Medical Coverage Policy | Remote Intraoperative Neurophysiologic (IONP) Monitoring

EFFECTIVE DATE: 03|01|2026
POLICY LAST REVIEWED: 05|20|2026

OVERVIEW

Intraoperative neurophysiologic (IONP) monitoring or Intraoperative Neurophysiological Monitoring (IOMN), collectively referred to as IONP in this policy, describes a variety of procedures used to monitor the integrity of neural pathways during high-risk neurosurgical, orthopedic, and vascular surgeries. It involves the detection of electrical signals produced by the nervous system in response to sensory or electrical stimuli to provide information about the functional integrity of neuronal structures.

Remote IONP monitoring is when IONP monitoring is provided from outside the operating room (remote or nearby) of either one case or more than one case at a time.

This policy addresses remote IONP monitoring services only.

MEDICAL CRITERIA

Not applicable

PRIOR AUTHORIZATION

Not applicable.

POLICY STATEMENT

Remote IONP Monitoring of One Case at a Time by a Qualified Neurologist, HCPCS Code G0453

Remote IONP monitoring of one case at a time by a physician (qualified neurologist), which may include somatosensory-evoked potentials, motor evoked potentials using transcranial electrical stimulation, brainstem auditory-evoked potentials, electromyography (EMG) of cranial nerves, electroencephalography (EEG), and electrocorticography (ECoG), may be considered medically necessary when ALL of the following criteria is met:

1. The number of individuals monitored by the physician (qualified neurologist) at one time does not exceed one; AND,
2. Monitoring is ordered by the operating surgeon; AND,
3. The surgical team (surgeon, anesthesiologist) and the monitoring team (technician, physician [qualified neurologist]) have a direct, real-time communication regarding the individual's status based on data interpretation; AND,
4. The monitoring is set up and performed in the operating room by an independent technologist present and in continuous attendance in the operating room whose sole function is monitoring and transmission of data for a single case; AND,
5. Remote IONP is being utilized for at least one of the following types of surgery:
    - Surgery of the aortic arch, its branch vessels, or thoracic aorta, including carotid artery surgery, when there is risk of cerebral or spinal cord ischemia
    - Resection of epileptogenic brain tissue or tumor
    - Resection of brain tissue close to the primary motor cortex and requiring brain mapping
    - Protection of cranial nerves:
        - Tumors that are optic, trigeminal, facial, auditory nerves
        - Resection of tumors involving the cranial nerves
        - Cavernous sinus tumors
        - Microvascular decompression of cranial nerves

    - Skull base surgery in the vicinity of the cranial nerves and surgeries of the foramen magnum
    - Oval or round window graft
- Endolymphatic shunt for Meniere's disease
- Vestibular section for vertigo
- Correction of scoliosis or deformity of spinal cord involving traction of the cord
- Protection of spinal cord where work is performed in close proximity to cord as in the placement or removal of old hardware or where there have been numerous interventions
- Spinal instrumentation requiring pedicle screws or distraction
- Decompressive procedures on the spinal cord or cauda equina carried out for myelopathy or claudication where function of spinal cord or spinal nerves is at risk
- Spinal cord tumors and spinal fractures (with the risk of cord compression)
- Neuromas of peripheral nerves of brachial plexus, when there is risk to major sensory or motor nerves
- Surgery or embolization for intracranial AV malformations
- Surgery for arteriovenous malformation of spinal cord
- Embolization of bronchial artery AVMs or tumors
- Cerebral vascular aneurysms
- Surgery for intractable movement disorders
- Arteriography, during which there is a test occlusion of the carotid artery
- Circulatory arrest with hypothermia (does not include surgeries performed under circulatory bypass [e.g., CABG, ventricular aneurysms])
- Distal aortic procedures, where there is risk of ischemia to spinal cord
- Leg lengthening procedures, where there is traction on sciatic nerve or other nerve trunks
- Basal ganglia movement disorders
- Surgery as a result of traumatic injury to spinal cord/brain
- Deep brain stimulation, and
- Certain thyroid surgeries:
    - high-risk total removal of a complete lobe of the thyroid; or,
    - removal of the entire gland; or,
    - surgery involves re-entry (re-operation) to a prior surgical field where scar tissue obscures the visual path of the recurrent laryngeal nerve.

Remote IONP monitoring of one case at a time by a physician (qualified neurologist) is considered not covered for Medicare Advantage Plans and not medically necessary for Commercial Products when the criteria above is not met.

Remote IONP Monitoring of More Than One Case at a Time by a Qualified Neurologist, CPT Code 95941

Remote IONP monitoring of more than one case at a time by a physician (qualified neurologist is considered not covered for Medicare Advantage Plans and not medically necessary for Commercial Products.

Additional Services that May Be Performed as Part of Remote IONP Monitoring

Additional services that may be performed as part of remote IONP monitoring (eg, somatosensory-evoked potentials, motor evoked potentials using transcranial electrical stimulation, brainstem auditory-evoked potentials, electromyography (EMG) of cranial nerves, electroencephalography (EEG), and electrocorticography (ECoG)) are covered when remote IONP monitoring is medically necessary. Refer to Coding section.

Additional services that may be performed as part of remote IONP monitoring (see above) are not covered for Medicare Advantage Plans and not medically necessary for Commercial Products when remote IONP

monitoring is not medically necessary as the evidence is insufficient to determine the effects of the technology on health outcomes. Refer to the Coding section.

Member's medical records must document that services are medically necessary for the care provided. Blue Cross Blue Shield of Rhode Island (BCBSRI) maintains the right to audit the services provided to our members, regardless of the participation status of the provider. All documentation must be available to BCBSRI upon request. Failure to produce the requested information may result in denial or retraction of payment.

COVERAGE

Benefits may vary between groups and contracts. Please refer to the appropriate Benefit Booklet, Evidence of Coverage or Subscriber Agreement for not medically necessary/not covered benefits/coverage.

BACKGROUND

Remote Intraoperative Neurophysiologic (IONP) Monitoring or Intraoperative neurophysiological monitoring (IONM)

The principal goal of IONP monitoring is the identification of nervous system impairment on the assumption that prompt intervention will prevent permanent deficits. Correctable factors at surgery include circulatory disturbance, excess compression from retraction, bony structures, hematomas, or mechanical stretching. The technology is continuously evolving with refinements in equipment and analytic techniques, including recording, with several patients monitored under the supervision of a physician who is outside the operating room. The different methodologies of monitoring are described below. Remote IONP monitoring is when IONP monitoring is provided from outside the operating room (remote or nearby) of either one case at a time or more than one case at a time while in the operating room.

Sensory-Evoked Potentials

Sensory-evoked potentials describe the responses of the sensory pathways to sensory or electrical stimuli. Intraoperative monitoring of sensory-evoked potentials is used to assess the functional integrity of central nervous system pathways during surgeries that put the spinal cord or brain at risk for significant ischemia or traumatic injury. The basic principles of sensory-evoked potential monitoring involve identification of a neurologic region at risk, selection and stimulation of a nerve that carries a signal through the at-risk region and recording and interpreting the signal at certain standardized points along the pathway. Monitoring of sensory-evoked potentials is commonly used in the following procedures: carotid endarterectomy, brain surgery involving vasculature, surgery with distraction compression or ischemia of the spinal cord and brainstem, and acoustic neuroma surgery. Sensory-evoked potentials can be further categorized by type of stimulation used.

Somatosensory-Evoked Potentials

Somatosensory-evoked potentials are cortical responses elicited by peripheral nerve stimulations. Peripheral nerves, such as the median, ulnar, or tibial nerves, are typically stimulated, but in some situations, the spinal cord may be stimulated directly. The recording is done either cortically or at the level of the spinal cord above the surgical procedure. Intraoperative monitoring of somatosensory-evoked potentials is most commonly used during orthopedic or neurologic surgery to prompt intervention to reduce surgically induced morbidity and/or to monitor the level of anesthesia. One of the most common indications for somatosensory-evoked potential monitoring is in patients undergoing corrective surgery for scoliosis. In this setting, somatosensory-evoked potential monitors the status of the posterior column pathways and thus does not reflect ischemia in the anterior (motor) pathways. Several different techniques are commonly used, including stimulation of a relevant peripheral nerve with monitoring from the scalp, from interspinous ligament needle electrodes, or from catheter electrodes in the epidural space.

Brainstem Auditory-Evoked Potentials

Brainstem auditory-evoked potentials are generated in response to auditory clicks and can define the functional status of the auditory nerve. Surgical resection of a cerebellopontine angle tumor, such as an

acoustic neuroma, places the auditory nerves at risk, and brainstem auditory-evoked potentials have been extensively used to monitor auditory function during these procedures.

Visual-Evoked Potentials
Visual-evoked potentials (VEPs) with light flashes are used to track visual signals from the retina to the occipital cortex. Visual-evoked potential (VEP) monitoring has been used for surgery on lesions near the optic chiasm. However, VEPs are very difficult to interpret due to their sensitivity to anesthesia, temperature, and blood pressure.

Motor-Evoked Potentials
Motor-evoked potentials are recorded from muscles following direct or transcranial electrical stimulation of motor cortex or pulsed magnetic stimulation provided using a coil placed over the head. Peripheral motor responses (muscle activity) are recorded by electrodes placed on the skin at prescribed points along the motor pathways. Motor-evoked potentials, especially when induced by magnetic stimulation, can be affected by anesthesia. The Digitimer electrical cortical stimulator received U.S. Food and Drug Administration (FDA) premarket approval in 2002. Devices for transcranial magnetic stimulation have not been approved by the FDA for this use.

Multimodal IONP monitoring, in which more than 1 technique is used, most commonly with somatosensory-evoked potentials and motor-evoked potentials, has also been described.

Electromyogram Monitoring and Nerve Conduction Velocity Measurements
Electromyogram (EMG) monitoring and nerve conduction velocity measurements can be performed in the operating room and may be used to assess the status of the cranial or peripheral nerves (eg, to identify the extent of nerve damage before nerve grafting or during resection of tumors). For procedures with a risk of vocal cord paralysis due to damage to the recurrent laryngeal nerve (ie, during carotid artery, thyroid, parathyroid, goiter, or anterior cervical spine procedures), monitoring of the vocal cords or vocal cord muscles has been performed. These techniques may also be used during procedures proximal to the nerve roots and peripheral nerves to assess the presence of excessive traction or other impairment. Surgery in the region of cranial nerves can be monitored by electrically stimulating the proximal (brain) end of the nerve and recording via EMG activity in the facial or neck muscles. Thus, monitoring is done in the direction opposite that of sensory-evoked potentials but the purpose is similar, to verify that the neural pathway is intact.

Electroencephalogram Monitoring
Spontaneous electroencephalogram (EEG) monitoring can also be used during surgery and can be subdivided as follows:

- EEG monitoring has been widely used to monitor cerebral ischemia secondary to carotid crossclamping during a carotid endarterectomy. EEG monitoring may identify those patients who would benefit from the use of a vascular shunt during the procedure to restore adequate cerebral perfusion. Conversely, shunts, which have an associated risk of iatrogenic complications, may be avoided in those patients with a normal EEG activity. Carotid endarterectomy may be done with the patient under local anesthesia so that monitoring of cortical function can be directly assessed.
- Electrocorticography is the recording of EEG activity directly from a surgically exposed cerebral cortex. Electrocorticography is typically used to define the sensory cortex and map the critical limits of a surgical resection. Electrocorticography recordings have been most frequently used to identify epileptogenic regions for resection. In these applications, electrocorticography does not constitute monitoring, per se.

Remote IONP monitoring, including somatosensory-evoked potentials and motorevoked potentials using transcranial electrical stimulation, brainstem auditory-evoked potentials, EMG of cranial nerves, EEG, and electrocorticography, has broad acceptance, particularly for spine surgery and open abdominal aorta aneurysm repairs. These indications have long been considered the standard of care, as evidenced by numerous society guidelines, including those from the American Academy of Neurology, American Clinical Neurophysiology

Society, American Association of Neurological Surgeons, Congress of Neurologic Surgeons, and American Association of Neuromuscular & Electrodiagnostic Medicine.

The Centers for Medicare & Medicaid Services Physician Fee Schedule Final Rule (2013) discussed payment of neurophysiologic monitoring. The rule states that CPT code 95940, which is reported when a physician monitors a patient directly, is payable by Medicare. CPT code 95941, which is used for remote monitoring, was made invalid for submission to Medicare. In the Final Rule, the Centers established a HCPCS G code for reporting physician monitoring performed from outside of the operating room (nearby or remotely). HCPCS code G0453 may be billed only for undivided attention by the monitoring physician to a single beneficiary [1:1 technologist to oversight physician billing], and not for simultaneous attention by the monitoring physician to more than one patient.

CODING

Medicare Advantage Plans and Commercial Products

The following HCPCS code(s) are medically necessary when the medical criteria above is met:

G0453 Continuous intraoperative neurophysiology monitoring, from outside the operating room (remote or nearby), per patient, (attention directed exclusively to one patient) each 15 minutes (list in addition to primary procedure)

The following CPT code(s) are not covered for Medicare Advantage Plans and not medically necessary for Commercial Products:

95941 Continuous intraoperative neurophysiology monitoring, from outside the operating room (remote or nearby) or for monitoring of more than one case while in the operating room, per hour (List separately in addition to code for primary procedure)

Additional Services Performed as Part of Remote IONP

The following CPT code(s) are covered only when remote IONP monitoring (HCPCS code G0453) is medically necessary:

Note: To ensure proper claim filing, when any of the CPT codes below are filed**,** the following modifier must be appended to the CPT code(s):

26 Professional component

51785 Needle electromyography studies (EMG) of anal or urethral sphincter, any technique
92653 Auditory evoked potentials; neurodiagnostic, with interpretation and report
95822 Electroencephalogram (EEG); recording in coma or sleep only
95812 Electroencephalogram (EEG) extended monitoring; 41-60 minutes
95813 Electroencephalogram (EEG) extended monitoring; 61-119 minutes
95861 Needle electromyography; 2 extremities with or without related paraspinal areas
95863 Needle electromyography; 3 extremities with or without related paraspinal areas
95864 Needle electromyography; 4 extremities with or without related paraspinal areas
95867 Needle electromyography; cranial nerve supplied muscle(s), unilateral
95868 Needle electromyography; cranial nerve supplied muscles, bilateral
95870 Needle electromyography; limited study of muscles in 1 extremity or non-limb (axial) muscles (unilateral or bilateral), other than thoracic paraspinal, cranial nerve supplied muscles, or sphincters
95886 Needle electromyography, each extremity, with related paraspinal areas, when performed, done with nerve conduction, amplitude and latency/velocity study; complete, five or more muscles studied, innervated by three or more nerves or four or more spinal levels (List separately in addition to code for primary procedure)
95907 Nerve conduction studies; 1-2 studies
95908 Nerve conduction studies; 3-4 studies
95909 Nerve conduction studies; 5-6 studies
95910 Nerve conduction studies; 7-8 studies
95911 Nerve conduction studies; 9-10 studies

95912 Nerve conduction studies; 11-12 studies
95913 Nerve conduction studies; 13 or more studies
95925 Short-latency somatosensory evoked potential study, stimulation of any/all peripheral nerves or skin sites, recording from the central nervous system; in upper limbs
95926 Short-latency somatosensory evoked potential study, stimulation of any/all peripheral nerves or skin sites, recording from the central nervous system; in lower limbs
95927 Short-latency somatosensory evoked potential study, stimulation of any/all peripheral nerves or skin sites, recording from the central nervous system; in the trunk or head
95928 Central motor evoked potential study (transcranial motor stimulation); upper limbs
95929 Central motor evoked potential study (transcranial motor stimulation); lower limbs
95930 Visual evoked potential (VEP) checkerboard or flash testing, central nervous system except glaucoma, with interpretation and report
95937 Neuromuscular junction testing (repetitive stimulation, paired stimuli), each nerve, any 1method
95938 Short-latency somatosensory evoked potential study, stimulation of any/all peripheral nerves or skin sites, recording from the central nervous system; in upper and lower limbs
95939 Central motor evoked potential study (transcranial motor stimulation); in upper and lower limbs
95955 Electroencephalogram (EEG) during nonintracranial surgery (eg, carotid surgery)
95999 Unlisted neurological or neuromuscular diagnostic procedure

RELATED POLICIES

Non Reimbursable Health Services
Out-of-Network Services Requests

PUBLISHED

Provider Update, January/July 2026
Provider Update, April 2024

REFERENCES

1. Centers for Medicare & Medicaid Services (CMS) National Coverage Determination (NCD) for Electroencephalographic Monitoring During Surgical Procedures Involving the Cerebral Vasculature (160.8).
2. Centers for Medicare & Medicaid Services (CMS) Local Coverage Determination (LCD) for Intraoperative Neurophysiological Testing (L35003)
3. Centers for Medicare & Medicaid Services (CMS) Local Coverage Determination (LCD) article for Billing and Coding: Intraoperative Neurophysiological Testing (A56722)
4. Centers for Medicare & Medicaid Services (CMS) Local Coverage Determination (LCD) for Intraoperative Neurophysiological Testing (L34623)
5. Centers for Medicare & Medicaid Services (CMS) Local Coverage Determination (LCD) article for Billing and Coding: Intraoperative Neurophysiological Testing (A57604)
6. Centers for Medicare & Medicaid Services (CMS), Billing Medicare for Remote Intraoperative Neurophysiology Monitoring in CY 2013. Updated September 2020; https://www.cms.gov/medicare/medicare-fee-for-service-payment/physicianfeesched/downloads/faq-remote-ionm.pdf.

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