

Reassessment: Neuroimaging in the Emergency Patient Presenting with Seizure

This evidence-based report provides clinicians with information to identify which seizure patients in the emergency department should receive expedited head CT imaging.

Case Presentation

A 46-year-old male presents to the emergency room after a witnessed seizure. He was watching television when his wife noted that he had loss of responsiveness, had slumped to the floor, and started jerking his left side. The episode lasted about two minutes. Wife reports that during the event his eyes were open and his jaw was clenched. He stopped breathing for a few seconds and then had shallow respirations. He had associated urinary incontinence. When the episode was over, he was poorly responsive for 20 minutes. He has no prior history of seizures or head trauma. He denies sleep deprivation, changes in his medications, or ETOH use. Medical history is significant for HIV infection. He stopped his HAART therapy several months ago. His CD4 count three weeks ago was 50. He has had no surgeries and is on no medications. He has no family history of seizure disorder. He smokes ½ pack of cigarettes a day and denies ETOH or drug abuse. Physical examination in the ED one hour after the event reveals a thin male in no acute distress. His vital signs including temperature are normal. His cranial nerve examination is normal. His motor examination reveals weakness over the left side to 4/5 in his arm and leg. His reflexes are 2/4 on the right and ¼ over the left side. He has decreased pinprick and vibration distally to his ankles. Coordination is slowed on the left side to finger to finger and heel to shin. Gait is abnormal secondary to weakness in the left leg.

What workup should be performed in the ED?¹

- The patient will need to have laboratory testing to include CBC, CHEM 10, LFT's, urine and serum tox screens.
- Imaging should be initiated with a head CT to evaluate for structural lesions. Contrast should be used if there are structural changes.
- In an individual with focal deficits, lumbar puncture is often indicated after head CT is performed to rule out increased intracranial pressure.

Do patients with first seizure, with AIDS, and focal deficits have a higher rate of abnormal head CT findings?

Yes.

What are the imaging finding on head CT for toxoplasmosis, primary CNS lymphoma, glioblastoma multiforme (GBM), and progressive multifocal leukoencephalopathy (PML)?

In 75% of cases of CNS toxoplasmosis, multiple subcortical lesions involving the basal ganglia are seen. Toxoplasmosis is typically hypodense on non-contrast head CT. When contrast is given, a ring enhancing area with an eccentric enhancing nodule may be seen, “eccentric target sign.”

Primary CNS lymphoma often manifests with leptomeningeal and periventricular involvement on head CT. Both CNS lymphoma and toxoplasmosis can be multifocal. CNS lymphoma can be hyperdense on non-contrast head CT.

On head CT, a GBM may appear as an irregular isodense or hypodense mass, often with a central area of hypodensity that is due to necrosis. With contrast, strong, heterogenous enhancement is seen. Multiple lesions may be seen.

The head CT in cases of PML can reveal a diffuse disorder or a mass lesion. Often there are multifocal, scalloping white matter hypodensities without mass effect or edema. Lesions may be confluent. Typically there is no enhancement with contrast, on occasion, faint enhancement may be seen.

Coding Discussion

For Part B billing, only **four diagnosis codes²** are allowed, so all of the manifestation codes cannot be listed. The patient presents to the ER with a single seizure. Epilepsy and/or recurrent seizures and underlying cause are not yet established so the most appropriate code here is:

780.39 Other convulsions

This is the code that would be used for the initial neuroimaging procedure.

Billing in this case would not occur until sometime after the neuroimaging procedure is done. If the study is negative, then the diagnoses are:

780.39 Other convulsions

342.00 Hemiplegia and hemiparesis, flaccid hemiplegia affecting unspecified

782.0 Disturbances of skin sensation

781.3 Lack of coordination

Since HIV has not yet been established as the condition leading to the seizure, the code, 042 HIV, would be listed after 780.39. If seizure is a “related condition” to the HIV infection, then 042 is always listed first.

Should the neuroimaging study indicate CNS toxoplasmosis, assuming HIV related, then the coding sequence would be:

042 HIV
130.0 Meningoencephalitis due to toxoplasmosis
780.39 Other convulsions
342.00 Hemiplegia and hemiparesis, flaccid hemiplegia, affecting unspecified side
782.0 Disturbances of skin sensation
781.3 Lack of coordination

Should the neuroimaging study indicate Primary CNS lymphoma, assuming HIV related, then the coding sequence would be:

042 HIV
200.50 Primary central nervous system lymphoma
780.39 Other convulsions
342.00 Hemiplegia and hemiparesis, flaccid hemiplegia, affecting unspecified side
782.0 Disturbances of skin sensation
781.3 Lack of coordination

Should the neuroimaging study indicate GBM, assuming not HIV related, the site of the tumor in the CNS is listed first:

191.x Malignant neoplasm of brain

This is followed by an “M-code” describing the specific tissue type of the glioblastoma. In this case it would not yet be known, so code:

M9440/3 Glioblastoma NOS
780.39 Other convulsions
342.00 Hemiplegia and hemiparesis, flaccid hemiplegia, affecting unspecified side
782.0 Disturbances of skin sensation
781.3 Lack of coordination

If PML is found, assuming this is related to the HIV, then code:

042 HIV
046.3 Progressive multifocal leukoencephalopathy
780.39 Other convulsions
342.00 Hemiplegia and hemiparesis, flaccid hemiplegia, affecting unspecified side
782.0 Disturbances of skin sensation
781.3 Lack of coordination

Consult in the Emergency Department (E&M)

<p>CPT® Code 99281</p>	<p>Focused History (chief complaint, 1-3 components of HPI) Focused Exam (limited to affected body area or organ system) Straightforward Medical Decision (min number of diagnoses or management options, min or no data to be reviewed, min risk of complications) Self Limited or Minor Problem (problem does not require physician presence or may involve supervision by a physician)</p>
<p>CPT® Code 99282</p>	<p>Expanded Problem Focused History (chief complaint, 1-3 components of HPI, 1 review of systems) Expanded Problem Focused Exam (affected body area or organ system, other symptomatic or related body area) Low Complexity Medical Decision Making (limited number of diagnoses or management options, limited data to be reviewed, low risk of complications) Low or Moderate Severity Problem</p>
<p>CPT® Code 99283</p>	<p>Expanded Problem Focused History (chief complaint, 1-3 components of HPI, 1 review of systems) Expanded Problem Focused Exam (affected body area or organ system, other symptomatic or related body area) Moderate Complexity Medical Decision Making (multiple diagnoses or management options, moderate data to be reviewed, moderate risk of complications) High Severity Problem</p>
<p>CPT® Code 99284</p>	<p>Detailed History (chief complaint, 4 components of HPI, 2-9 review of systems, directly related family or social history) Detailed Examination (extended examination of affected and other body areas) Moderate Complexity Decision Making (multiple diagnoses or management options, moderate data to be reviewed, moderate risk of complications) High Severity Problem</p>

CPT® Code 99285	Comprehensive History (chief complaint, 4 components of HPI, 10 or more review of systems, complete family or social history) Comprehensive Examination (complete single system detailed evaluation or complete multiple system evaluation) High Complexity Medical Decision (extensive diagnoses or management options, extensive data to be reviewed, high risk of complications) High Severity Problem
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Note: If the patient is admitted by the neurologist from the ED, then the inpatient consult codes are used instead.

1. Harden CL, Huff JS, Schwartz TH, et al. Reassessment: Neuroimaging in the emergency patient presenting with seizure (an evidence-based review): Report of the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology. *Neurology*® 2007;69(18):1772-80.
2. Centers for Disease Control and Prevention. International classification of diseases, ninth revision, clinical modification (ICD-9-CM). www.cdc.gov/nchs/icd/icd9cm.htm.

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