

Vestibular Evoked Myogenic Potential (VEMP) Testing

Policy MP-029

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Disclaimer:

1. Policies are subject to change in accordance with State and Federal notice requirements.
2. Policies outline coverage determinations for U of U Health Plans Commercial, and Healthy U (Medicaid) plans. Refer to the "Policy" section for more information.

Description:

Vertigo is the primary symptom of vestibular dysfunction. It can be experienced as illusory movement such as spinning, swaying, or tilting. Vertigo may be associated with a feeling of being pushed or pulled to the ground, blurred vision, nausea and vomiting, or postural and gait instability. Vertigo may arise from damage or dysfunction of the vestibular labyrinth, vestibular nerve, or central vestibular structures in the brainstem.

Vertigo may be caused by loose particles (otoconia) from the otolith organs that pass into one of the semicircular canals, most frequently the posterior canal. Specific head movements cause the particle to stimulate the canal, causing brief benign paroxysmal positional vertigo.

Vestibular evoked myogenic potential (VEMP) tests use newer techniques that allow loud sound (e.g., click, tone burst) or bone vibration (e.g., tendon hammer tap to the forehead or mastoid) to assess otolith function. Both the saccule and utricle are sensitive to sound as well as vibration and movement.

Cervical VEMPs (cVEMPs) use surface electrodes on the ipsilateral sternocleidomastoid muscle in the neck to be measured and are thought to originate primarily in the saccule of the inner ear. Although, abnormality in any part of the auditory cVEMP pathway (saccule, inferior vestibular nerve, vestibular nucleus, medial vestibulospinal tract, the accessory nucleus, the eleventh nerve, and sternocleidomastoid) can affect the response.

Ocular VEMPs (oVEMPs) use surface electrodes under the contralateral eye during an upward gaze, to detect subtle activity of an extraocular muscle and are thought to be due primarily to stimulation of the utricle. The vestibulo-ocular reflex stimulated by sound or vibration is very small, but synchronous bursts of activity of the extraocular muscles can be detected by electromyography. Lesions that affect the oVEMP may occur in the utricle, superior vestibular nerve, vestibular nucleus, and the crossed vestibulocochlear reflex pathways.

Policy Statement and Criteria

1. Commercial Plans

U of U Health Plans does NOT cover vestibular evoked myogenic potential (VEMP) testing as this testing is considered investigational.

2. Medicaid Plans

Coverage is determined by the State of Utah Medicaid program; if Utah State Medicaid has no published coverage position and InterQual criteria are not available, the U of U Health Plans Commercial criteria will apply. For the most up-to-date Medicaid policies and coverage, please visit their website at:

<http://health.utah.gov/medicaid/manuals/directory.php> or the [Utah Medicaid code Look-Up tool](#)

3. Medicare Plans

Coverage is determined by the Centers for Medicare and Medicaid Services (CMS); if a coverage determination has not been adopted by CMS and InterQual criteria are not available, the U of U Health Plans Commercial criteria will apply. For the most up-to-date Medicare policies and coverage, please visit their search website at:

<http://www.cms.gov/medicare-coverage-database/overview-and-quick-search.aspx?from2=search1.asp&> or [the manual website](#)

Clinical Rationale

In 2015, Weber et al reported on Vestibular evoked myogenic potential (VEMP) tests and how they use sound or vibration to stimulate the otolith organs. Cervical VEMP (cVEMP) measures evoked electrical potentials in the ipsilateral sternocleidomastoid muscle following stimulation of the saccule, while ocular VEMP (oVEMP) measures electrical potentials in the extraocular muscles contralateral to the utricle. There is large and rapid growing literature on VEMPs for the assessment of otolith function, although most studies assess how cVEMP and oVEMP change with various disease states. VEMPs have been evaluated in superior canal dehiscence, vestibular neuritis, benign paroxysmal positional vertigo (BPPV), vestibular schwannoma, Meniere disease, vestibular migraine, and central vestibular disorders.

A number of concerns arise about using VEMPs to assess the otolith organs. One issue is that sound and bone conduction stimuli are likely to influence senses other than the saccule and utricle, and stimulation of structures other than the utricle can affect the VEMP. In addition, VEMP responses have been shown to decrease with age, with a high rate of absent responses in normal older adults. Another is that latency and amplitude measures are very sensitive to variables that can be introduced by the examiner, as observed in a 2016 study by Welgampola et al that included 1038 patients whose ailments included vestibular migraine or neuritis, BPPV, somatoform, phobic postural vertigo, unilateral or bilateral vestibulopathy, Meniere disease, downbeat nystagmus syndrome, and other diagnoses. The authors observed significant differences between examiners for measures of oVEMP and cVEMP latencies, concluding that the field should “work on a better standard for VEMP recordings.

A 2017 cohort study by Hunter et al compared cVEMP and oVEMP testing in 39 individuals who had known superior semicircular canal dehiscence, with a control cohort of 84 age-matched symptom-free

individuals. Primary end points included peak-to-peak amplitudes of the 2 treatments and sensitivity and specificity. The authors observed that between cVEMP and oVEMP, cVEMP peak amplitudes (>214.3 μ V) were less effective overall for diagnosis of semicircular canal dehiscence (area under the curve [AUC], 0.731). At the 2 treatment centers from which patients were drawn, oVEMP amplitudes and cVEMP thresholds proved to be the superior tests (overall AUC scores, 0.856 and 0.912, respectively). For patients between 50 and 60 years of age, testing cVEMP threshold (<75 decibels) provided sensitivity of 100%, as well as good specificity (92.9%). Overall, findings suggested superiority of cVEMP thresholds or oVEMP amplitudes over measurement of cVEMP amplitudes.

Per Maheu et al (2017): "It is, however, important to remain cautious when associating endolymphatic hydrops (EH) with Ménière's disease (MD), since EH could also be present in individuals who do not have an MD diagnosis. Therefore, VEMP findings in the diagnosis of MD should be analyzed in the light of the symptoms described by the patients, but also using the results of other evaluations. In terms of diagnostic efficiency, modifications in cVEMP amplitude following glycerol or furosemide administration, BCV stimulation, and frequency sensitivity shift appear to be better supported than IAR and, thus, should be considered first when MD is suspected." The authors found that, further studies are needed to evaluate the usefulness of VEMP, using either BCV or ACS, for the early identification and the development of a proper classification of MD, which is of clinical importance when it comes to early intervention.

In a 2019 meta-analysis, Oya et al aimed to validate the clinical significance of cervical (c) and ocular (o) VEMP in BPPV. The authors found that p13 latency in cVEMP and n1 latency in oVEMP were slightly but significantly prolonged in BPPV patients compared to control patients. AR in oVEMP of BPPV patients also showed higher value than that of control patients. However, the n23 latency and AR in cVEMP and p1 latency in oVEMP showed no significant difference between BPPV and control patients. Furthermore, latencies in VEMPs also showed no significant difference between an affected and a non-affected ear in BPPV patients. In conclusion, although the results indicated that otolith dysfunction of BPPVs was detected by latencies in VEMPs and AR in oVEMP more sensitively reflects the difference between affected and non-affected ears in BPPV patients. The otolith dysfunction of BPPV might be induced by the systemic condition. Therefore, because the differences of latencies between BPPV patients and control patients were too small to use VEMPs as a prognostic predictor, further studies are needed.

The International Federation of Clinical Neurophysiology reported in a 2014 expert consensus document, on cervical vestibular evoked myogenic potential methods that the clinical use of VEMP's "is evolving and questions still exist about its underlying physiology and measurement."

The American Academy of Neurology's (AAN) practice guidelines from 2017 assessed the diagnostic value of vestibular evoked myogenic potential testing in individuals with vestibular symptoms. The conditions of interest included superior canal dehiscence syndrome, vestibular neuritis or migraine, Meniere disease, and benign paroxysmal positional vertigo (BPPV). The evidence for testing in BPPV was drawn from 2 class III studies, neither of which presented sufficient diagnostic value of VEMP testing for the treatment to be recommended.

A 2018 UpToDate article on Meniere disease states that in addition to diagnosis, VEMP testing might be useful for monitoring the disease progression and possibly identifying the active ear in patients with bilateral disease, however it is "an emerging technology that has not yet been standardized or fully validated clinically".

Applicable Coding

CPT Codes

92700 Unlisted otorhinolaryngological service or procedure

HCPCS Codes

No applicable codes

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