Voltage-Gated Potassium Channel Antibody Disorders

Voltage-gated potassium channel antibody disorders include limbic encephalitis, faciobrachial dystonic seizures, and peripheral nerve hyperexcitability disorders that may occur following immunotherapy and/or plasmapheresis.

Disease Overview

Incidence

Unknown

Symptoms

- Limbic encephalitis (mainly LGI1 antibodies)
  - Amnesia
  - Seizures
  - Disorientation
  - Psychiatric disturbance
  - Peripheral nerve hyperexcitability
  - Neuromyotonia
  - CSF usually normal
- Morvan syndrome (mainly CASPR2 antibodies)
  - Limbic encephalitis
  - Neuromyotonia
  - Confusion
  - Amnesia
  - Insomnia
  - Pain
  - Autonomic dysfunction – hyperhidrosis, constipation, urinary incontinence

Diagnostic Issues

Antibody testing may aid in diagnosis

- Should be performed only when neuromuscular and/or neurological symptoms are present
- Anti-VGKC disorders are rare and present with symptoms similar to those of other encephalitic disorders
- Antibody testing should not be used for screening

Tests to Consider

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• Antibodies may be associated with paraneoplastic (autoimmune) or nonparaneoplastic neurological disorders
• Not all neurological disorders or antibodies are associated with tumors
  o In most antibody-mediated, non-neoplastic-associated diseases, individuals improve substantially with immunotherapy
  o Important to diagnose these illnesses due to therapeutic responsiveness

Physiology
• VGKC autoantibodies
  o Directed against a protein that is complexed with potassium channels in both peripheral nervous system and CNS
    ▪ CASPR2
      ▪ Present in ~50% of individuals with neuromyotonia
      ▪ CASPR2 antibodies are common in individuals with thymic malignancies
    ▪ LGI1
      ▪ Not directed against the potassium channels
      ▪ Associated with limbic encephalitis, faciobrachial dystonic seizures, hyponatremia, and myoclonic movements
      ▪ Disorders are rarely associated with tumors
• VGKC RIA test can be used as a general screen for VGKC-complex antibodies directed against
  o LGI1
  o CASPR2
  o Other unidentified targets

Test Interpretation

Results

VGKC Antibody, Serum
• Positive – >88 pmol/L
  o Suggests VGKC antibody-related disease
• Indeterminate – 32-87 pmol/L
  o Retest in 2-4 weeks
• Negative – 0-31 pmol/L
  o Likelihood of VGKC antibody-related disease is reduced but not necessarily eliminated

VGKC Antibody, CSF
• Positive – >1.1 pmol/L
  o Suggests VGKC antibody-related disease
• Negative – 0.0-1.1 pmol/L
Differential evaluation of encephalitis of unknown origin with subacute onset of seizures, confusion, memory loss, and/or behavioral change

Testing for LGI1 and CASPR2 antibodies always performed.

Panel includes NMDA receptor antibody, VGKC antibody, GAD65 antibody, AQP4 antibody.

For adults and patients with suspicion of cancer, additional evaluation of paraneoplastic autoantibodies is recommended. Individual tests in panel may also be ordered separately.

See Anti-NMDA Receptor (NR1) IgG Antibodies test fact sheet for more information on the evaluation of NMDA antibodies in autoimmune encephalitis.

Acceptable reflexive panel for the differential diagnosis of acquired neuromuscular junction disorders

Panel includes acetylcholine receptor binding, blocking, and modulating antibodies; VGKC antibody; VGCC antibody; titin antibody; striated muscle antibody; and LGI1 and CASPR2 antibodies

See Related Tests

Related Information

N-methyl-D-Aspartate (NMDA)-Type Glutamate Receptor Autoantibody Disorders - Anti-NMDA-Receptor Encephalitis
Paraneoplastic Neurological Syndromes and Associated Disorders - PNS
Paraneoplastic Neurological Syndromes Testing Algorithm

Related Tests

N-methyl-D-Aspartate Receptor Antibody, IgG, Serum with Reflex to Titer 2004221

Method: Semi-Quantitative Indirect Fluorescent Antibody

N-methyl-D-Aspartate Receptor Antibody, IgG, CSF with Reflex to Titer 2005164

Method: Semi-Quantitative Indirect Fluorescent Antibody

Glutamic Acid Decarboxylase Antibody 2001771
Method: Semi-quantitative Enzyme-Linked Immunosorbent Assay

Aquaporin-4 Receptor Antibody 2003036
Method: Semi-Quantitative Enzyme-Linked Immunosorbent Assay

Aquaporin-4 Receptor Antibody, IgG by IFA with Reflex to Titer, Serum 2013320
Method: Semi-Quantitative Indirect Fluorescent Antibody

Alpha-amino-3-hydroxy-5-methyl-4-isoxazolepropionic Acid (AMPA) Receptor Antibody, IgG by IFA with Reflex to Titer, Serum 3001260
Method: Semi-Quantitative Indirect Fluorescent Antibody

Gamma Aminobutyric Acid Receptor, Type B (GABA-BR) Antibody, IgG by IFA with Reflex to Titer, Serum 3001270
Method: Semi-Quantitative Indirect Fluorescent Antibody

Myelin Oligodendrocyte Glycoprotein (MOG) Antibody, IgG by IFA with Reflex to Titer, Serum 3001277
Method: Semi-Quantitative Indirect Fluorescent Antibody

Paraneoplastic Antibodies (PCCA/ANNA) by IFA with Reflex to Titer and Immunoblot 2007961
Method: Semi-Quantitative Indirect Fluorescent Antibody/Qualitative Immunoblot

Antinuclear Antibody (ANA) with HEp-2 Substrate, IgG by IFA 3000082
Method: Semi-Quantitative Indirect Fluorescent Antibody

ANCA-Associated Vasculitis Profile (ANCA/MPO/PR3) with Reflex to ANCA Titer 2006480
Method: Semi-Quantitative Indirect Fluorescent Antibody/Semi-Quantitative Multiplex Bead Assay

Antiphospholipid Syndrome Reflexive Panel 2003222
Method: Electromagnetic Mechanical Clot Detection/Semi-Quantitative Enzyme-Linked Immunosorbent Assay

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