Clinical Policy: Digital EEG Spike Analysis

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Coding Implications
Revision Log

Description
Electroencephalography (EEG) is a significant component of epilepsy diagnosis, along with a thorough medical history and neurological workup. Most EEGs today are performed on digital machines which record data and automatically detect spikes that may indicate seizures (ACNS, 2008). For the purpose of this policy, digital EEG spike analysis, which also is known as 3D dipole localization or dipole source imaging, refers to additional analysis of digitally recorded EEG spikes by a technician and a physician. Digital EEG spike analysis is also called 3D dipole localization or dipole source imaging.

Policy/Criteria

I. It is the policy of PA Health & Wellness (PHW), that digital EEG spike analysis, including topographic voltage and/or dipole analysis, is **medically necessary** for the presurgical evaluation of members with intractable epilepsy, in conjunction with video EEG long-term monitoring.

II. It is the policy of PHW that digital EEG spike analysis is **not medically necessary** for any other indication.

Background
According to the American Clinical Neurophysiology Society's (ACNS) Guidelines for Long Term Monitoring of Epilepsy, digital EEG is the industry standard (2008). Ambulatory EEG, video EEG, and routine EEG all use digital technology and usually incorporate automatic spike detection. A report by the American Academy of Neurology (AAN) and the ACNS states that multiple well-designed studies have established automatic spike and seizure detection via digital EEG as highly sensitive, though not very specific (1997, p. 280). This is also true of EEG in general. There are several reasons that an EEG would record a false positive, and most EEG patterns can be caused by a wide variety of neurologic conditions, while many diseases can produce more than one type of EEG pattern (Moeller, Haider & Hirsch, 2015). Nonetheless, the AAN recommends EEG with automatic seizure and spike detection in clinical practice, commenting that "general clinical use in the community has been very positive" (AAN & ACNS, 1997). Automatic spike detection can save a great amount of time as a technician or electroencephalographer does not have to visually review hours or days of data. However, there are some circumstances in which further analysis of the EEG is required, beyond the automatic digital spike analysis.

The ACNS states that in general, 3D dipole localization would require an extra hour of work by a technician, and 20-30 minutes of physician time to review the technician's work and data produced. Moreover, digital EEG analysis by 3D dipole localization is an advanced procedure that is most commonly used at epilepsy surgery centers, where staff are familiar with how to perform it. The AAN and ACNS recommend further digital analysis, in conjunction with review

by a technician or provider, in the noninvasive evaluation of candidates for epilepsy surgery (AAN & ACNS, 1997, p. 281). They note that:

> "The well-designed studies of this specific technique [dipole analysis] are few but consistent and confirmed in follow-up postoperatively. The clinical rationale seems clear. Control testing for evoked potential known cortical generator sites has confirmed the technical accuracy of dipole localization. The use of dipole analysis seems sufficiently demonstrated to warrant its clinical use in patients undergoing evaluation for surgical therapy for epilepsy. In other clinical settings, it has not been demonstrated to be sufficiently clinically useful to warrant general clinical use at this time" (AAN & ACNS, 1997, p. 280).

It is important to note that the ACNS specifically states that ambulatory EEG is not appropriate for "detailed characterization of EEG features as is required in presurgical evaluation" (ACNS, 2008, p. 15).

3D spike dipole source analysis, or digital EEG spike analysis, has been shown to be concordant with other modes of presurgical evaluation of epilepsy, including a thorough neurological workup with video EEG, magnetic resonance imaging (MRI), and multiple other imaging and neuropsychological tests; electrocorticography; and magnetoencephalography (Park et al., 2015). Furthermore, Park and others cite three other studies demonstrating "that dipole source models can be successfully employed to detect the epileptogenic foci of interictal epileptiform discharges" (2015). Park and others agree with the AAN and ACNS that digital EEG spike analysis is "recommended for the presurgical evaluation of intractable epilepsy patients (2015).

Coding Implications

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CPT®* Codes	Procedure codes that support medical necessity criteria
95957	**Digital EEG spike analysis** when performed in conjunction with any of the following:
95718	Electroencephalogram (EEG), continuous recording, physician or other qualified health care professional review of recorded events, analysis of spike and seizure detection, interpretation and report, 2-12 hours of EEG recording; with video (VEEG)
95720	Electroencephalogram (EEG), continuous recording, physician or other qualified health care professional review of recorded events, analysis of spike and seizure detection, each increment of greater than 12 hours, up to 26 hours of EEG recording; interpretation and report after each 24-hour period; with video (VEEG)

CPT®* Codes	Procedure codes that support medical necessity criteria
95722	Electroencephalogram (EEG), continuous recording, physician or other qualified health care professional review of recorded events, analysis of spike and seizure detection, interpretation, and summary report, complete study, greater than 36 hours, up to 60 hours of EEG recording, with video (VEEG)
95724	Electroencephalogram (EEG), continuous recording, physician or other qualified health care professional review of recorded events, analysis of spike and seizure detection, interpretation, and summary report, complete study, greater than 60 hours, up to 84 hours of EEG, with video (VEEG)
95726	Electroencephalogram (EEG), continuous recording, physician or other qualified health care professional review of recorded events, analysis of spike and seizure detection, interpretation, and summary report, complete study, greater than 84 hours, with video (VEEG)

ICD-10-CM Diagnosis Codes that Support Coverage Criteria
+ indicates a code requiring an additional character

ICD-10-CM Code	Diagnosis codes that support medical necessity criteria
G40.011	Localization-related (focal) (partial) idiopathic epilepsy and epileptic syndromes with seizures of localized onset, intractable, with status epilepticus
G40.019	Localization-related (focal) (partial) idiopathic epilepsy and epileptic syndromes with seizures of localized onset, intractable, without status epilepticus
G40.111	Localization-related (focal) (partial) symptomatic epilepsy and epileptic syndromes with simple partial seizures, intractable, with status epilepticus
G40.119	Localization-related (focal) (partial) symptomatic epilepsy and epileptic syndromes with simple partial seizures, intractable, without status epilepticus
G40.211	Localization-related (focal) (partial) symptomatic epilepsy and epileptic syndromes with complex partial seizures, intractable, with status epilepticus
G40.219	Localization-related (focal) (partial) symptomatic epilepsy and epileptic syndromes with complex partial seizures, intractable, without status epilepticus
G40.311	Generalized idiopathic epilepsy and epileptic syndromes, intractable, with status epilepticus
G40.319	Generalized idiopathic epilepsy and epileptic syndromes, intractable, without status epilepticus
G40.411	Other generalized epilepsy and epileptic syndromes, intractable, with status epilepticus
G40.419	Other generalized epilepsy and epileptic syndromes, intractable. without status epilepticus
G40.803	Other epilepsy, intractable, with status epilepticus
G40.804	Other epilepsy, intractable, without status epilepticus
G40.813	Lennox-Gastaut syndrome, intractable, with status epilepticus
G40.814	Lennox-Gastaut syndrome, intractable, without status epilepticus
G40.823	Epileptic spasms, intractable, with status epilepticus
G40.824	Epileptic spasms, intractable, without status epilepticus
G40.911	Epilepsy, unspecified, intractable, with status epilepticus

ICD-10-CM Code	Diagnosis codes that support medical necessity criteria
G40.919	Epilepsy, unspecified, intractable, without status epilepticus
G40.A11	Absence epileptic syndrome, intractable, with status epilepticus
G40.A19	Absence epileptic syndrome, intractable, without status epilepticus
G40.B11	Juvenile myoclonic epilepsy, intractable, with status epilepticus
G40.B19	Juvenile myoclonic epilepsy, intractable without status epilepticus

Reviews, Revisions, and Approvals	Date	Approval Date
Policy created.	04/18	09/18
References reviewed and updated.	02/19	03/19
References reviewed and updated. Updated description. Removed Quantitative EEG from criteria I and reworded the statement. Removed CPT codes 95830, 95950, 95951, 95953, 95954, 95955, 95956 and 95958. Added CPT: 95718, 95720, 95722, 95724, 95726 (new codes for 2020.)		07/2020

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