Clinical Policy Title: Vestibular evoked myogenic potential testing

Clinical Policy Number: CCP.1276

Effective Date: April 1, 2017
Initial Review Date: October 19, 2016
Most Recent Review Date: November 6, 2018
Next Review Date: November 2019

Policy contains:

- Vestibular disorders.
- Cervical and ocular vestibular evoked myogenic potential.
- Vestibular function testing.

Related policies:

- CCP.1109 Brainstem auditory evoked response
- CCP.1359 Video head impulse testing
- CCP.1249 Tile table testing

ABOUT THIS POLICY: AmeriHealth Caritas has developed clinical policies to assist with making coverage determinations. AmeriHealth Caritas’ clinical policies are based on guidelines from established industry sources, such as the Centers for Medicare & Medicaid Services (CMS), state regulatory agencies, the American Medical Association (AMA), medical specialty professional societies, and peer-reviewed professional literature. These clinical policies along with other sources, such as plan benefits and state and federal laws and regulatory requirements, including any state- or plan-specific definition of “medically necessary,” and the specific facts of the particular situation are considered by AmeriHealth Caritas when making coverage determinations. In the event of conflict between this clinical policy and plan benefits and/or state or federal laws and/or regulatory requirements, the plan benefits and/or state and federal laws and/or regulatory requirements shall control. AmeriHealth Caritas’ clinical policies are for informational purposes only and not intended as medical advice or to direct treatment. Physicians and other health care providers are solely responsible for the treatment decisions for their patients. AmeriHealth Caritas’ clinical policies are reflective of evidence-based medicine at the time of review. As medical science evolves, AmeriHealth Caritas will update its clinical policies as necessary. AmeriHealth Caritas’ clinical policies are not guarantees of payment.

Coverage policy

AmeriHealth Caritas considers the use of vestibular evoked myogenic potential testing to be investigational and, therefore, not medically necessary.

Limitations:

None.

Alternative covered services:

- Clinical examination.
- Diagnostic imaging (e.g., magnetic resonance imaging and computerized tomography).
• Other tests as indicated to help rule out causes of imbalance unrelated to the vestibular system.
• Otoacoustic emissions.
• Electrocochleography.
• Brainstem auditory evoked response.
• Caloric tests.
• Electronystagmography.
• Videonystagmography.
• Rotation tests.

Background

Vestibular disorders result from damage to the parts of the inner ear and brain that process the sensory information involved with controlling balance and eye movements (Vestibular Disorders Association, 2018). Symptoms of vestibular disorders include vertigo and dizziness, imbalance and spatial disorientation, vision disturbance, hearing changes, cognitive and/or psychological changes, and other symptoms such as nausea and vomiting, motion sickness, and headaches.

Vestibular disorders are more common among the elderly, persons with diabetes, and persons with existing sensory disorders (Agrawal, 2013). They can adversely impact quality of life, activities of daily living and are associated with an increased risk of clinically significant outcomes (e.g., falls). In children, vestibular deficits can impair motor development and balance, and affect gaze stability that interferes with learning to read (Vestibular Disorders Association, 2018).

Etiologies include disease or injury to these sensory processing areas, genetic or environmental conditions, or unknown reasons (Vestibular Disorders Association, 2018). Benign paroxysmal positional vertigo is the most common vestibular disorder and may account for up to one-third of vertigo presentations to dizziness clinics (Agrawal, 2013). In children, vestibular migraine, benign paroxysmal positional vertigo, and vestibular neuritis are the three most common forms (Gioacchini, 2014; Agrawal, 2013). Other vestibular disorders include labyrinthitis and vestibular neuritis, Ménière’s disease, secondary endolymphatic hydrops, and perilymph fistula, superior canal dehiscence, acoustic neuroma, ototoxicity, enlarged vestibular aqueduct syndrome, and mal de débarquement (Vestibular Disorders Association, 2018).

Assessment of vestibular disorders involves testing of auditory, visual, and somatosensory systems that absorb information, as well as the associated nerves and brain centers that process the information and direct the appropriate response. The otolithic organs of the vestibular system (the saccule and utricle) sense motion according to their orientation. Vestibular evoked myogenic potential, also known as click evoked potential, is a noninvasive test that provides specific information about otolith function (Vestibular Disorders Association, 2018). It uses skin surface electrodes to measure muscle activity evoked in response to acoustic stimuli. Computer technology amplifies the myogenic response, which is averaged and presented as a vestibular evoked myogenic potential (Vestibular Disorders Association, 2018).
There are two main types of vestibular evoked myogenic potential for evaluating vestibular disorders that measure saccular or utricular function. Cervical vestibular evoked myogenic potential uses electrodes placed on the sternocleidomastoid muscle and is presumed to reflect the vestibulo-collic (or sacculo-collic) reflex, while ocular vestibular evoked myogenic potential employs electrodes on the ocular muscles below the eye believed to reflect the vestibule-ocular (or utrico-ocular) reflex (Hain, 2016).

**Searches**

AmeriHealth Caritas searched PubMed and the databases of:

- UK National Health Services Centre for Reviews and Dissemination.
- Agency for Healthcare Research and Quality.
- The Centers for Medicare & Medicaid Services.

We conducted searches on September 19, 2018. Search terms were: “Vestibule, Labyrinth/diagnosis” (MeSH), “Vestibular Evoked Myogenic Potentials” (MeSH), “Labyrinth Diseases/diagnosis” (MeSH), and the free text term "vestibular evoked myogenic potential."

We included:

- **Systematic reviews**, which pool results from multiple studies to achieve larger sample sizes and greater precision of effect estimation than in smaller primary studies. Systematic reviews use predetermined transparent methods to minimize bias, effectively treating the review as a scientific endeavor, and are thus rated highest in evidence-grading hierarchies.
- **Guidelines based on systematic reviews.**
- **Economic analyses**, such as cost-effectiveness, and benefit or utility studies (but not simple cost studies), reporting both costs and outcomes — sometimes referred to as efficiency studies — which also rank near the top of evidence hierarchies.

**Findings**

For this policy, we identified one systematic review and meta-analysis (Zhang, 2015), two studies with a narrative literature review addressing normal values for vestibular evoked myogenic potential (Blakley, 2015; Meyer, 2015), and five evidence-based guidelines (Lopez-Escamez, 2015; American Academy of Otolaryngology—Head and Neck Surgery, 2014; Nguyen, 2012; Bhattacharyya, 2008; Fife, 2000). The growing body of evidence consists of primarily small, observational studies assessing the diagnostic performance of vestibular evoked myogenic potential in persons with benign paroxysmal positional vertigo and, to a lesser extent, persons with Ménière’s disease.

The evidence is insufficient to support vestibular evoked myogenic potential testing for evaluating vestibular disorders. There is a lack of consensus regarding normal values, definition of an abnormal vestibular evoked myogenic potential, standardization of testing protocols, and clinical application. Patient characteristics and aspects of the technique can influence test results, and guidelines differ on the value of vestibular evoked myogenic potential testing in persons with benign paroxysmal positional vertigo or
Ménière’s disease, despite being the most widely studied applications. While it may have value as part of the battery of other accepted vestibular function tests, the selection of patients for whom addition vestibular evoked myogenic potential test information may be beneficial has not been established, nor has its impact on patient management been studied.

Policy updates:

The American Academy of Neurology updated their guideline on cervical and ocular vestibular evoked myogenic potential testing (Fife, 2017). They now include vestibular evoked myogenic potential testing in the battery of available tests for diagnosing superior canal dehiscence syndrome. The recommendations are based on limited low quality evidence suggesting cervical vestibular evoked myogenic potential and cervical vestibular evoked myogenic potential thresholds are lower than normal and amplitudes are higher than normal, but substantial uncertainty exists in the research. The clinical utility of vestibular evoked myogenic potential for all other vestibular disorders remains unclear. No policy changes are warranted at this time.

In 2018, we added an update of the American Academy of Otolaryngology—Head and Neck Surgery guideline on benign paroxysmal positional vertigo (Bhattacharyya, 2017). The guideline mentions vestibular evoked myogenic potential testing among the battery of diagnostic tests that can be considered, particularly to differentiate superior canal dehiscence syndrome from benign paroxysmal positional vertigo. As with the American Academy of Neurology (Fife, 2017) recommendations, these recommendations are based on very limited evidence, and questions of its clinical value remain (Noij, 2018). No policy changes are warranted.

Policy ID changed from CP# 10.01.03 to CCP.1276.

Summary of clinical evidence:

<table>
<thead>
<tr>
<th>Citation</th>
<th>Content, Methods, Recommendations</th>
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| Bhattacharyya (2008, updated 2017) for the American Academy of Otolaryngology—Head and Neck Surgery | Key points:  
- Vestibular evoked myogenic potential testing remains among the battery of testing available for diagnosing benign paroxysmal positional vertigo, and may be particularly useful for differentiating superior canal dehiscence syndrome from benign paroxysmal positional vertigo (based on very limited evidence). |
| Fife (2017) for the American Academy of Neurology | Key points:  
- Systematic review of 58 Class III studies (case-control study or cohort study that enrolled a narrow spectrum of persons with the condition or controls, used an acceptable reference standard and either an objective diagnostic test or performed and interpreted by different observers.  
- Evidence-based recommendations ([Level C = possibly effective]): |
<table>
<thead>
<tr>
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<th>Content, Methods, Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervical vestibular evoked myogenic potential stimulus threshold values (two studies), corrected cervical vestibular evoked myogenic potential amplitude (three studies), or ocular vestibular evoked myogenic potential amplitude (three studies) may distinguish superior canal dehiscence syndrome from controls (two studies). (Level C).</td>
<td>The role of vestibular evoked myogenic potential testing in diagnosing all other vestibular disorders is inconclusive.</td>
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Blakley (2015)  
Normal values for cervical vestibular evoked myogenic potential | Key points:  
- Literature review and case series (48 patients) at a tertiary academic center with no history of hearing loss or vestibular symptoms.  
- Normal values for cervical vestibular evoked myogenic potential parameters are statistically consistent in the literature.  
- The clinical significance of abnormal values has not been validated. For clinical purposes, cervical vestibular evoked myogenic potential "thresholds" should be reported.  
- Reporting of other parameters is optional. |

Lopez-Escamez (2015) for the Classification Committee for an International Classification of Vestibular Disorders  
Diagnostic criteria for Ménière’s disease | Key points:  
- Committee includes Bárány Society, The Japan Society for Equilibrium Research, the European Academy of Otology and Neurotology, the Equilibrium Committee of the American Academy of Otolaryngology—Head and Neck Surgery and the Korean Balance Society.  
- Definite Ménière’s disease is based on clinical criteria and requires observation of an episodic vertigo syndrome associated with low- to medium-frequency sensorineural hearing loss and fluctuating aural symptoms (hearing, tinnitus and/or fullness) in the affected ear. Duration of vertigo episodes is limited to a period between 20 minutes and 12 hours.  
- Probable Ménière’s disease is a broader concept defined by episodic vestibular aural symptoms occurring in a period from 20 minutes to 24 hours.  
- No mention of vestibular evoked myogenic potential testing. |

Meyer (2015)  
Cervical vestibular evoked myogenic potential: effects on response parameters and normative values | Key points:  
- Systematic review and meta-analysis of 60 reports.  
- Overall quality: unclear. Methods of review unclear.  
- Cervical vestibular evoked myogenic potential technique had significant effects on all response parameters.  
- Authors’ conclusions: Optimal stimulus and recording parameters suggested by previous research are confirmed. Variations in stimulus and recording parameters influence response parameter values. Authors suggested normative response values as a guideline for interpretation. |

Zhang (2015)  
Diagnostic value of vestibular evoked myogenic potentials in endolymphatic hydrops | Key points:  
- Meta-analysis of 30 studies (26 prospective, four retrospective). Likely overlapping study populations.  
- Overall quality: Moderate to high. Likely publication bias, no established gold standard, heterogeneous study designs with small sample sizes.  
- Sensitivity 49% (95% confidence interval [CI] 46% to 51%), specificity 95% (95% CI 93% to 97%). |
Citation | Content, Methods, Recommendations
--- | ---
94% to 96%), positive likelihood ratio 18.01 (95% CI 9.45 to 34.29), negative likelihood ratio 0.54 (95% CI 0.47 to 0.61), area under the summary receiver operating characteristic curve 0.78, and diagnostic odds ratio 39.89 (95% CI 20.13 to 79.03).

- Factors affecting diagnostic performance: (Caucasian patients vs. Asian patients, prospective design vs. retrospective design, healthy controls vs. patient controls, period between attacks vs. period during attacks, air conduction vs. bone conduction, ocular vestibular evoked myogenic potential vs. cervical vestibular evoked myogenic potential, comparison among different stages, tone burst vs. click, and funded projects vs. non-funded projects).

- Authors’ conclusion: vestibular evoked myogenic potentials test alone is not sufficient for Ménière’s disease or delayed endolymphatic hydrops diagnosis. It might be an important component of a test battery. Its high specificity and non-invasive nature might be a screening tool.

| Nguyen-Huynh (2012) | Key points: |
--- | ---
Evidence-based practice: management of vertigo | - Addressed management of benign paroxysmal positional vertigo.  
- Dix-Hallpike or supine head roll test recommended.  
- Repeated testing in separate occasions may be necessary to avoid missing the diagnosis.  
- No mention of vestibular evoked myogenic potential testing. |

**References**

**Professional society guidelines/other:**


**Peer-reviewed references:**


**Center for Medicare & Medicaid Services National Coverage Determinations:**

160.10 Evoked Response Tests. (Does not mention vestibular evoked myogenic potential).

**Local Coverage Determinations:**

L35007 Vestibular and audiologic function studies.

L34537 Vestibular function testing.

L33966 Vestibular function tests.

A54818 Vestibular function testing - coding guidelines.

**Commonly submitted codes**

Below are the most commonly submitted codes for the service(s)/item(s) subject to this policy. This is not an exhaustive list of codes. Providers are expected to consult the appropriate coding manuals and bill accordingly.

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<td>Auditory evoked potentials for evoked response audiometry and/or testing on the central</td>
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<td>H81.90-H81.93</td>
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