

Johns Hopkins University School of Medicine
Appropriate Use Criteria
Priority Clinical Area: Headache
Setting: Ambulatory and Emergency Department

INTRODUCTION

The Centers for Medicare and Medicaid Services (CMS) Appropriate Use Criteria (AUC) program takes effect January 2020 and requires ambulatory and emergency medicine providers to consult AUC using a CMS approved clinical decision support mechanism when ordering advanced imaging (CT, MRI or nuclear medicine) in eight priority clinical areas (PCAs). Headache is included in the PCAs. The purpose of this project was to evaluate the highest-grade evidence in the literature pertaining to the utility of computed tomography (CT), magnetic resonance imaging (MRI) and nuclear medicine scanning for outpatients and emergency department patients with headache, focusing on patient outcomes and costs and in keeping with high value practice.

LITERATURE REVIEW

Jan. 26, 2019

("Headache"[mh] OR "headache"[tiab]) AND ("tomography, x-ray computed"[mh] OR "computed tomography"[mh]) OR "computed tomography"[tiab] OR "magnetic resonance imaging"[mh] OR "magnetic resonance"[tiab] OR "MRI"[tiab] OR "nuclear medicine"[mh]) AND ("clinical study"[Pt] OR "clinical trial"[Pt] OR "comparative study"[Pt] OR "controlled clinical trial"[Pt] OR "evaluation studies"[Pt] OR "meta analysis"[Pt] OR "multicenter study"[Pt] OR "observational study"[Pt] OR "practice guideline"[Pt] OR "randomized controlled trial"[Pt] OR "systematic review"[Pt] OR "validation studies"[Pt]) AND 1990:3000[dp] AND eng[la]

PRISMA

- 747 references imported for screening
 - Zero duplicates removed
- 747 studies screened against title and abstract
 - 627 studies excluded
- 120 studies assessed for full-text eligibility
 - 27 studies excluded
- 93 studies included
 - 25 studies identified clinical indicators of pathology ("red flags")

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Publication type

- Two meta-analyses
- Four systematic reviews
- Three prospective studies
- 13 retrospective studies
- Three clinical practice guidelines

Oxford grade

- Three studies Oxford grade 1
- Six studies Oxford grade 2
- Seven studies Oxford grade 3
- Six studies Oxford grade 4
- Three studies Oxford grade 5

Summary statement: Evidence supports avoidance of immediate advanced imaging at presentation in the absence of neurologic findings or clinical indicators of serious underlying conditions, which include:

- Subarachnoid or parenchymal hemorrhage
- Infection
- Tumor
- Sinus thrombosis
- Arterial dissection

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APPROPRIATE USE CRITERIA

Title	Clinical scenario 1: Concern for subarachnoid hemorrhage/aneurysm or bleed	Clinical scenario 2: Concern for brain abscess or encephalitis	Clinical scenario 3: Concern for sinus thrombosis	Clinical scenario 4: Concern for cerebral artery dissection	Clinical scenario 5: Concern for tumor	Clinical scenario 6: Migraine patient
Definition	One or more of the following: worst headache of life, severe headache, sudden onset, emesis, altered mental status, altered cognition, brought on by cough, sexual activity or exertion	One or more of the following: fever, papilledema, altered mental status, meningismus, focal neurologic deficit, new headache in immunocompromised patient	One or more of the following: headaches that are acute to subacute, focal, continuous, moderate to severe intensity; accompanied by focal neurologic deficits or seizures; in setting of positive D-dimer	One or more of the following: acute onset, severe intensity, ipsilateral and modified by head and/or neck positioning	One or more of the following: new headache especially if >50, papilledema or other evidence if elevated intracranial pressure, focal neurologic deficit, altered mental status, history of cancer including lung cancer	All of the following: Migraine patient with recurrent headaches, no recent change in pattern, no history of seizures, no focal neurologic signs or symptoms
AUC Rules						

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Consistent with AUC	Brain CT without contrast	Brain CT without contrast, brain MRI	Brain CT without contrast, brain CT venogram, brain MRI with MR venogram	Brain CT angiogram, brain MRI with head and neck MR angiogram	Brain CT without contrast, brain MRI	No advanced imaging is consistent with AUC for this clinical presentation.
Allowable by AUC	Brain CT angiogram, brain CT venogram, brain MRI, brain MRI with MR venogram, Brain MRI with head and neck MR angiogram	Brain CT with contrast		Brain CT without contrast	Brain CT with contrast	

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Does not meet AUC	Brain CT with contrast, nuclear medicine brain positron emission tomography (PET)/CT	Brain CT angiogram, brain CT venogram, brain MRI with MR venogram, Brain MRI with head and neck MR angiogram, nuclear medicine brain PET/CT	Brain CT with contrast, brain CT angiogram, brain MRI, brain MRI with head and neck MR angiogram, nuclear medicine brain PET/CT	Brain CT with contrast, brain MRI, brain CT venogram, brain MRI with MR venogram, nuclear medicine brain PET/CT	Brain CT angiogram, brain CT venogram, brain MRI with MR venogram, brain MRI with head and neck MR angiogram, nuclear medicine brain PET/CT	Brain CT without contrast, brain CT with contrast, brain CT angiogram, brain CT venogram, brain MRI, brain MRI with MR venogram, brain MRI with head and neck MR angiogram, nuclear medicine brain PET/CT
No AUC available						
Evidentiary vs Consensus	Evidentiary for imaging appropriateness, consensus for exam protocol	Evidentiary for imaging appropriateness, consensus for exam protocol	Evidentiary for imaging appropriateness, consensus for exam protocol	Evidentiary for imaging appropriateness, consensus for exam protocol	Evidentiary for imaging appropriateness, consensus for exam protocol	Evidentiary

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MULTIDISCIPLINARY TEAM

The Johns Hopkins University School of Medicine requires that all practicing physicians participating in the development of AUC disclose any conflicts of interest using the International Community of Medical Journal Editors (ICJME) form. This information is publically available in a timely fashion upon request, for a period of not less than five years after the most recent published update of the relevant appropriate use criteria. Members of the headache AUC development team are:

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Disclosure: AUC developers may receive future royalties from licensure of AUCs to CMS-approved clinical decision support mechanisms.