the differential diagnosis of acquired neuromuscular junction (NMJ) disorders

Striated Muscle Antibodies, IgG with Reflex to Titer 0050746

Method: Semi-Quantitative Indirect Fluorescent Antibody

- Secondary diagnostic testing for MG

- Titin and/or striated muscle antibodies
  - Characteristic of MG
  - Not specific to MG
  - Presence in early onset MG indicates ≥95% likelihood of underlying thymoma
  - Testing may be useful
    - In conjunction with AChR antibodies in the management of individuals with MG
    - In AChR antibody-negative MG

- Order if the primary tests are negative
- Differential evaluation of NMJ

Titin Antibody 2005636

Method: Semi-Quantitative Enzyme-Linked Immunosorbent Assay

- Secondary diagnostic testing for MG
- Order if the primary tests are negative
- Screen for presence of thymoma in patients with MG

Refer to Related Tests for individually orderable tests.

Testing Strategy

- Acetylcholine Receptor (AChR) Antibody Reflexive Panel tests for binding and blocking antibodies and reflexes to modulating antibody, and is the most cost-effective testing algorithm for the diagnosis of MG.
  - AChR testing should not be performed for patients who recently received radioisotopes for diagnostic or therapeutic reasons, due to the potential for false-positive results.
- Muscle-specific kinase (MuSK) antibody should be considered for patients who are AChR antibody seronegative.

Test Interpretation

Sensitivity

Combination of binding and blocking AChR antibody testing identifies 99.6% of population possessing AChR antibodies and is

- Positive in up to 90% of individuals with generalized MG
- Positive in 50-70% of individuals with purely ocular MG

Results

Paraneoplastic disease is likely when positive AChR modulating antibody is in conjunction with

- Striated muscle antibody titer of ≥1:80
- Titin antibody index value of 0.72
- Both antibodies (which usually indicates thymoma)

Limitations

Negative result does not rule out a diagnosis of MG

Additional Resources

Howard JF. Clinical overview of MG. Myasthenia Gravis Foundation of America. Accessed Jul 2019.

Phillips LH. The epidemiology of myasthenia gravis. *Ann N Y Acad Sci*. 2003;998:407-412.

Related Information

Myasthenia Gravis - MG

Related Tests

Acetylcholine Receptor Blocking Antibody 0099580

Method: Semi-Quantitative Flow Cytometry

Acetylcholine Receptor Modulating Antibody 0099521

Method: Semi-Quantitative Flow Cytometry

Acetylcholine Receptor Binding Antibody 0080009

Method: Quantitative Radioimmunoassay

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