



# CLINICAL GUIDELINES

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## Head Imaging Policy

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eviCore healthcare Clinical Decision Support Tool Diagnostic Strategies: This tool addresses common symptoms and symptom complexes. Imaging requests for individuals with atypical symptoms or clinical presentations that are not specifically addressed will require physician review. Consultation with the referring physician, specialist and/or individual's Primary Care Physician (PCP) may provide additional insight.

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## HEAD IMAGING GUIDELINES

<b>ABBREVIATIONS</b>	<b>3</b>
HD-1~GENERAL GUIDELINES	4
HD-2~TASTE AND SMELL DISORDERS	9
HD-3~ATAXIA	10
HD-4~BEHAVIORAL DISORDERS	11
HD-5~CHIARI AND SKULL-BASE MALFORMATION	12
HD-6~FACIAL PALSY (BELL'S PALSY)	13
HD-7~RECURRENT LARYNGEAL PALSY	14
HD-8~DEMENTIA	15
HD-9~EPILEPSY/SEIZURES	18
HD-10~FACIAL PAIN/TRIGEMINAL NEURALGIA	19
HD-11~HEADACHE	20
HD-11~HEADACHE	21
HD-12 ANEURYSM AND AVM	26
HD-13~HEAD TRAUMA	29
HD-14~CNS INFECTION	30
HD-15~MOVEMENT DISORDERS	31
HD-16~MULTIPLE SCLEROSIS (MS) AND RELATED CONDITIONS	33
HD-17~PAPILLEDEMA/PSEUDOTUMOR CEREBRI	35
HD-18~PARESTHESIAS	36
HD-19~PITUITARY	37
HD-20~SCALP AND SKULL LESIONS	41
HD-21 STROKE/TIA	42
HD-22~CEREBRAL VASCULITIS	44
HD-23~DIZZINESS, VERTIGO AND SYNCOPE	45
HD-24~OTHER IMAGING STUDIES	47
HD-25~EPISTAXIS	51
HD-26~MASTOID DISEASE	52
HD-27~HEARING LOSS	53
HD-28~EAR PAIN (OTALGIA)	54
HD-29~SINUSITIS	55
HD-30~TEMPOROMANDIBULAR JOINT DISEASE (TMJ) AND DENTAL/PERIODONTAL/MAXILLOFACIAL IMAGING	57
HD-31~TINNITUS	59
HD-32~EYE DISORDERS	61
HD-33~ACOUSTIC NEUROMA & OTHER CEREBELLOPONTINE ANGLE TUMORS	63
HD-34~PINEAL CYSTS	64
HD-35~ARACHNOID CYSTS	65
HD-36~NUCLEAR MEDICINE	66

## ABBREVIATIONS for HEAD IMAGING GUIDELINES

<b>ACTH</b>	adrenocorticotrophic hormone
<b>AD</b>	Alzheimer's Disease
<b>ADH</b>	antidiuretic hormone
<b>AION</b>	arteritic ischemic optic neuritis
<b>AVM</b>	arteriovenous malformation
<b>CBCT</b>	Cone-beam computerized tomography
<b>CMV</b>	cytomegalovirus
<b>CSF</b>	cerebrospinal fluid
<b>CT</b>	computed tomography
<b>CTA</b>	computed tomography angiography
<b>DNA</b>	deoxyribonucleic acid
<b>DWI</b>	diffusion weighted imaging (for MRI)
<b>EEG</b>	electroencephalogram
<b>ENT</b>	Ear, Nose, Throat
<b>ESR</b>	erythrocyte sedimentation rate
<b>FDG</b>	fluorodeoxyglucose
<b>FSH</b>	follicle-stimulating hormone
<b>FTD</b>	Frontotemporal Dementia
<b>GCA</b>	giant cell arteritis
<b>GCS</b>	Glasgow Coma Scale
<b>HIV</b>	human immunodeficiency virus
<b>LH</b>	luteinizing hormone
<b>MMSE</b>	mini mental status examination
<b>MRA</b>	magnetic resonance angiography
<b>MRI</b>	magnetic resonance imaging
<b>MRN</b>	magnetic resonance neurography
<b>MS</b>	multiple sclerosis
<b>MSI</b>	magnetic source imaging
<b>NAION</b>	non-arteritic ischemic optic neuritis
<b>NPH</b>	normal pressure hydrocephalus
<b>PET</b>	positron emission tomography
<b>PML</b>	progressive multifocal leukoencephalopathy
<b>PNET</b>	primitive neuro ectodermal tumor
<b>PWI</b>	perfusion weighted imaging (for MRI)
<b>SAH</b>	subarachnoid hemorrhage
<b>SIADH</b>	Syndrome of Inappropriate Antidiuretic Hormone Secretion
<b>SLE</b>	systemic lupus erythematosus
<b>TIA</b>	transient ischemic attack
<b>TMJ</b>	temporomandibular joint disease
<b>TSH</b>	thyroid-stimulating hormone
<b>VBI</b>	vertebrobasilar
<b>VP</b>	ventriculoperitoneal
<b>XRT</b>	radiation therapy

## HEAD IMAGING GUIDELINES

### **HD-1~GENERAL GUIDELINES**

<u>HD-1</u>	<u>GENERAL GUIDELINES</u>
1.1 – ANATOMIC ISSUES	5
1.2 – MODALITY	6
1.3 – MRI HEAD	6
1.4 – CT HEAD	6
1.5 – CT AND MR ANGIOGRAPHY: (CTA AND MRA)	7
1.6 – CODING NOTES	8
1.7 – OTHER IMAGING SITUATIONS	8

## HEAD IMAGING GUIDELINES

### **HD-1~GENERAL GUIDELINES**

- ✓ A current clinical evaluation (within 60 days) is required before advanced imaging can be considered (exceptions allowed for scheduled surveillance evaluation of known abnormalities such as follow up for tumors or hydrocephalus).
  - The clinical evaluation should include a relevant history and physical examination, including a neurological examination, as well as appropriate laboratory studies and non-advanced imaging modalities.
  - Other meaningful contact (telephone call, electronic mail or messaging) with an established patient can substitute for a face-to-face clinical evaluation.

#### **HD-1.1 General Guidelines - Anatomic Issues**

- ✓ If two studies using the same modality both cover the anatomic region of clinical interest, only one is generally needed, with the exception of the following scenarios:
  - **Maxillofacial CT (CPT<sup>®</sup> code set: 70486-70488) or orbital/temporal bone CT (CPT<sup>®</sup> code set: 70480-70482):** both cover the structures of the orbits, sinuses, and face. Two separate imaging studies are only supported if there is suspicion of simultaneous involvement of more posterior lesions, especially of the region involving the middle or inner ear.
  - **Pituitary Gland:** one study (either MRI head [CPT<sup>®</sup> 70553] or MRI Orbit, Face, Neck [CPT<sup>®</sup> 70543]) is adequate to report the imaging of the pituitary. If a previous routine MRI head was reported to show a possible pituitary tumor, a repeat MRI with dedicated pituitary protocol may be performed.
  - **Internal Auditory Canal:** (IAC) MRI can be reported as a limited study with one code from the set (CPT<sup>®</sup> 70540-CPT<sup>®</sup> 70543), but should not be used in conjunction with MRI head codes (CPT<sup>®</sup> 70551- CPT<sup>®</sup> 70553) if IAC views are performed as part of the brain.
  - **Mandible (jaw):** maxillofacial CT (CPT<sup>®</sup> code set: 70486, 70487, 70488) or neck CT (CPT<sup>®</sup> code set: 70490, 70491, 70492) can be used to report imaging of the mandible. Neck CT will also image the submandibular space.
    - If MRI is indicated, MRI of orbit, face, neck (CPT<sup>®</sup> 70540, CPT<sup>®</sup> 70542, or CPT<sup>®</sup> 70543) can be used to report imaging of the mandible and submandibular space.
    - MRI of the temporomandibular joint(s) (TMJ) is reported as CPT<sup>®</sup> 70336. This code is inherently bilateral and should not be reported twice on the same date of service.

## **HD-1.2 General Guidelines - Modality**

- ✓ MRI is preferable to CT for most indications. For exceptions, see **HD 1.4: General Guidelines – CT Head.**
- ✓ MRI may be performed for these indications following an initial CT:
  - MRI head without and with contrast (CPT<sup>®</sup> 70553) may be performed to follow-up abnormalities seen on CT head without contrast (CPT<sup>®</sup> 70450) when a mass, lesion, or infection is found.
  - MRI head without contrast (CPT<sup>®</sup> 70551) or MRI head without and with contrast (CPT<sup>®</sup> 70553) may be performed to follow-up abnormalities seen on CT head without contrast (CPT<sup>®</sup> 70450) when there is suspected Multiple Sclerosis or other demyelinating disease.
  - MRI head without (CPT<sup>®</sup> 70551) or MRI head without and with contrast (CPT<sup>®</sup> 70553) may be performed to follow up on stroke or TIA when initial CT head was done on emergent basis.
  - MRI head without and with contrast (CPT<sup>®</sup> 70553) for evaluation of new onset seizures.

## **HD-1.3 General Guidelines –MRI head**

- ✓ MRI, with contrast, (CPT<sup>®</sup> 70552) should not be ordered except to follow-up on a very recent non-contrast study (within two weeks).

The AMA CPT manual does not describe nor assign any minimum or maximum number of sequences for any CT or MRI study. Both MRI and CT imaging protocols are often influenced by the individual clinical situation of the patient and additional sequences are not uncommon. There are numerous MRI sequences that may be performed to evaluate specific clinical questions, and this technology is constantly undergoing development. Additional sequences, however, are still performed and coded under the routine MRI Brain CPT<sup>®</sup> codes, 70551, 70552 or 70553.

## **HD-1.4 General Guidelines –CT Head**

- ✓ Scenarios in which MRI is contraindicated (i.e. pacemakers, ICDs, cochlear implants, aneurysm clips, orbital metallic fragments etc...)
- ✓ Head CT without contrast (CPT<sup>®</sup> 70450) in nearly all cases, to show:
  - Mass effect
  - Blood/blood products
  - Urgent/emergent settings due to availability and speed of CT
  - Trauma
  - Recent hemorrhage, whether traumatic or spontaneous
  - Bony structures of the head evaluations

- Hydrocephalus evaluation and follow-up (some centers use limited fast MRI to minimize radiation exposure in children - these requests may be approved).
- Prior to lumbar puncture in patients with cranial complaints (without contrast (CPT<sup>®</sup> 70450)).

### **HD-1.5 General Guidelines - CT and MR Angiography: (CTA and MRA)**

- ✓ Head MRA (CPT<sup>®</sup> 70544) is generally done without contrast.
- ✓ MRA Neck may be done either without or with contrast for most indications, depending on facility preference and protocols, and type of scanner.
- ✓ MRA Neck, both without and with contrast, is reserved for evaluation of possible or known arterial dissection.
- ✓ **Head MRA or CTA** may be considered with suspected intracranial vascular disease, for example:
  - pulsatile tinnitus
  - hemifacial spasm if consideration for surgical decompression
  - Evaluation of stroke or TIA (See **HD 12.1**)
  - trigeminal neuralgia failed medical therapy
  - cerebral sinus thrombosis suspected with increased intracranial pressure (refractory headaches, papilledema, diagnosis of pseudotumor cerebri)
  - aneurysm suspected with acute “thunderclap” headache syndrome and appropriate screening or evaluation of known subarachnoid hemorrhage
  - intra-cranial pre-operative planning if there is concern of possible vascular involvement or risk for vascular complication from procedure
  - suspicion of vasculitis based on supporting clinical evidence
  - **NOTE:** Evaluation of posterior circulation disease requires both neck and head MRA/CTA to visualize the entire vertebral- basilar system.
  - CTA or MRA head without or without contrast and with contrast for follow up of aneurysm clipping or coiling procedures (See **HD 12.1**).
- ✓ **CT and MR Venography** (CTV and MRV) are reported with the same codes as the CTA/MRA counterpart:
  - If arterial and venous CT or MR studies are both performed in the same session, only *one* CPT<sup>®</sup> code should be used to report both procedures.
  - MRA with and without contrast with venous sinus thrombosis to differentiate total from subtotal occlusion.

## **HD-1.6 General Guidelines - Coding Notes**

- ✓ Metabolic Brain PET should be reported as metabolic brain PET (CPT® 78608).
- ✓ Amyloid Brain PET should be reported as limited PET CPT® 78811 or limited PET/CT (CPT® 78814)

## **HD-1.7 General Guidelines - Other Imaging Situations**

- ✓ Nausea and vomiting, persistent, unexplained and a negative GI evaluation: can undergo MRI head without contrast (CPT® 70551).
- ✓ (See also: **AB-1.9 Special Considerations** in the Abdomen Imaging Guidelines)
- ✓ ECT treatment to screen for intracranial disease: can undergo either MRI head without contrast (CPT® 70551) or head CT without contrast (CPT® 70450).
- ✓ Screening for metallic fragments before MRI should be done initially with plain x-ray.
  - The use of orbital CT to rule out orbital metallic fragments prior to MRI is rarely necessary.
  - Plain x-rays are generally sufficient; X-ray detects fragments of 0.12 mm or more, and CT detects those of 0.07 mm or more.
- ✓ Plain x-ray is generally sufficient to screen for aneurysm clips.

## **References**

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2. Latchaw RE, Kucharczyk J, Moseley ME. *Imaging of the Nervous System*. Philadelphia, Elsevier, 2005.
3. Rowland LP (Ed.). *Merritt's Neurology*. 12<sup>th</sup> Ed. Philadelphia, Lippincott, 2010.
4. Menkes JH, Sarnat HB, Maria BL. *Child Neurology*. 7<sup>th</sup> Ed. Philadelphia, Lippincott, 2006.  
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## HEAD IMAGING GUIDELINES

### **HD-2~TASTE and SMELL DISORDERS**

#### **HD-2.1 Taste and Smell Disorders**

- ✓ MRI head without and with contrast (CPT<sup>®</sup> 70553) or without contrast (CPT<sup>®</sup> 70551) is considered with unexplained unilateral or bilateral anosmia (inability to perceive odor) or dysgeusia (loss of taste)<sup>1, 2</sup>.
- ✓ If sinus or facial bone disorders is suspected, then consider initially Maxillofacial CT without contrast (CPT<sup>®</sup> 70486)<sup>2</sup>.

#### **Reference**

1. Wippold FJ II, Cornelius RS, Aiken AH, Angtuaco EJ, et al. ACR Appropriateness Criteria<sup>®</sup> cranial neuropathy. American College of Radiology (ACR); 2012. 18 p

## HEAD IMAGING GUIDELINES

### **HD-3~ATAXIA**

#### **HD-3.1 Ataxia**

- ✓ MRI head without and with contrast (CPT<sup>®</sup> 70553) or MRI head without contrast (CPT<sup>®</sup> 70551) is considered in all patients with ataxia<sup>1</sup>:
  - If it is progressive and/or not acute and suspect spinal disease can ADD MRI cervical, thoracic and/or lumbar spine without contrast<sup>1</sup> (CPT<sup>®</sup> 72141, CPT<sup>®</sup> 72146, CPT<sup>®</sup> 72148)
  - If it is acute and stroke is suspected see **HD-21~ Stroke – TIA**
  - **If MS is suspected, see HD-16-Multiple Sclerosis (MS) & Related Conditions**
  - If it is acute following head trauma, CT head without contrast (CPT<sup>®</sup> 70450) and/or CT temporal bone without contrast<sup>1</sup> (CPT<sup>®</sup> 70480) can be added

#### **Reference**

1. Broderick DF, Wippold FJ II, Cornelius RS, Aiken AH, et al. Expert Panel on Neurologic Imaging. ACR Appropriateness Criteria<sup>®</sup> ataxia. *American College of Radiology (ACR)*; 2012.

## HEAD IMAGING GUIDELINES

### **HD-4~BEHAVIORAL DISORDERS**

Autism: See PAEDHD-17~Autism and Autism Spectrum Disorders

#### **HD-4.1 Behavioral Disorders**

Neuroses and psychoses do not need advanced imaging, except:

- ✓ **Bipolar disorder, schizophrenia, and related disorders** who fail to respond to treatment in the expected manner *and* who manifest features suggestive of an organic brain disorder
  - MRI head without contrast (CPT<sup>®</sup> 70551), or
  - Head CT without contrast (CPT<sup>®</sup> 70450)

#### **References**

1. Ropper AH and Brown RH. *Adams and Victor's Principles of Neurology*. 8<sup>th</sup> Ed. New York, McGraw-Hill, 2005, pp.1285-1332.
2. Rowland LP (Ed.). *Merritt's Neurology*. 12<sup>th</sup> Ed. Philadelphia, Lippincott, 2010, pp.1053-1075.

**HEAD IMAGING GUIDELINES**

**HD-5~CHIARI and SKULL-BASE MALFORMATION**

See Pediatric Head Guidelines, **PEDHD 9 Chiari and Skull Base Malformations**

## CRANIAL NERVE (CN) PROBLEMS

### **HD-6~FACIAL PALSY (Bell's Palsy)**

#### **HD-6.1 Facial Palsy**

- ✓ MRI brain without and with contrast (CPT<sup>®</sup> 70553) or MRI head without contrast (CPT<sup>®</sup> 70551) is considered with unexplained facial paresis/paralysis in clinical scenarios with<sup>1,2</sup>:
  - Trauma to the temporal bone<sup>2</sup>
  - History of tumor<sup>2</sup>
  - No improvement in 8 weeks<sup>1</sup>
  - No full recovery in 3 months<sup>2</sup>
  - Worsening paresis/paralysis<sup>2</sup>
  - Atypical or Inconsistent features<sup>2</sup> including:
    - Second paralysis on the same side<sup>2</sup>
    - Paralysis of isolated branches of the facial nerve<sup>2</sup>
    - Paralysis associated with other cranial nerves<sup>2</sup>
- ✓ MRI head without and with contrast (CPT<sup>®</sup> 70553) may be considered for known sarcoidosis with suspected neurosarcoid or CNS involvement.

#### **HD-6.2 Hemifacial Spasm**

- ✓ MRI brain without and with contrast (CPT<sup>®</sup> 70553) CTA Head – CPT<sup>®</sup> 70496 or MRA Head - CPT<sup>®</sup> 70544 prior to a vascular decompression surgical procedure to clarify the vascular anatomy.

#### **References**

1. Reginald Baugh et al. Clinical Practice Guidelines Summary: Bell's Palsy. *Otolaryngol Head Neck Surg*, 2013; 149: S1-S27
2. Wippold FJ II, Cornelius RS, Aiken AH, Angtuaco EJ, et al. ACR Appropriateness Criteria<sup>®</sup> cranial neuropathy. ACR Appropriateness Criteria, Cranial Neuropathy. 2012.
3. Iannuzzi MC, Rybicki BA, Teirstein AS. Sarcoidosis. *N Engl J Med*. 2007 Nov 22;357(21):2153-65.
4. Joseph FG, Scolding NJ. Sarcoidosis of the nervous system. *Pract Neurol*. 2007 Aug;7(4):234-44.
5. Gullapalli D, Phillips LH 2nd. Neurosarcoidosis. *Curr Neurol Neurosci Rep*. 2004 Nov;4(6):441-7.
6. Yalthro TC, Jankovic J. The many faces of hemifacial spasm: Differential diagnosis of unilateral facial spasms. *Mov Disord*. 2011; 26(9):1582-1592.

## CRANIAL NERVE (CN) PROBLEMS

### **HD-7~RECURRENT LARYNGEAL PALSY**

#### **HD-7.1 Recurrent Laryngeal Palsy The following can be considered with unilateral vocal cord/fold palsy identified by laryngoscopy<sup>1</sup>:**

- ✓ MRI head without and with contrast (CPT<sup>®</sup> 70553) and/or MRI neck without and with contrast (CPT<sup>®</sup> 70543); or
- ✓ MRI head without contrast (CPT<sup>®</sup> 70551) and/or MRI neck without contrast (CPT<sup>®</sup> 70540); or
- ✓ If MRI is contraindicated, CT head without and with contrast (CPT<sup>®</sup> 70470) and/or CT neck with contrast (CPT<sup>®</sup> 70491); chest CT with contrast (CPT<sup>®</sup> 71260) may be added with left vocal cord palsy.<sup>1</sup>

#### **Reference**

1. Wippold FJ II, Cornelius RS, Aiken AH, et al. Expert Panel on Neurologic Imaging. ACR Appropriateness Criteria<sup>®</sup> cranial neuropathy. American College of Radiology (ACR); 2012.

## HEAD IMAGING GUIDELINES

### **HD-8~DEMENTIA**

#### **HD-8.1 Dementia**

- ✓ Neuropsychological testing can be performed when history and bedside mental status examination cannot provide a confident diagnosis.<sup>1,2</sup> MRI head without contrast (CPT<sup>®</sup> 70551) or MRI head without and with contrast (CPT<sup>®</sup> 70553) or Head CT without contrast (CPT<sup>®</sup> 70450) is considered after an initial clinical diagnosis of dementia<sup>3,4</sup>

#### **HD-8.2 Dementia - PET**

Send to MD review. Amyloid Brain PET (CPT<sup>®</sup> 78811 or CPT<sup>®</sup> 78814) imaging is considered experimental and investigational in the diagnosis of Alzheimer's disease and in differentiating between Alzheimer's disease and other neurodegenerative/neurologic disorders.<sup>3,4,5</sup> Amyloid PET studies may be approved one time for Medicare patients enrolled in approved clinical trials under CED program. For CMS, approval with Coverage with Evidence Development (CED) is available for patients enrolled in studies approved by CMS. See the link below for a list of the CMS approved clinical trials:

<https://www.cms.gov/Medicare/Coverage/Coverage-with-Evidence-Development/Amyloid-PET.html>

- ✓ Send to MD review. FDG brain PET (CPT<sup>®</sup> 78608) is considered experimental and investigational in the diagnosis of Alzheimer's disease and in differentiating between Alzheimer's disease and other neurodegenerative/neurologic disorders.
  - CPT<sup>®</sup> 78608 is used to report FDG PET metabolic brain studies for dementia, seizure disorders, and dedicated PET tumor imaging studies of the brain.
  - CPT<sup>®</sup> 78609 is used to report PET brain perfusion studies that are not performed with FDG. These scans are nationally noncovered by Medicare.
  - Amyloid-beta(A $\beta$ ) Brain Studies:
    - Medicare will reimburse for brain PET, performed with the radiopharmaceutical florbetapir F-18, only through CED.
    - Only one study will be paid per beneficiary and the radiopharmaceutical must be FDA-approved. As of October 25, 2013, only the agents Amyvid<sup>™</sup> and Vizamyl<sup>®</sup> met this qualification.
  - FDG PET for Dementia and Neurodegenerative Diseases
    - Medicare covers FDG PET for individuals with a recent diagnosis of dementia and documented cognitive decline of at least six months who meet diagnostic criteria for both Alzheimer's disease (AD) and front-temporal dementia (FTD).

- The individual must have been evaluated for specific alternate neurodegenerative diseases or other causative factors, but the etiology of the symptoms remains unclear.
- Other conditions must also be met. For the complete coverage policy, see the Medicare National Coverage Determinations (NCD) Manual, Section **220.6.13**.
- Medicare also covers FDG PET for individuals with mild cognitive impairment or early dementia when the study is performed in the context of a CMS-approved clinical trial. Requirements are detailed in Section **220.6.13** of the NCD Manual.
- All other uses of FDG PET for patients with a presumptive diagnosis of dementia-causing neurodegenerative disease for which CMS has not specifically indicated coverage continue to be noncovered. Examples of noncovered indications described in the NCD include: possible or probable AD, clinically typical FTD, dementia of Lewy bodies, and Creutzfeld-Jacob disease.

[http://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/downloads/ncd103c1\\_Part4.pdf](http://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/downloads/ncd103c1_Part4.pdf)

## **Practice Notes**

The clinical diagnosis of dementia can be established by history-taking from the patient and a knowledgeable informant<sup>1</sup> as well as a “bedside” mental status examinations (such as the Mini Mental Status Exam, Montreal Cognitive Assessment, Memory Impairment Screen<sup>1,2</sup>).

## **References**

1. McKhann GM. The diagnosis of dementia due to Alzheimer’s disease: Recommendations from the National Institute on Aging and the Alzheimer’s Association workgroup, ePub Alzheimer’s & Dementia. *Alzheimer's & Dementia*, 2011; 7: 270-279.
2. AAN Guideline Summary for Clinicians. Detection, diagnosis, and management of dementia. [http://tools.aan.com/professionals/practice/pdfs/dementia\\_guideline.pdf](http://tools.aan.com/professionals/practice/pdfs/dementia_guideline.pdf).
3. Decision Memo for Positron Emission Tomography (FDG) for Alzheimer's Disease/Dementia (CAG-00088N).
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5. D. S. Knopman, et. al., Practice parameter: Diagnosis of dementia (an evidence-based review), Report of the Quality Standards Subcommittee of the American Academy of Neurology, *Neurology* May 8, 2001 vol. 56 no. 9 1143-1153.
6. Keith A. Johnson, Appropriate use criteria for amyloid PET: A report of the Amyloid Imaging Task Force, the Society of Nuclear Medicine and Molecular Imaging, and the Alzheimer’s Association, *Alzheimer’s & Dementia - Alzheimer's & Dementia*, Volume 9, Issue 1 , Pages E1-E16, January 2013.
7. Decision Memo for Positron Emission Tomography (FDG) and Other Neuroimaging Devices for Suspected Dementia (CAG-00088R) September 15, 2004, <http://www.cms.gov/medicare-coverage-database/details/nca-decision-memo.aspx?NCAId=104>, acquired March 10, 2014.



8. NCD for FDG PET for Dementia and Neurodegenerative Diseases (220.6.13), effective 4/3/2009, implemented 10/30/2009, <http://www.cms.gov/medicare-coverage-database/details/ncd-details.aspx?NCDId=288&ncdver=3&bc=BAABAAAAAAAA&>. Accessed May 17, 2016.

## HEAD IMAGING GUIDELINES

### **HD-9~EPILEPSY/SEIZURES**

#### **HD-9.1 Epilepsy/Seizure**

- ✓ MRI head without and with contrast (CPT<sup>®</sup> 70553) or MRI head without contrast (CPT<sup>®</sup> 70551) may be considered.
  - For refractory or drug resistant seizures
  - For preoperative planning
    - PET (CPT<sup>®</sup> 78608) can be considered for planning in patients with seizures who are candidates for surgical treatment<sup>1</sup>.
  - If CT head was performed for an initial evaluation, MRI (as described above) may be approved for additional evaluation.
- ✓ MRI head without and with contrast (preferred study) (CPT<sup>®</sup> 70553) or MRI head without contrast (CPT<sup>®</sup> 70551) may be considered
  - For new onset seizures
  - Follow-up studies after a previous routine normal study may be considered if performed with special “Epilepsy Protocol” (typically 3T magnet, thin sections with angled slices through hippocampus and temporal lobes).
- ✓ FDG PET for Refractory Seizures
  - Medicare covers FDG PET for pre-surgical evaluation for the purpose of localization of a focus of refractory seizure activity.
  - The complete coverage policy is found in the Medicare National Coverage Determinations (NCD) Manual, **Section 220.6.9**:  
[http://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/downloads/ncd103c1\\_Part4.pdf](http://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/downloads/ncd103c1_Part4.pdf)

#### **References**

1. Luttrull MD, Cornelius RS, Angtuaco EJ, et al. Expert Panel on Neurologic Imaging. ACR Appropriateness Criteria<sup>®</sup> seizures and epilepsy. [online publication]. Reston (VA): American College of Radiology (ACR); 2014. 12 p.
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## HEAD IMAGING GUIDELINES

### **HD-10~FACIAL PAIN/TRIGEMINAL NEURALGIA**

#### **HD-10.1 Facial Pain/Trigeminal Neuralgia**

- ✓ MRI head without and with contrast (CPT<sup>®</sup> 70553) (with special attention to the skull base), and facial imaging orbital MRI without and with contrast (CPT<sup>®</sup> 70543) may be of value in a given case, including:
  - Suspected tic douloureux (or its IX or VII nerve variants)
- ✓ Those under age 40, See also **HD 6.2 Hemifacial Spasm**
  - Which raise reasonable concerns about an underlying diagnosis of multiple sclerosis.
  - Trigeminal neuralgia which involve the ophthalmic nerve, (peri-orbital or forehead pain), once herpetic neuralgia (a complication of shingles) has been excluded.
  - See **HD 1.5: General Guidelines - CT and MR Angiography**

#### **Practice Notes**

The differential diagnosis of facial pain is extensive, complex, and difficult, and there is considerable case-to-case variation in optimal imaging pathway.

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## HEAD IMAGING GUIDELINES

### **HD-11~HEADACHE**

<u>HD-11</u>	<u>HEADACHE</u>
11.1 – HEADACHE NON-INDICATIONS	21
11.2 – ABNORMAL FINDINGS ON EXAMINATION	21
11.3 – SUDDEN ONSET OF HEADACHE	22
11.4 – TRIGEMINAL AUTONOMIC CEPHALGIAS	22
11.5 – SKULL BASE, ORBIT, PERIORBITAL OR OROMAXILLARY	22
11.6 – SUSPECTED INTRACRANIAL EXTENSION OF SINUSITIS OR MASTOIDITIS	23
11.7 – NEW HEADACHE ONSET OLDER THAN AGE 50	23
11.8 – CANCER OR IMMUNOSUPPRESSION	23
11.9 – PROTHROMBOTIC STATES	23
11.10 – PREGNANCY	23
11.11 – PHYSICAL EXERTION	23
11.12 – POST-TRAUMA	24
11.13 – ACUTE SYSTEMIC INFECTIONS	24
11.14 – HYDROCEPHALUS SHUNTS	24
11-15 – LOW PRESSURE HEADACHE AND CSF LEAK	24

## HEAD IMAGING GUIDELINES

### **HD-11~HEADACHE**

#### **HD-11.1 Headache Non-Indications**

Neuroimaging is not usually warranted in patients with migraine and a normal neurologic examination.<sup>4</sup>

- ✓ Advanced imaging of the head is NOT indicated for any of the following:
  - Primary headache disorder in the absence of focal neurological deficits (headaches that meet criteria for migraine or tension variety)
  - Chronic headaches or intermittent recurring headaches with a normal exam, no significant recent changes in pattern or character of headache
  - A new, recent onset headache without “red flags” or findings such as focal deficits, papilledema, age over 50, headache that awakens patient from sleep, or “thunderclap” headache.

#### **HD-11.2 Abnormal Findings on Examination**

- ✓ Advanced imaging may be considered for patients with acute or chronic headaches and abnormal features or neurological findings on examination, including:
  - Change in attack pattern<sup>1,2,7</sup>.
    - For example: rapidly increasing headache intensity or frequency, transformation of established migraine to chronic daily headaches, associated with seizure.
  - Focal neurological signs or symptoms, which may include lack of coordination, papilledema, vomiting, personality changes, drowsiness, dizziness, seizure, confusion, memory loss, gait disturbance, unilateral facial and/or body paralysis, sensory loss, loss of vision, cranial nerve palsy, nystagmus, dysarthria and dysphagia.
  - Papilledema
- ✓ If any of the above abnormal findings are present, the following advanced imaging studies may be considered:
  - MRI head without and with contrast (preferred study) (CPT<sup>®</sup> 70553); or
  - MRI head without contrast (CPT<sup>®</sup> 70551); or
  - CT head without contrast (CPT<sup>®</sup> 70450)

See also: **HD-17~Papilledema/Pseudotumor Cerebri**

### **HD-11.3 Sudden Onset of Headache**

- ✓ For sudden onset of headache including:
  - Worst, most severe headache ever experienced or thunderclap-type<sup>1,2,6</sup> (example: awakening from sleep<sup>2,4</sup>).
  - Sudden onset unilateral headache, suspected carotid or vertebral dissection or ipsilateral Horner syndrome<sup>1</sup>.
- ✓ If any of these onset of headache features are present, the following advanced imaging studies may be considered:
  - CT head without contrast (preferred study) (CPT<sup>®</sup> 70450); or
  - CTA head with contrast (CPT<sup>®</sup> 70496); or
  - MRA head without and with contrast (CPT<sup>®</sup> 70546); or
  - MRA head without contrast (CPT<sup>®</sup> 70544); or
  - MRI head without contrast (CPT<sup>®</sup> 70551);

See also: **HD-12.1 Intracranial Aneurysms** and **HD-21.1 Stroke/TIA**

### **HD-11.4 Trigeminal Autonomic Cephalgias**

- ✓ Trigeminal autonomic cephalgias includes cluster headache short-lasting, unilateral, neuralgiform headache attacks with conjunctival injection and tearing (SUNCT) syndromes; hemicrania continua.
  - May also include one-time pituitary screening<sup>1,12</sup>
- ✓ Cluster Headache (may also include pituitary)
- ✓ The following advanced imaging studies may be considered for trigeminal autonomic cephalgias and cluster headache:
  - MRI head without and with contrast (preferred study) (CPT<sup>®</sup> 70553); or
  - MRI head without contrast (CPT<sup>®</sup> 70551)

See also **HD-10~Facial Pain/Trigeminal Neuralgia**

### **HD-11.5 Skull Base, Orbit, Periorbital or Oromaxillary**

- ✓ Skull base, orbital, periorbital or oromaxillary<sup>1</sup> imaging is appropriate for concern of skull base tumors in patients with head and neck cancers, other skull base abnormalities seen on previous imaging, any invasive sinus infections as well as sinus tumors or orbital tumors with intracranial extension. In these clinical scenarios, any one of the following procedures may be considered:
  - MRI head and orbits without and with contrast (preferred study) (CPT<sup>®</sup> 70553 and CPT<sup>®</sup> 70543); or
  - MRI head and orbits without contrast (CPT<sup>®</sup> 70551 and CPT<sup>®</sup> 70540); or
  - CT head and orbits without and with contrast (CPT<sup>®</sup> 70470 and CPT<sup>®</sup> 70482); or

- CT head and orbits with contrast (CPT<sup>®</sup> 70460 and CPT<sup>®</sup> 70481)

### **HD-11.6 Suspected Intracranial Extension of Sinusitis or Mastoiditis**

- ✓ For suspected intracranial extension of sinusitis or mastoiditis<sup>1</sup>, NOT cervicogenic
- ✓ MRI head without and with contrast (CPT<sup>®</sup> 70553) may be considered (see **HD-29~Sinusitis**)

### **HD-11.7 New Headache Onset Older than Age 50**

- ✓ For new onset headache in patients older than 50 years of age<sup>2,6</sup> the following may be considered:
  - MRI head without and with contrast (preferred study) (CPT<sup>®</sup> 70553); or
  - MRI head without contrast (CPT<sup>®</sup> 70551);
  - If Giant Cell Arteritis is suspected, MRA head without and with contrast (CPT<sup>®</sup> 70546) may be added.

### **HD-11.8 Cancer or Immunosuppression**

- ✓ For new headache in patients with cancer or who are immunocompromised, the following may be considered:
  - MRI head without and with contrast (preferred study) (CPT<sup>®</sup> 70553); or
  - MRI head without contrast (CPT<sup>®</sup> 70551)

### **HD-11.9 Prothrombotic States**

- ✓ For Prothrombotic states<sup>1</sup> including anticoagulation, the following may be considered:
  - MRI head without and with contrast (CPT<sup>®</sup> 70553); or
  - CT head without contrast (CPT<sup>®</sup> 70450)
  - If there is concern for venous sinus thrombosis in those with hypercoagulable states, MRA/MRV (CPT<sup>®</sup> 70544) or CTA/CTV (CPT<sup>®</sup> 70496) may be added.

### **HD-11.10 Pregnancy**

- ✓ For new onset headache in pregnancy,<sup>1</sup> the following may be considered:
  - MRI head without contrast (Gadolinium relatively contraindicated in pregnancy) (CPT<sup>®</sup> 70551)
  - MRA/MRV (CPT<sup>®</sup> 70544) may be added if there is concern for venous sinus thrombosis.

### **HD-11.11 Physical Exertion**

- ✓ For onset of headache with Valsalva maneuver<sup>2,6</sup>, cough, physical exertion or sexual (post-coital) activity,<sup>1,6</sup> but not a worsening of headache with these activities, the following procedures may be considered:
  - MRI head without and with contrast (preferred study) (CPT<sup>®</sup> 70553); or

- MRI head without contrast (CPT<sup>®</sup> 70551); or
- CT head without contrast (CPT<sup>®</sup>70450)

### **HD-11.12 Post-Trauma**

- ✓ For post-traumatic headaches within one year of the injury's event, the following may be considered:
  - CT head without contrast (preferred study) (CPT<sup>®</sup> 70450); or
  - MRI head without contrast (CPT<sup>®</sup> 70551); or
  - MRI head without and with contrast (CPT<sup>®</sup> 70553)

See also: **HD-13~Head Trauma**

### **HD-11.13 Acute Systemic Infections**

- ✓ For acute systemic infections with meningeal neck stiffness<sup>1,6</sup> the following may be considered:
  - MRI head without and with contrast (preferred study) (CPT<sup>®</sup> 70553); or
  - MRI head without contrast (CPT<sup>®</sup> 70551)

### **HD-11.14 Hydrocephalus Shunts**

- ✓ For new onset of headache or neurologic deficits in adults with known hydrocephalus and shunts, the following may be considered:
  - MRI head without and with contrast (CPT<sup>®</sup> 70553); or
  - CT head without contrast (CPT<sup>®</sup> 70450); or
  - MRI head without contrast (CPT<sup>®</sup> 70551).

### **HD-11.15 Low Pressure Headache and CSF Leak**

- ✓ Evaluation of suspected low pressure headache and CSF leak may include MRI head without and with contrast (CPT<sup>®</sup> 70553) and MRI cervical, thoracic and lumbar spine without contrast (CPT<sup>®</sup> 72141, CPT<sup>®</sup> 72146, and CPT<sup>®</sup> 72148).

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## HEAD IMAGING GUIDELINES

### **HD-12 Aneurysm and AVM**

#### **HD-12.1 Intracranial Aneurysms**

- ✓ Head CTA (CPT<sup>®</sup> 70496) or Head MRA (CPT<sup>®</sup> 70544) can be performed in any of the following clinical scenarios:
  - Symptoms or signs of cerebral aneurysm, including:
    - “Thunderclap headache”
    - Third nerve palsy with pupillary involvement (pupil sparing third nerve palsies are not caused by external compression)
    - Suspicion of aneurysm bleed (CT Head or MRI Brain or CSF exam showing evidence of SAH)
    - Abnormal Head CT or MRI Brain suggesting possible aneurysm
  - Screening for High Risk Populations as defined by the following criteria (screening usually begins at age 20 unless unusual circumstances as aneurysms are uncommon in children and adolescents):
    - Positive Family History: Two or more first degree relatives (parent, sibling, or child) with history of cerebral aneurysm or SAH: screening every 5 years beginning at age 20.
      - One first degree relative (parent, sibling, or child) with history of cerebral aneurysm or SAH
    - Autosomal dominant polycystic kidney disease (screening begins at age 20 to 65 and is repeated at ten year intervals)
    - Aortic coarctation or bicuspid aortic valve
    - Type 4 (Vascular) Ehlers-Danlos Syndrome
    - Marfan’s Syndrome
    - Loeys-Dietz Syndrome
    - Microcephalic osteodysplastic primordial dwarfism
    - Patients with previous history of SAH or treatment for cerebral aneurysm: continued surveillance and screening every 5 years
  - Follow up of known cerebral aneurysm
    - Known incidentally discovered aneurysms which have never bled. The optimal interval and duration of recommended follow up in the literature are undefined. The risk of aneurysm rupture is related to size, location (posterior circulation is higher risk), and patient factors including age, sex (higher for female), and history of smoking and hypertension.
    - Follow up at 6 months, 12 months and then annually for up to 5 years or until aneurysm is determined to be stable; and then at decreasing frequency,

- generally every 5 years unless judged to be at higher risk (see above risk factors).
- Follow up of treated aneurysms, clipping or coiling (with or without SAH)
    - Follow up at 3-6 month intervals for the first year, then 6-12 months for up to 2 years, then annually to ensure that aneurysm is not recanalizing. If stable and occluded at last imaging then follow up surveillance every 5 years. MRA head without contrast (CPT<sup>®</sup>70544), with contrast (CPT<sup>®</sup>70545), or without and with contrast (CPT<sup>®</sup>70546) or CTA head (CPT<sup>®</sup>70496) at discretion of the specialist (neurosurgeon)
  - ✓ Spinal MRI (Cervical, Thoracic, Lumbar (without and with contrast) (CPT<sup>®</sup> 72156, CPT<sup>®</sup> 72157, CPT<sup>®</sup> 72158) is appropriate to evaluate patients with SAH and negative studies for brain aneurysm in whom spinal abnormalities (i.e. AVM) may be suspected as the cause of hemorrhage.

## **HD-12.2 Arteriovenous Malformations (AVMs) and Related Lesions**

- ✓ MRI head without and with contrast (CPT<sup>®</sup> 70553) or without contrast (CPT<sup>®</sup> 70551) may be considered in the following clinical scenarios:
  - AVM is suspected based on a history of SAH.
  - Screening for:
    - Hereditary hemorrhagic telangiectasia syndrome (Osler Weber Rendu).
    - Familial cavernoma: Screening should include MRI Head without or without and with contrast (with gradient echo images).
- ✓ In addition to MRI, **one** head CTA (CPT<sup>®</sup> 70496) or head MRA (CPT<sup>®</sup> 70544) can be performed for screening. If negative, no further screening studies are indicated
- ✓ Head CTA (CPT<sup>®</sup> 70496) or brain MRA (CPT<sup>®</sup> 70544 or CPT<sup>®</sup> 70546) may be considered when known AVM are being evaluated for embolization or surgery
- ✓ Repeat advanced imaging with MRI head without and with contrast (CPT<sup>®</sup> 70553) or without contrast (CPT<sup>®</sup> 70551), plus MRA head (CPT<sup>®</sup> 70544) or CTA head (CPT<sup>®</sup> 70496) may be considered depending on the character of the disease and risk factors, or in the following clinical scenarios:
  - New hemorrhage episode is likely
  - Onset or change of seizures
  - Focal neurological signs
  - As follow up after treatment (surgery or embolization) as requested by specialists.

## **Practice Notes**

Trauma is the most common reason for subarachnoid hemorrhage. Ruptured berry aneurysm is the most common reason for non-traumatic subarachnoid hemorrhage in adults.

Small aneurysms are present in about 2% of adults, but very few ever reach a size for which bleeding is a risk (>5mm). Small (< 3-4 mm) unruptured aneurysms in those with no personal history of SAH have a 0.1% to 0.5% a year rate of bleeding. The risk of cerebral aneurysm with family history ranges from 2% with one first degree relative to 30-35% for identical twin or two parents. The risks and benefits of screening these populations need to be considered before advanced imaging.

AVM's most often come to clinical notice either by bleeding or by acting as a seizure focus. They are usually congenital, recognized later in life and have an initial risk of bleeding of 2% per year.

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## HEAD IMAGING GUIDELINES

### **HD-13~HEAD TRAUMA**

#### **HD-13.1 Head Trauma**

Patients with head trauma are at risk for facial and cervical trauma.

(See: **SP-3~Neck (Cervical Spine) Pain with Neurological Features and Trauma**)

- Head CT without contrast (CPT<sup>®</sup> 70450) is the primary imaging modality in patients with acute head trauma and any of the following modified Canadian Criteria:
  - Taking one anticoagulant or two anti-aggregants, (e.g., aspirin and Plavix)
  - Known platelet or clotting disorder
  - Renal failure (creatinine>6)
  - Glasgow coma scale (GCS) score of less than 15 at 2 hours following injury
  - >30 minutes of amnesia
  - Any “dangerous mechanism of injury” (fall greater than 5 steps down stairs or from height greater than 3 feet; any pedestrian motor vehicle accident or ejection from motor vehicle)
  - Suspected open skull fracture
  - Signs of basilar skull fracture
  - Two or more episodes of vomiting
  - Patient > 64 years old
- MRI head without contrast (CPT<sup>®</sup> 70551) is thereafter used when the clinical findings are not explained by the CT results or to evaluate late effect of brain injury.

Follow-up imaging, MRI or CT, for known subdural hematomas, intracerebral hemorrhage, or contusions can be done at the discretion of ordering specialist.

#### **Practice Note:**

Recent studies have shown that Diffusion tensor MRI tractography may be more sensitive in demonstrating abnormalities such as axonal injury in closed head injury than conventional MRI, but these techniques are best described presently as research tools and their use in routine clinical practice is not determined.

Decisions regarding return to normal activities, including sports, are made based on the clinical status of the patient and repeat imaging is unnecessary.

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## **HEAD IMAGING GUIDELINES**

### **HD-14~CNS INFECTION**

#### **HD-14.1 CNS Infection**

- ✓ Signs of intracranial infection include: 1) headaches, seizures or new focal deficits in a setting of fever or elevated white blood cell count (WBC); 2) known infection elsewhere; 3) or immunosuppression. The following studies may be considered for suspected intracranial infection<sup>1-4</sup> if any of these signs of infection are present:
  - MRI head without and with contrast (CPT<sup>®</sup> 70553), or
  - MRI head without contrast (CPT<sup>®</sup> 70551), or
  - CT head without contrast (CPT<sup>®</sup> 70450), or
  - CT head without and with contrast (CPT<sup>®</sup> 70470)

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## HEAD IMAGING GUIDELINES

### **HD-15~Movement Disorders**

#### **HD-15.1 Movement Disorders**

- ✓ The majority of movement disorders are diagnosed based on a clinical diagnosis and do not require imaging. These include:
  - Typical Parkinson's Disease<sup>1</sup>
  - Essential Tremor or Tremors of Anxiety or Weakness
  - Restless Leg Syndrome
  - Tics or Spasms which can be duplicated at will
- ✓ MRI of the brain without, or without and with contrast (CPT<sup>®</sup> 70551 or CPT<sup>®</sup> 70553) is considered in the following clinical scenarios:
  - **Atypical Parkinsonism** because of unusual clinical features (for example, persistent unilateral signs and symptoms, young onset under age of 50, rapid progression), incomplete or uncertain medication responsiveness, or clinical diagnostic uncertainty<sup>1</sup>. These cases should be forwarded for medical director review.
  - Suspected Huntington Disease<sup>1</sup>
  - Evaluation for surgical treatment or Essential Tremor or Parkinson's disease, including Deep Brain Stimulator placement.
- ✓ DAT-SPECT (ioflupane I-123 SPECT) may be considered:
  - To evaluate patients in whom the diagnosis and differentiation between Parkinson's disease and Essential Tremor remains unclear after evaluation by experts in movement disorders and medication trials.
  - DAT Scans are not useful for differentiation of subtypes of Parkinson's syndromes, to monitor progression of disease or predict risk of development of disease.

#### **Practice Notes**

There is little evidence to support the use of MRA/CTA and PET in the evaluation of movement disorders.<sup>2</sup>

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## HEAD IMAGING GUIDELINES

### **HD-16~Multiple Sclerosis (MS) and Related Conditions**

#### **HD-16.1 Multiple Sclerosis**

- ✓ MRI head without and with contrast (CPT<sup>®</sup> 70553) and MRI cervical and thoracic spine without and with (CPT<sup>®</sup> 72156 and CPT<sup>®</sup> 72157) use in these clinical scenarios requires<sup>1</sup> clinical suspicion based on recurrent episodes of variable neurological signs and symptoms or clinically isolated syndromes and<sup>2</sup> the baseline exclusion of appropriate alternative conditions that can mimic MS.<sup>1-4</sup>
  - An orbital MRI without and with contrast (CPT<sup>®</sup> 70543) may be considered if optic neuritis is suspected, in addition to the above scenario.<sup>4</sup>
- ✓ MRI lumbar spine usually is not needed since Cervical and Thoracic studies will usually visualize the entire spinal cord.
- ✓ Repeat Brain and/or Spine imaging may be considered in the following scenarios:
  - New episode of neurological deficit<sup>4</sup>
  - Baseline, in 3 – 6 months and then annually when instituting or maintaining immune-modulating agents and when changing therapy<sup>4</sup>
  - Symptoms suggestive of Progressive Multifocal Leukoencephalopathy during Tysabri therapy.<sup>5</sup> Screening with MRI Brain every 6 months if JC virus positive on Tysabri or other treatments known to increase risk of PML.
  - Asymptomatic MRI imaging is to be determined on a case by case basis
  - Repeat imaging requests for MRI without contrast may be approved when requested by a specialist
- ✓ Family members needs not be screened, unless they exhibit suspicious signs or symptoms suggestive of MS.

#### **Practice Notes**

Multiple Sclerosis (MS) is common and variable with more women affected and at a younger age than men. MS tends to be relapsing-remitting (improves between episodes), relapsing-progressive (worsens with attacks) and chronic progressive (gradual and steady).

MS is a clinical diagnosis, traditionally recognized by “lesions dispersed in time and space,” which means involvement of different areas of the neuraxis at different times.”

Screening based on family history of MS is not supported by the peer-reviewed evidence.

Sagittal MRI of the spinal cord with phased array detector coil (CPT<sup>®</sup> 72156 or CPT<sup>®</sup> 72157) is an alternative spinal imaging.

## **References**

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2. Evidence-based guideline: Clinical evaluation and treatment of transverse myelitis: Report of the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology, T.F. Scott, MD, E.M. Frohman, MD, PhD, J. De Seze, MD, G.S. Gronseth, MD, FAAN and B.G. Weinshenker, MD, *Neurology* December 13, 2011 vol. 77 no. 24 2128-2134
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6. Traboulsee A, Simon JH, Stone L, et al. Revised recommendations of the Consortium of MS Centers Task Force for a standardized MRI protocol and clinical guidelines for the diagnosis and follow-up of multiple sclerosis. *Am J Neuroradiol.* 2016;37:397-401.

## HEAD IMAGING GUIDELINES

### **HD-17~Papilledema/Pseudotumor Cerebri**

#### **HD-17.1 Papilledema/Pseudotumor Cerebri**

- ✓ MRI head without and with contrast (CPT<sup>®</sup> 70553) can be considered when there is suspected elevated intracranial pressure, such as with pseudotumor cerebri (benign intracranial hypertension) and papilledema, to exclude cerebral mass lesions, obstructive hydrocephalus, or occult meningeal disease.
  - Orbital MRI (CPT<sup>®</sup> 70543) or Orbit CT without and with (CPT<sup>®</sup> 70482) may be considered if there is concern for orbital pseudotumor or a primary bilateral orbital disorder.
  - Repeat imaging may be considered to evaluate either:
    - Shunt dysfunction in those patients who have had ventriculoperitoneal (VP) or lumboperitoneal (LP) shunts
    - Clinical deterioration
  - MRA head without contrast or CTA head without and with contrast can be approved for papilledema with suspected venous sinus thrombosis.
  - See **HD 1.5 General Guidelines - CT and MR Angiography: (CTA and MRA)** for information regarding contrast in MRA.

#### **Reference**

1. *Headache Currents* 2005;2:1-10

## HEAD IMAGING GUIDELINES

### **HD-18~PARESTHESIAS**

#### **HD-18.1 Paresthesias**

**Requests will be sent for Medical Director review.** Paresthesia(s) (localized numbness and tingling) are symptoms of a local (nerve entrapment for example), regional (Multiple Sclerosis for example) or central (stroke for example) disorder.<sup>1,2</sup> Advanced imaging can be considered initially, based on the highest suspicion disorder, according to these guidelines.<sup>1,2</sup>

#### **References**

1. NINDS Paresthesia Information Page, <http://www.ninds.nih.gov/disorders/paresthesia/paresthesia.htm>, acquired March 12, 2014.
2. Medical Disability Advisor, Paresthesia, <http://www.mdguidelines.com/paresthesia>, acquired on March 12, 2014

## HEAD IMAGING GUIDELINES

### **HD-19~PITUITARY**

#### **HD-19.1 Pituitary**

- ✓ Bitemporal hemianopsia is the classic finding.
- ✓ Endocrine laboratory studies should be performed prior to considering advanced imaging.
- ✓ Pituitary imaging is primarily performed with MRI head without and with contrast (CPT<sup>®</sup> 70553):
  - MRI orbit, face, neck (CPT<sup>®</sup> 70543) or CT head without and with contrast (CPT<sup>®</sup> 70470) are alternatives
  - CT head without contrast (CPT<sup>®</sup> 70450) or without and with contrast (CPT<sup>®</sup> 70470) and/or CT maxillofacial without contrast (CPT<sup>®</sup> 70486) is occasionally used in addition to MRI to visualize pferisellar bony structures in the preoperative evaluation of certain sellar tumors and for preoperative planning for transphenoidal approaches.

#### **PITUITARY IMAGING**

MICROADENOMA (<1cm)		
Indication	Initial Imaging	Repeat Imaging for Non-Operative Care
<b>Acromegaly****</b> (Elevated IGF-1 confirmed by lack of suppression of growth hormone on glucose suppression testing, with or without acromegaly)	MRI head without and with contrast (CPT <sup>®</sup> 70553)	MRI Brain without and with contrast (CPT <sup>®</sup> 70553) <ul style="list-style-type: none"> <li>• At least 12 weeks after surgery to evaluate for residual tumor</li> <li>• If treated with Pegvisomant, 6 to 12 months after treatment initiated, then annually if stable or if hormone levels increase or neurological findings appear</li> </ul>
<b>Microadenoma:</b> Nonfunctioning, unexplained pituitary asymmetries, and incidentally found small tumors (<1cm)	MRI head without contrast and with contrast (CPT <sup>®</sup> 70553)	MRI head without contrast and with contrast (CPT <sup>®</sup> 70553) at: <ul style="list-style-type: none"> <li>• 6 and 12 months, then yearly for 3 years if stable. After 3 years, then every other year for the next 6 years, then every 5 years if stable.</li> </ul>

<b>Prolactinomas*</b>	MRI head without and with contrast (CPT <sup>®</sup> 70553) with: <ul style="list-style-type: none"> <li>○ Unexplained elevated prolactin (normal prolactin levels range up to 20 µg/l in non-lactating, non-pregnant women and in males. Transient elevation of up to 40 µg/l in females can occur, and requires repeating prior to consideration of advanced imaging); or</li> <li>○ Persistent galactorrhea/nipple discharge: see Chest-25.7</li> <li>○ After initial start of dopamine agonist therapy, repeat MRI in 1 year (or in 3 months if macroprolactinoma), if prolactin levels continue to rise while on dopaminergic agents, or if new symptoms emerge (e.g., galactorrhea, visual disturbances, headaches, or other hormonal disorders occur)</li> <li>○ In those with visible tumor remnant after treatment initiated, continue imaging per microadenoma or macroadenoma guidelines, accordingly.</li> </ul>	
<b>TSH, FSH, and LH producing</b>	MRI head without and with contrast (CPT <sup>®</sup> 70553) when hormone levels are inappropriately elevated.	
<b>Male Hypogonadism</b>	MRI head without and with contrast (CPT <sup>®</sup> 70553) if pituitary hormones are borderline to low (LH <i>or</i> FSH) and serum total testosterone of less than 80% of the lower limit of normal (<150 ng/l, most labs).	
<b>Panhypopituitarism</b>	MRI head without and with contrast (CPT <sup>®</sup> 70553)	
<b>ADH ABNORMALITIES</b>		
Indication	Initial Imaging	Repeat Imaging for Non-Operative Care
<b>Diabetes Insipidus (DI)</b>	MRI head without and with contrast (CPT <sup>®</sup> 70553) if: <ul style="list-style-type: none"> <li>• Laboratory testing consistent with DI (serum osmolality should be high and urine osmolality should be low) and etiology uncertain.</li> </ul>	NA
<b>Syndrome of Inappropriate ADH (SIADH)</b>	MRI head without and with contrast (CPT <sup>®</sup> 70553) if: <ul style="list-style-type: none"> <li>• Etiology remains uncertain or is thought to be in the nervous system;</li> <li>• Urine osmolality should be high and serum osmolality low.</li> </ul>	NA
<b>Macroadenoma (greater than 10mm)</b>	MRI head without and with contrast (CPT <sup>®</sup> 70553)	MRI head without and with contrast(CPT <sup>®</sup> 70553) every: <ul style="list-style-type: none"> <li>• 6 months for the first year; then</li> <li>• Annually for 5 years (longer if craniopharyngiomas);</li> <li>• Every 6 months if treatment is deferred.</li> </ul>
<b>Other Pituitary Region Tumors**</b>	Evaluation may require CT in addition to MRI to evaluate for hyperostosis. Requests will be sent for Medical Director review.	
<b>Enlarged/Empty Sella Turcica***</b>	Head CT without and with contrast (CPT <sup>®</sup> 70470) or, MRI head without and with contrast (CPT <sup>®</sup> 70553) to: <ul style="list-style-type: none"> <li>• Exclude residual pituitary tumor, and</li> <li>• To assess the position of the chiasm since herniation into the sella, causes</li> </ul>	MRI without and with contrast (CPT <sup>®</sup> 70553) 1-5 years after the initial study can be performed.

## **HD 19.2: Additional Imaging**

- ✓ Post-operatively, follow-up pituitary imaging is generally done at the discretion of the neurosurgeon, usually at 3 months if stable.
- ✓ If a pituitary abnormality is reported incidentally on a MRI Brain or CT Brain performed for other reasons, a follow-up dedicated pituitary study may be obtained (Brain MRI Brain without and with contrast CPT<sup>®</sup> 70553 or MRI Orbit/Face/Neck CPT<sup>®</sup> 70543. CPT<sup>®</sup> 70553 covers both brain and dedicated pituitary if performed at the same time; no additional CPT<sup>®</sup> codes are needed.)
- ✓ In those who, after 2 years of dopamine agonist treatment, have no visible tumor remnant with normal prolactin levels on either tapered or discontinued DA therapy, MRI imaging is repeated only if prolactin increases above normal levels.

### **Practice Notes**

**\*Prolactinoma Note:** Most common of the secreting Microadenoma (>50%). Normal prolactin levels range up to 20 µg/l in non-lactating, non-pregnant women and in males. Transient elevation of up to 40 µg/l in females can occur, and requires repeating prior to consideration of advanced imaging. Routine surveillance during pregnancy is not recommended due to risk to fetus. Repeat imaging is performed for new or worsening symptoms, such as headaches or visual symptoms.

**\*\*Other Pituitary Region Tumor Notes:** Craniopharyngiomas arise in the parasellar area. About 10% of meningiomas arise in this area.

**\*\*\*Enlarged/Empty Sella Turcica Notes:** An enlarged sella turcica without evident tumor is an incidental finding on MRI head or CT head from a defect in the dural diaphragm of the sella (especially if there is elevated intracranial pressure from another cause), pituitary surgery, or as a result of a pituitary tumor which has expanded the sella and then infarcted (pituitary apoplexy).

**\*\*\*\*Acromegaly:** Rarely, biochemically confirmed acromegaly with a normal pituitary gland on MRI may occur. Somatostatin receptor scintigraphy (Octreoscan) of thorax and abdomen and GHRH level may be considered to evaluate ectopically located disease.

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## HEAD IMAGING GUIDELINES

### **HD-20~SCALP and SKULL LESIONS**

#### **HD-20.1 Scalp and Skull Lesions**

The majority of these are benign soft tissue or bony lesions easily defined by physical examination or with skull x-rays.

- ✓ Head CT without or without and with contrast (CPT<sup>®</sup> 70450 or CPT<sup>®</sup> 70470) is appropriate for the following scenarios:
  - Any lesion on physician examination and skull x-ray which is not clearly benign.
  - Langerhans' cell histiocytosis, myeloma, and metastatic cancer, when symptoms suggest bony lesions.
  
- ✓ MRI head without contrast (CPT<sup>®</sup> 70551) or with and without contrast (CPT<sup>®</sup> 70553) may be considered if there is concern for intracranial extension.

## HEAD IMAGING GUIDELINES

### **HD-21 STROKE/TIA**

#### **HD-21.1 Stroke/TIA**

- ✓ *One* from each of the following procedures can be considered for the initial occurrence or repeat episodes of TIA, stroke<sup>1-4</sup> or Transient Global Amnesia<sup>5</sup>:
  - CT head without contrast (CPT<sup>®</sup> 70450) or CT head without and with contrast (CPT<sup>®</sup> 70470) *or* MRI head without and with contrast (CPT<sup>®</sup> 70553) or MRI head without contrast (CPT<sup>®</sup> 70551).
    - MRI is preferred with later presentation for evaluation and can be considered after an initial CT head<sup>1-4</sup>
  - Duplex ultrasound of the carotid arteries *or* MRA neck without contrast (CPT<sup>®</sup> 70547) or MRA neck with contrast (CPT<sup>®</sup> 70548) or MRA neck without and with contrast (CPT<sup>®</sup> 70549) or Neck CTA (CPT<sup>®</sup> 70498); and MRA Head without contrast (CPT<sup>®</sup> 70544).
- ✓ MRA head without contrast (CPT<sup>®</sup> 70544) or CTA head with contrast (CPT<sup>®</sup> 70496) may be considered in addition to the above in the following clinical scenarios:
  - Vertebrobasilar stroke (vertigo associated with diplopia, dysarthria, bifacial numbness or ataxia)<sup>1-4</sup>.
  - Suspected Carotid or Vertebral Artery Dissections<sup>2-4</sup>. Risks may include premature stroke (under age 50), head or neck trauma, fibromuscular dysplasia, Ehlers-Danlos syndrome, and chiropractic neck manipulation.
    - Repeat imaging as determined by a specialist.
  - Suspected Venous Infarcts [as MRV (CPT<sup>®</sup> 70544) or CTV (CPT<sup>®</sup> 70496)] if identified on CT/MRI head<sup>6</sup>.
- ✓ MRA neck without and with contrast (CPT<sup>®</sup> 70549) is reserved for evaluation of possible or known arterial dissection.

#### **HD-21.2 Venous Infarcts**

- ✓ MRV (CPT<sup>®</sup> 70544) or CTV (CPT<sup>®</sup> 70496) and MRI head without contrast (CPT<sup>®</sup> 70551) are appropriate in the following scenarios:
  - Intracranial hypertension with headache, vomiting and papilledema from venous sinus thrombosis
  - Venous infarction is identified on MRI head or Head CT
  - Women with postpartum stroke or postpartum papilledema
  - Children or young adults who present with a stroke in which headache and seizures are prominent features, or who are known to have an intrinsic system clotting disorder.

## **Practice Notes**

Transient Global Amnesia is the “...sudden onset of transient inability to retain new information and to recall previous events for a variable period of time, generally occurring in middle-aged or elderly patients formerly in good health and without significant cardiac or cerebrovascular disease...”<sup>5</sup>

## **References**

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## HEAD IMAGING GUIDELINES

### **HD-22~CEREBRAL VASCULITIS**

#### **HD-22.1 Cerebral Vasculitis**

- ✓ MRI head without and with contrast (CPT<sup>®</sup> 70553) is considered when CNS vasculitis is suspected.
  - MRA Head without and with contrast (CPT<sup>®</sup> 70546) and MRA Neck without or with contrast (CPT<sup>®</sup> 70549); CTA<sup>3</sup> may be considered in addition to MRI.

#### **Practice Notes**

Classification of vasculitides based on vessel size adapted from Joseph<sup>1</sup>. MRA and CTA are useful for the evaluation of the large proximal arteries; evaluation of a possible small vessel vasculitis may be beyond the resolution of routine Head MRA and CTA. However, other abnormalities, such as atherosclerotic disease, arterial dissection, moyamoya disease, or reversible cerebral vasoconstriction may be demonstrated. Conventional angiogram is superior to MRA and CTA in demonstrating abnormalities in smaller vessels and is considered the “gold standard” in the evaluation of primary small vessel CNS vasculitis.

<b>Dominant Vessel Involved</b>	<b>Primary</b>	<b>Secondary</b>
Large arteries	<ul style="list-style-type: none"><li>• Giant cell arteritis</li><li>• Takayasu’s arteritis</li></ul>	Aortitis with rheumatoid disease; Infection (e.g. syphilis)
Medium Arteries	<ul style="list-style-type: none"><li>• Classical polyarteritis nodosa</li><li>• Kawasaki disease</li></ul>	Infection (e.g. hepatitis B)
Small vessels and medium arteries	<ul style="list-style-type: none"><li>• Wegener’s granulomatosis</li><li>• Churg–Strauss syndrome</li><li>• Microscopic polyangiitis</li></ul>	Vasculitis with rheumatoid disease, systemic lupus erythematosus, Sjögren’s syndrome, drugs, infection (e.g. HIV)
Small vessels	<ul style="list-style-type: none"><li>• Henoch-Schönlein purpura</li><li>• Essential cryoglobulinaemia</li><li>• Cutaneous leukocytoclastic vasculitis</li></ul>	Drugs (e.g. sulphonamides, etc.) Infection (e.g. hepatitis C)

#### **References**

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## HEAD IMAGING GUIDELINES

### **HD-23~DIZZINESS, VERTIGO and SYNCOPE**

#### **HD-23.1 Dizziness, Vertigo, and Syncope**

- ✓ The initial components in the evaluation of false sensations of balance or motion include obtaining a patient history and performing a physical examination that can assist in diagnosis. These include the elimination of inciting factors.<sup>1,2</sup>
- ✓ Evaluation of arterial blood flow (Carotid Doppler, transcranial Doppler, Neck and Head MRA/CTA), CT Head and MRI Head are not indicated unless a primary neurological cause of transient loss of consciousness is suspected. Neurological testing is not indicated for patients with uncomplicated syncope.
- ✓ Prior to advanced imaging, the minimum initial evaluation should include the following:
  - A detailed description of the symptoms
  - Orthostatic blood pressure,<sup>1,2</sup>
  - Dix-Hallpike maneuver or other positional testing,<sup>1,2</sup>
  - Nystagmus examination,<sup>1,2</sup>
  - Any one Gait examination, including Romberg,<sup>1,2</sup>
  - Psychiatric evaluation including for anxiety or panic disorders (if suspected),<sup>1,2</sup>
  - Hearing testing (if associated with hearing loss) to determine if conductive, sensorineural, or mixed,<sup>5</sup>
  - Vision examination<sup>1</sup>
- ✓ CT temporal bone without contrast (CPT<sup>®</sup> 70480) may be considered in addition to the MRI evaluation if concern for trauma, superior canal dehiscence or other bony abnormalities.
- ✓ MRI head with attention to internal auditory canal without and with contrast (CPT<sup>®</sup> 70553) or without contrast (CPT<sup>®</sup> 70551; limited study CPT<sup>®</sup> 70540 or CPT<sup>®</sup> 70543)<sup>3,5</sup> can be considered when the initial evaluation reveals:
  - Any associated neurological signs or symptoms<sup>2</sup>
    - Cerebrovascular symptoms of TIA or CVA<sup>2</sup>
    - Examples include drop attacks, seizures, coincident headache, ataxia, aura or focal neurological findings
  - Equivocal or unusual nystagmus findings, including direction changing or persistent downbeat nystagmus<sup>2,4</sup>
  - Absent head thrust sign<sup>2</sup>
  - Short duration (minutes) recurrent attacks<sup>2</sup>

- CT temporal bone without contrast (CPT<sup>®</sup> 70480) may be considered in addition to the MRI evaluation<sup>5</sup>
- Hearing loss associated with
  - Progressive unilateral hearing loss<sup>3</sup>
  - Sensorineural<sup>5</sup>
  - Conductive:<sup>5</sup> CT temporal bone without contrast (CPT<sup>®</sup> 70480) may be considered in addition to the MRI evaluation
  - Congenital or total hearing loss:<sup>5</sup> CT temporal bone without contrast (CPT<sup>®</sup> 70480) may be considered in addition to the MRI evaluation
  - Pre-surgical planning or cochlear implant candidate:<sup>5</sup> CT temporal bone without contrast (CPT<sup>®</sup> 70480) may be considered in addition to the MRI evaluation
- Features atypical for benign positional vertigo, which may include abnormal cranial nerve findings, visual disturbances, and severe headache<sup>4</sup>
- Central vertigo
- Also see: **HD-21 Stroke/TIA**

## **References**

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## HEAD IMAGING GUIDELINES

### **HD-24~OTHER IMAGING STUDIES**

**Some payers may consider these techniques investigational, and their coverage policies may take precedence over eviCore's guidelines.**

#### **HD-24.1 Functional MRI (f-MRI)**

- ✓ f-MRI is useful in pre-operative scenarios to define the “eloquent” areas of brain.
- ✓ The ordering physician must be a neurosurgeon or radiation oncologist. All other requests should be sent for MD review. It must be evident that brain surgery is planned, and that f-MRI is being performed to avoid the language centers, or other processing centers, of the brain.
- ✓ f-MRI can be approved with PET brain in epilepsy surgery planning.
- ✓ Procedure codes for functional MRI:
  - CPT<sup>®</sup> 70554 MRI head, functional MRI, including test selection and administration of repetitive body part movement and/or visual stimulation, not requiring physician or psychologist administration.
  - CPT<sup>®</sup> 70555 MRI head, functional MRI; requiring physician or psychologist administration of entire neurofunctional testing.

#### **HD-24.2 Magnetic Resonance Spectroscopy (MRS)**

- ✓ All requests for MRS will be forwarded for Medical Director review.
- ✓ MRS involves analysis of the levels of certain chemicals in a pre-selected voxels (small regions) on an MRI scan done at the same time.
- ✓ MRS is evaluated on a case-by-case basis, and may be considered:
  - Distinguish recurrent brain tumor from radiation necrosis as an alternative to PET (CPT<sup>®</sup> 78608).
  - Diagnosis of certain rare inborn errors of metabolism affecting the CNS (primarily pediatric patients).

### **HD-24.3 CSF Flow Imaging**

- ✓ This is generally imaged as a part of a head MRI study. It is not coded separately for preoperative evaluation of hydrocephalus and Chiari syndrome, with either features of hydrocephalus or syrinx.
- ✓ There is no specific or unique procedure code for this study; it is done as a special sequence of a routine MRI head without contrast (CPT<sup>®</sup> 70551).

### **HD-24.4 CT or MRI Perfusion**

- ✓ Performed as part of a head CT or MRI examination in the evaluation of patients with very new strokes or brain tumors.
- ✓ Category III 0042T - “cerebral perfusion analysis using CT”
- ✓ There is no specific CPT<sup>®</sup> code for MRI Perfusion. Perfusion weighted images are obtained with contrast and are not coded separately from a contrasted MRI Head examination. If MRI head without and with contrast is approved, no additional CPT<sup>®</sup> codes are necessary or appropriate to perform MRI perfusion.

### **HD-24.5 Magnetic Resonance Neurography (MRN)**

MRN is currently considered investigational by most payers.

### **HD-24.6 Cone Beam Computed Tomography (CBCT)**

MD review is required.

CPT<sup>®</sup> Codes: 70486, 70487, 70488, 70480, 70482 (NO separate 3-D rendering codes should be reported)

See: **HD-30~Temporomandibular Joint Disease (TMJ)**

### **HD-24.7 Transcranial Doppler (CPT<sup>®</sup> 93886)**

- ✓ Transcranial Doppler (TCD) is a noninvasive ultrasonic technique that measures local blood flow velocity and direction in the proximal portions of large intracranial arteries.
- ✓ It is used principally in the evaluation and management of patients with cerebrovascular disease.
  - Children with sickle cell anemia (annual screening and evaluation for TIA/CVA)
  - Evaluation of right to left cardiac shunts: TEE is preferred for initial screening as it provides direct anatomic information regarding the size and nature of the shunt. TCD may serve as an adjunct evaluation in patients with known shunts.



- Evaluation of intracranial occlusive disease in patients with documented stroke or TIA.
- Evaluation of hemodynamic effects of known severe extra-cranial occlusive disease.
- Other indications and uses of TCD generally involve in-patient settings: Evaluation of vasospasm in SAH, determination of brain death, evaluation of acute stroke and need for thrombolytics or other intervention, and intraoperative monitoring.

Note: TCD studies are not indicated for evaluation of brain tumors, degenerative disease, psychiatric disorders, epilepsy, migraine or other headache disorders.

#### CPT<sup>®</sup> Codes:

- 93886 Transcranial Doppler study of the intracranial arteries; complete study
- 93888 Limited study (follow up)
- 93890 Vasoreactivity study
- 93892 Emboli detection without intravenous microbubble injection
- 93893 Emboli detection with intravenous microbubble injection

Note: CPT<sup>®</sup> 93890 – CPT<sup>®</sup> 93893, represent add on services that require additional expertise, lab time, and equipment not included in the complete and limited codes.

### **References**

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10. Parsons MW, Pepper EM, Bateman GA, Wang Y, Levi CR. Identification of the penumbra and infarct core on hyperacute noncontrast and perfusion CT. *Neurology* 2007;68:730-736.
11. Haughton VM, et al. *Mapping brain function with functional magnetic resonance imaging*. In Latchaw RE, Kucharczyk J, Moseley ME. *Imaging of the Nervous System*. Philadelphia, Elsevier, 2005, pp.89-100

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13. Medina LS, Bernal B, Dunoyer C, et al. Seizure disorders: functional MR imaging for diagnostic evaluation and surgical treatment—perspective study. *Radiology* 2005;236:247-253.
14. Petrella JR, Shah LM, Harris KM, et al. Preoperative functional MRI imaging localization of language and motor areas: effect on therapeutic decision making in patients with potentially resectable brain tumors. *Radiology*. 2006; 240(3):793-802.
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**HD-25~EPISTAXIS**

**HD-25.1 Epistaxis**

- ✓ All cases should go to MD for review.
- ✓ Maxillofacial CT without or without and with contrast (CPT<sup>®</sup> 70486 or CPT<sup>®</sup> 70488) and/or MRI orbit, face, and/or neck without and with contrast (CPT<sup>®</sup> 70549) is appropriate based on endoscopic findings of mass lesion during ENT examination.

**References**

1. American College of Radiology (ACR). ACR Appropriateness Criteria<sup>®</sup>. Sinonasal disease. 2012. Available at:  
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**HEAD IMAGING GUIDELINES**

**HD-26~MASTOID DISEASE**

**HD-26.1 Mastoid Disease**

- ✓ See Pediatric Head Guidelines, **PEDHD 16.2 Ear Pain**

## HEAD IMAGING GUIDELINES

### **HD-27~HEARING LOSS**

#### **HD-27.1 Hearing Loss**

- ✓ MRI head with attention to internal auditory canal without and with contrast (CPT<sup>®</sup> 70553), or MRI head with attention to internal auditory canal without contrast or CT temporal bone without contrast (CPT<sup>®</sup> 70480) can be considered for hearing loss<sup>1</sup>. Clinical information provided should include evaluation of hearing either by bedside testing or by formal audiology.
- ✓ Limited Study MRI with attention to internal auditory canal (CPT<sup>®</sup> 70540 - CPT<sup>®</sup> 70543) can be approved in place of MRI head with attention to internal auditory canal when requested by the provider in the following scenarios:
  - Any sensorineural (cochlea or auditory nerve)<sup>1</sup>
  - Any conductive<sup>1</sup>(including Cholesteatoma<sup>2</sup>)
  - Cochlear implants candidate<sup>1</sup>
  - Fluctuating hearing loss<sup>1</sup>

#### **Practice Note**

An initial evaluation generally determines whether a patient's hearing loss is conductive (external or middle ear structures) or sensorineural (inner ear structures, such as cochlea or auditory nerve) hearing loss.<sup>1,2</sup>

#### **References**

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2. Isaacson J, Vora N. Differential Diagnosis and Treatment of Hearing Loss, *Am Fam Physician*. 2003 Sep 15;68(6):1125-1132

**HD-28~EAR PAIN (OTALGIA)**

**HD-28.1 Ear Pain (Otalgia)**

- ✓ CT temporal bone without and with contrast (CPT<sup>®</sup> 70482) or without contrast (CPT<sup>®</sup> 70480) and/or MRI head without contrast (CPT<sup>®</sup> 70551) or without and with contrast (CPT<sup>®</sup> 70553) can be considered for:
  - Common causes of ear pain include ear infections, dental problems, sinus infection, neck problems, tonsillitis, and pharyngitis, as well as otitis media or externa or no obvious cause, which do not improve over a reasonable time.
  - Cerebellopontine angle or other intracranial tumor is suspected.
  - Nervus intermedius neuralgia in order to exclude a structural lesion.

See also: **HD-27~Hearing Loss**

**References**

1. Li JC and Brunk J. *Otalgia*. eMedicine. March 16, 2010, <http://emedicine.medscape.com/article/845173-overview>. Accessed June 13, 2011
2. Imaging of the Temporal Bone, 4th ed. *J.D. Swartz and L.A. Loevner, eds. Thieme Medical Publishers; 2009.*

## HEAD IMAGING GUIDELINES

### **HD-29~SINUSITIS**

#### **HD-29.1 Sinus Imaging in Adults**

- ✓ CT Maxillofacial without contrast (CPT<sup>®</sup> 70486) or limited sinus CT without contrast (CPT<sup>®</sup> 76380) is considered for any of the following:
  - Acute (<4 weeks) and sub-acute (4-12 weeks) rhinosinusitis in immune-deficient (i.e., fungal sinusitis)<sup>1</sup>
    - There is no evidence to support advanced imaging of Acute (<4 weeks) and subacute (4–12 weeks) uncomplicated rhinosinusitis.<sup>1,3</sup>
    - There is no evidence to support routine follow-up advanced imaging after treatment with clinical improvement of sinusitis.<sup>1</sup>
  - Recurrent (<30 days episodes separated by at least 10 asymptomatic days) acute/subacute/chronic rhinosinusitis in a patient who is possible surgical candidate.<sup>1,2,3</sup>
  - Sinonasal polyposis<sup>1</sup>
  - Chronic (>12 weeks) sinusitis<sup>3</sup>
  - Worsening or failure to improve within 72 hours of initial management<sup>4</sup>
  - CT Orbits without contrast (CPT<sup>®</sup> 70480) or with contrast (CPT<sup>®</sup> 70481) or MRI head without contrast (CPT<sup>®</sup> 70551) or without and with contrast (CPT<sup>®</sup> 70553) or CT head without and with contrast (CPT<sup>®</sup> 70470) may be added to the standard sinus CT procedure in the following scenarios
    - Orbital and/or Intracranial complications with ocular and/or neurological deficit<sup>1,3,4</sup>
    - Any new obstructing sinus mass, including retention cysts and nasal polyps, that obscures the physician's view on endoscopy (MRI orbit/face/neck without and with contrast, CPT<sup>®</sup> 70543,) may be added to the standard sinus CT procedure.
    - Fungal Sinusitis<sup>1</sup>
  - One time repeat imaging may be approved in the following scenarios:
    - An ENT specialist requests the imaging AND:
    - There is no improvement after an additional 4 weeks of conservative treatment after initial imaging was completed; AND
    - There has been a follow-up visit since the previous imaging; OR
    - If there is a new abnormality on exam such as obstructing mass
- ✓ CT Maxillofacial (CPT<sup>®</sup> 70486) may be approved following MRI Brain if request otherwise meets criteria for imaging of sinus disease.

## **Practice Notes**

Rhinosinusitis is defined as inflammation of the nasal cavity and adjacent paranasal sinuses. Acute sinusitis refers to symptom duration <4 weeks, subacute 4 to 12 weeks, and chronic >12 weeks. Complicated sinusitis refers to symptoms suggesting spread of disease into adjacent structures, including orbital or intracranial complications.<sup>1,2,3</sup>

## **References**

1. Rosenfeld RM, Piccirillo JF, Chandrasekhar SS, et al. Clinical practice guideline (update): adult sinusitis. *Otolaryngol Head Neck Surg.* 2015 Apr;152(2 Suppl):S1-S39
2. Desrosiers M, Evans GA, Keith PK, Wright ED, Kaplan A, Bouchard J, Ciavarella A, Doyle PW, Javer AR, Leith ES, Mukherji A, Schellenberg RR, Small P, Witterick IJ. Canadian clinical practice guidelines for acute and chronic rhinosinusitis. *Allergy Asthma Clin Immunol.* 2011 Feb 10;7(1):2
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4. Huntzinger A. Guidelines for the Diagnosis and Management of Rhinosinusitis in Adults, *Am Fam Physician.* 2007;76:1718-1724



## HEAD IMAGING GUIDELINES

### **HD-30~Temporomandibular Joint Disease (TMJ) and Dental/Periodontal/Maxillofacial Imaging**

#### **HD-30.1 Temporomandibular Joint Disease (TMJ)**

- ✓ TMJ MRI (CPT<sup>®</sup> 70336) is the diagnostic study of choice and should be reserved for those who fail a minimum of 6 weeks of non-surgical treatment and who are actively being considered for TMJ surgery.
- ✓ CT maxillofacial without contrast (CPT<sup>®</sup>70486) or without and with contrast (CPT<sup>®</sup>70488) may be performed when there is suspicion of bony involvement from the MRI and if primary bony pathologies are suspected clinically.
- ✓ Ultrasound can be used to look for the presence of a joint effusion and to evaluate cartilage and disk displacement with open and closed mouth imaging and to guide injections.
- ✓ TMJ Imaging in children with Juvenile Rheumatoid Arthritis

See: **PEDHD-27 Temporomandibular Joint Imaging in Children**

#### **HD-30.2 Dental/Periodontal/Maxillofacial Imaging**

- ✓ All requests will be forwarded to Medical Director for review.
- ✓ Indications for cone beam CT if requested by an oral or maxillofacial surgeon:
  - Impacted teeth
  - Supernumerary teeth
  - Dentoalveolar trauma
  - Root resorption
  - Foreign body
  - Odontogenic cysts, tumors, or other jaw pathology
  - Cleft pathology
  - Orthognathic surgery for dentofacial anomalies
  - Osteomyelitis and odontogenic infections
  - Bisphosphonate-related osteonecrosis of the jaw
  - Salivary gland stones
  - Maxillofacial bone graft planning
  - Dental implants related to tooth loss from injury, trauma, or jaw pathology such as cysts, tumors, or cancer

- ✓ Currently, there are no published guidelines from any specialty society such as the American Association of Oral and Maxillofacial Surgeons regarding the appropriate use of cone beam CT for dentoalveolar conditions, maxillofacial conditions, orthodontics, endodontics, or dental implants.
- ✓ Most payers do not include orthodontic clinical conditions, replacement of teeth lost due to caries or periodontal disease, non-trauma related dental implantology, or endodontic treatment not related to trauma to the natural tooth in their coverage policies.
  - Thus, cone beam CT scans in these patients would also not be included in the coverage policy.
  - These coverage policies will take precedence over eviCore's guidelines.
- ✓ **Cone Beam CT:** Report with CPT<sup>®</sup> Codes: 70486, 70487, 70488, 70480, 70482.
- ✓ 3-D rendering (CPT<sup>®</sup> 76376 or CPT<sup>®</sup> 76377) should NOT be reported separately.
- ✓ Also called i-CAT scanner or mini-CAT scanner.

### **References**

1. *International Journal of Oral & Maxillofacial Surgery* 2009 June;38(6):609-625
2. *N Engl J Med* 2008;359:2693-2705
3. Bag, et al. Imaging of the temporomandibular joint: An update. *World Journal of Radiology*. 2014, August 28; 6(8) 567-582.

## HEAD IMAGING GUIDELINES

### **HD-31~TINNITUS**

#### **HD-31.1 Tinnitus**

- ✓ Advanced imaging is not usually indicated in the evaluation of Tinnitus, unless one or more of the following signs and symptoms are present:
  - Tinnitus localized to a single ear
  - Pulsatile tinnitus
  - Focal neurological abnormalities
  - Asymmetric hearing loss

If one or more of these signs and symptoms are present, the following advanced imaging studies can be considered:

- ✓ MRI head without and with contrast<sup>1,2,3</sup> (CPT<sup>®</sup> 70553), *or*
- ✓ CT temporal bone<sup>3</sup> without or without and with contrast (CPT<sup>®</sup> 70480 or CPT<sup>®</sup> 70482), *or*
- ✓ MRI head with attention to internal auditory canal<sup>3</sup> without and with contrast (CPT<sup>®</sup> 70553), *or* MRI head and internal auditory canal<sup>3</sup> without contrast (CPT<sup>®</sup> 70551), *or*
- ✓ Limited Study MRI with attention to internal auditory canal (CPT<sup>®</sup> 70540 – CPT<sup>®</sup> 70543) can be approved in place of MRI head with attention to internal auditory canal when requested by the provider
- ✓ MRA head without contrast (CPT<sup>®</sup> 70544) and/or MRA neck without contrast (CPT<sup>®</sup> 70547) or MRA neck with contrast (CPT<sup>®</sup> 70548) or CTA Head (CPT<sup>®</sup> 70496) and/or CTA Neck (CPT<sup>®</sup> 70498) can be added if there is suspicion of vascular lesions
- ✓ Head CT<sup>1,2</sup> without contrast (CPT<sup>®</sup> 70450) or head CT without and with contrast (CPT<sup>®</sup> 70470) can be approved for:
  - Suspected intracranial extension of a tumor
  - Patient is unable to have an MRI

#### **Practice Notes**

The history in patients with tinnitus should include a description of the tinnitus (episodic or constant, pulsatile or non-pulsatile, rhythmicity, pitch, quality of the sound), as well as inciting or alleviating factors. Continuous and pulsatile tinnitus are more concerning for an underlying and significant disorder.<sup>2</sup> Audiometric assessment can be used as initial diagnostic testing<sup>1,2,3</sup> particularly in patients with tinnitus that is unilateral, persistent (>6 months) or associated with hearing difficulties.

#### **References**

1. Vattoth S, Shah R, Cure JK. A compartment-based approach for the imaging evaluation of tinnitus. AJNR, 2010; 31: 211-18.

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3. Expert Panel on Neurologic Imaging. ACR Appropriateness Criteria® hearing loss and/or vertigo. American College of Radiology (ACR); 2013.
4. American Speech-Language-Hearing Association, Tinnitus Triage Guidelines, <http://www.asha.org/aud/Articles/Tinnitus-Triage-Guidelines>. Acquired March 18, 2014.
5. Tunkel DE, Bauer CA, Sun GH, Rosenfeld RM, et al. Clinical Practice Guideline: Tinnitus. *Otolaryngology – Head and Neck Surgery*, 2014; 151: S1.

## HEAD IMAGING GUIDELINES

### **HD-32~EYE DISORDERS**

#### **HD-32.1 Eye Disorders**

- ✓ MRI head without and with contrast (CPT<sup>®</sup> 70553) and/or MRI orbit without and with contrast (CPT<sup>®</sup> 70543) or MRI head without contrast (CPT<sup>®</sup> 70551) and/or MRI orbit without contrast (CPT<sup>®</sup> 70540). May be considered in the following scenarios\*:
  - Anisocoria which is of new onset (e.g. not present in previous photographs) and  $\geq$  1mm Acute or progressive vision loss due to any cause, including suspected optic neuritis
  - Ophthalmoplegia
  - Binocular Diplopia
  - Horner's Syndrome, for which CT Neck with contrast and/or CT Chest with contrast may be considered in addition to the head or orbital imaging.
  - CT head without contrast may be substituted for the MRI imaging if there has been a head injury.
- ✓ Evaluation of a third nerve palsy may be accomplished with an MRI head without and with contrast (CPT<sup>®</sup> 70553) and/or MRA brain without contrast (CPT<sup>®</sup> 70544).
  - CT head without and with contrast (CPT<sup>®</sup> 70470) and/or CT orbit with contrast (CPT<sup>®</sup> 70481) can be approved if there is a clinical question of blood in the subarachnoid space.
- ✓ If MRI contraindicated or cannot be performed, CT head without and with contrast (CPT<sup>®</sup> 70470), CT orbit with contrast (CPT<sup>®</sup> 70482) or CT orbit without and with contrast (CPT<sup>®</sup> 70482) may be considered as substitutes.

Also see **HD-16~Multiple Sclerosis (MS) and Related Conditions**

#### **Practice Notes**

\*Advanced imaging of the brain and orbit are not routinely paired. Medical necessity for each region is needed to image both regions, based on suspicion of these disorders.

#### **References**

1. Wippold FJ II, Cornelius RS, Berger KL, Broderick DF, Davis PC, Douglas AC, Germano IM, Hadley JA, McDermott MW, Mechtler LL, Smirniotopoulos JG, Waxman AD, Expert Panel on Neurologic Imaging. ACR Appropriateness Criteria<sup>®</sup> orbits, vision and visual loss: American College of Radiology (ACR); 2012.
2. Quisling SV, Shah VA, Lee HK, et al. Magnetic resonance imaging of third cranial nerve palsy and trigeminal sensory loss caused by herpes zoster. *J Neuroophthalmol*. 2006 Mar. 26(1):47-8.
3. Physiologic anisocoria, American Academy of Ophthalmology, <http://one.aao.org> . Acquired March 19, 2014.
4. Deciphering Diplopia, American Academy of Ophthalmology, <http://one.aao.org> . Acquired March 19, 2014.
5. Lee, JH, et. al., Neuroimaging Strategies for Three Types of Horner Syndrome with Emphasis on

Anatomic Location, *American Journal of Roentgenology*. 2007;188: W74-W81.

## HEAD IMAGING GUIDELINES

# **HD-33~ACOUSTIC NEUROMA & OTHER CEREBELLOPONTINE ANGLE TUMORS**

### **HD-33.1 Acoustic Neuroma & Other Cerebellopontine Angle Tumors**

- ✓ Clinical information should include evaluation of hearing either by bedside testing or by formal audiology.
- ✓ Initial diagnosis can be accomplished with MRI head without and with contrast (CPT<sup>®</sup> 70553) which should be done with attention to the internal auditory canals. Clinical information provided should include evaluation of hearing either by bedside testing or by formal audiology.
- ✓ MRI Head without contrast (CPT<sup>®</sup> 70551) may be approved if performed with FIESTA protocol.
- ✓ MRI orbits, neck, or face without and with contrast (CPT<sup>®</sup> 70543) may be considered with audiologic or clinical features of retrocochlear hearing loss and a negative head MRI and in the rare patient in whom a detailed search is indicated for both a lesion of the cerebellopontine angle *and* lesions of the cerebral hemispheres.
- ✓ After resection, MRI head without and with contrast with attention to the internal auditory canals (CPT<sup>®</sup> 70553) at 1 and 5 years is sufficient.
- ✓ Observation with MRI head without and with contrast with attention to the internal auditory canals (CPT<sup>®</sup> 70553) at 6 months after diagnosis and then once a year.

### **References**

1. Hingwala, et al. Applications of 3D CISS sequence for problem solving in neuroimaging. Indian J Radiol Imaging. 2011 Apr-Jun; 21(2): 90–97.
2. Yousry, et al. Visualization of cranial nerves I-XII: value of 3D CISS and T2-weighted FSE sequences. Eur Radiol. 2000;10(7):1061-7.

**HEAD IMAGING GUIDELINES**

**HD-34~PINEAL CYSTS**

See Pediatric Head Guidelines, **PEDHD 13.2 Pineal Cysts**



**HEAD IMAGING GUIDELINES**

**HD-35~ARACHNOID CYSTS**

See Pediatric Head Guidelines, **PEDHD 13.1 Arachnoid Cysts**

## HEAD IMAGING GUIDELINES

### **HD-36~NUCLEAR MEDICINE**

- ✓ Nuclear Medicine
  - Nuclear medicine studies may be used in the evaluation of some head/brain disorders, and other rare indications exist as well:
    - Brain Scintigraphy with or without vascular flow (any one of CPT<sup>®</sup> 78600, CPT<sup>®</sup> 78601, CPT<sup>®</sup> 78605, or CPT<sup>®</sup> 78606)
      - Establish brain death (rarely done in outpatient setting)
    - Brain Imaging SPECT with Ioflupane I-23 (CPT<sup>®</sup> 78607)
      - Immunocompromised patients with mass lesion detected on CT or MRI for differentiation between lymphoma and infection
    - Brain Imaging Vascular Flow (CPT<sup>®</sup> 78610)
      - Cerebral ischemia
      - Establish brain death
    - CSF Leakage Detection (CPT<sup>®</sup> 78650)
      - Evaluation of CSF rhinorrhea or otorrhea, or refractory post-lumbar puncture headache
    - Radiopharmaceutical Dacryocystography (CPT<sup>®</sup> 78660)
      - Suspected obstruction of nasolacrimal duct due to excessive tearing
- ✓ Cisternogram (CPT<sup>®</sup> 78630) is rarely done in children but can be approved for the following:
  - Known hydrocephalus with worsening symptoms
  - Suspected obstructive hydrocephalus
  - Suspected normal pressure hydrocephalus with gait disturbance and either dementia or urinary incontinence
- ✓ Cerebrospinal Ventriculography (CPT<sup>®</sup> 78635) is rarely done in children but can be approved for the following:
  - Evaluation of internal shunt, porencephalic cyst, or posterior fossa cyst
- ✓ Nuclear Medicine Shunt Evaluation (CPT<sup>®</sup> 78645) and CSF Flow SPECT (CPT<sup>®</sup> 78647) are rarely done in children but can be approved for the following:
  - Suspected malfunction of ventriculoperitoneal, ventriculopleural, or ventriculovenous shunts.