

Appropriate Use Criteria for Headache
Red Flag Evidence Table

	Year	Author	Title	Journal	Grade (oxford level of evidence)	Study type	Study details	Rule	Rule (simplified)
#466 - AlonsiME 2018	2018	Alonsi ME.; Goudsmit BFJ.; Jellema K.; van Walderveen MAA.; Wermer MJH.; Algra A.	Yield of Computed Tomography (CT) Angiography in Patients with Acute Headache, Normal Neurological Examination, and Normal Non Contrast CT: A Meta-Analysis.	Journal of stroke and cerebrovascular diseases	1a	SR	Meta-analysis	88 patients from authors' own hospital plus 641 patients identified in 3 studies were analyzed. Overall, 5.7-7.3% respectively (7.4% combined meta-analysis) with abnormality on CTA: overwhelming majority of which were aneurysms and 0.3-0.5% incidence of cerebral venous thrombosis, cervical artery dissection, moyamoya, or RCVS. Of included patients, 73% had history of migraine. Most aneurysms were felt to be incidental and not related to acute headache given negative LP.	Number needed to scan to identify abnormality on CTA was 14, and became 61 if incidental aneurysms thought unlikely to be related to headache syndrome (negative LP for xanthochromia) were removed. Overall diagnostic yield is low of CTA in pts with acute headache and normal HCT and neuro exam, but may be indicated in Emergency situation given risk of consequences if undiagnosed.
#441 - Aygun 2003	2003	Aygun D.; Bildik F.	Clinical warning criteria in evaluation by computed tomography the secondary neurological headaches in adults	European Journal of Neurology	2b	observational study	prospective cohort, good standard reference	Usefulness of 5 clinical warning criteria (CWC) in predicting intracranial lesion on HCT, 70 patients study size. (CWC: increase in intensity or frequency, abrupt onset, increase in intensity despite analgesics, alteration of characteristics of HA, and focal neurological symptoms or findings)	Only CWC of focal neurological symptoms or findings correlated with 100% predictive rate/statistically significant value of abnormal HCT finding (ischemic stroke, ITH, or abscess). CWC of persistence of headache despite analgesics was actually found to be present and statistically significant in patients without abnormal HCT.
#450 - Berger 1996	1996	Berger JR.; Stein N.; Pall L.	Headache and human immunodeficiency virus infection: a case control study.	European neurology	3b	Observational study	case-control study	Qualities of headaches in patients with and without HIV were tracked to determine if any patterns between benign headaches (drug side effects, depression, etc.) and malignant headaches such as in concerns of intracranial neoplasm or opportunistic infection. CSF abnormalities are common in HIV+ patients (76%) but did not show a correlation to headache (as half of patients with abnormal CSF did not have headache) nor does presence of headache correlate with any statistical significance of abnormal findings on MRI. There was no statistical difference in headache frequency or qualities in patients with and without HIV. Headache is common in both HIV+ group and HIV- controls, ~47-55%.	Simplified Rule: Headache presence or new onset headache in HIV+ patient (neurologically asymptomatic and without AIDS) is not correlated with increased likelihood of abnormal MRI, CSF, or neurologic exam when compared to non-HIV control group of patients with headache.
#247 - Bhand 2004	2004	Bhand AA.	Brain abscess--diagnosis and management.	Journal of the College of Physicians and Surgeons--Pakistan : JCPSP Jul 2004;14(7):407-10	4	observational study	cross-sectional study	Evaluation of clinical presentation, diagnosis, treatment, outcomes of 82 patients with brain abscesses. Source of infection/abscess found in 89% of cases, with most common source being otogenic (63%). Mean age was 18.	Simplified Rule: Most common presentation in patients with brain abscess was headache with papilloedema (in 82% of cases). Meningismus only present in 12%, malaise and fever present in 28%. Focal neurologic deficit found in 46%, most often CN deficit of abducens or vestibular. HCT w/ contrast was positive in all cases.
#667 - Brilla 2004	2004	Brilla R.; Block M.; Geremia G.; Wichter M.	Clinical and neuroradiologic features of 39 consecutive cases of West Nile Virus meningoencephalitis.	Journal of the neurological sciences	2b	retrospective cohort	Retrospective review of case series	Rare to uncommon involvement of LMN/anterior horn cells in patients with confirmed WNV in CSF.	Red flags predominant in patients with West Nile meningoencephalitis were fever, headache, and altered mentation/decreased consciousness, though encephalopathy/AMS was most prominent and many had absence of meningeal signs or fever. Rash was more common in those less than 40 years old (65%) compared to 18% in those older than age 40. Limited usefulness of MRI in these patients to support or confirm diagnosis of WNV meningoencephalitis as only 1/39 was abnormal.
#589 - Chu 2001	2001	Chu K.; Kang DW.; Yoon BW.; Roh JK.	Diffusion-weighted magnetic resonance in cerebral venous thrombosis.	Archives of neurology Oct 2001;58(10):1569-76	3b	Observational study	Consecutive patient case series	Three patterns of MRI DWI findings were found in patients with cerebral venous thrombosis: heterogeneous signal intensity, multifocal signal intensity, and high signal intensity. Intravascular clots in cerebral sinus may have high signal intensity on DWI and low intensity on ADC in the early subacute phase. Parenchymal high ADC intensity (bilateral basal ganglia, thalami, cerebellum) may be seen in reversible changes in CVT	DWI sequence on MRI Brain interpreted in tandem with ADC intensity can be useful in discerning diagnostic clues for cerebral venous thrombosis, such as edema patterns and tissue viability, which are involved pathophysiologically in mechanism of ischemic stroke secondary to disruption of BBB and arterial blood flow in CVT
#707 - Alons 2015	2015	Alons IM.; Jellema K.; Wermer MJ.; Algra A.	D-dimer for the exclusion of cerebral venous thrombosis: a meta-analysis of low risk patients with isolated headache.		2a	SR	Meta-analysis	Low risk patients (normal neuro exam, normal HCT, no overt risk factors such as peripartum) with isolated headache consecutively at one institution and identified through literature review were reviewed for D-dimer and presence/absence of cerebral venous thrombosis.	In low-risk patients with isolated headache, D-dimer was 97.8% sensitive for being elevated > 0.5 (positive) in patients with cerebral venous thrombosis and with 85% specificity. A negative D-dimer in a patient with isolated headache had a 99.8% negative predictive value. D-Dimer in low-risk patients with isolated headache and normal neuro exam without overt risk factors for thrombus appears to be sensitive for evaluating for CVT. Patients with high suspicion of CVT should undergo neuro-imaging.
#732 - Coutinho 2014	2014	Coutinho JM.; Gerritsma JJ.; Zuurbier SM.; Stam J.	Isolated cortical vein thrombosis: systematic review of case reports and case series.	Stroke Jun 2014;45(6):1836-8	3a	SR	SR of case-series and case reports	Almost all patients underwent MRI of brain, which was diagnostic of cortical vein thrombosis in 73% of patients. (MR angiography was not done with MRI brain). 81% had a parenchymal brain abnormality on imaging: hemorrhagic infarct most common, then localized edema, then localized SAH, which was more common in ICVT than in Cerebral Venous Sinus Thrombosis. 71% of isolated cortical vein thrombosis patients had headache, 58% had seizure. Fundoscopy was negative for papilloedema in all patients with cortical vein thrombosis.	MRI imaging (including T2 Gradient Echo sequence which has high sensitivity for detecting thrombus in cortical veins) was the most commonly used imaging for diagnosing cortical vein thrombosis, and was positive in 73% of cases (but this was MRI alone, without concurrent MR angiography). In difficult cases, conventional angiography had to be used when MRI was negative. CT Venography was rarely used, and the review lacked enough data to determine whether CTV was insufficient for diagnosing isolated cortical vein thrombosis.
#703 - Davison 1997	1997	Davison SP.; Facer GW.; McGough PF.; McCaffrey TV.; Reder PA.	Use of magnetic resonance imaging and magnetic resonance angiography in diagnosis of sigmoid sinus thrombosis.	Ear, nose, & throat journal Jul 1997;76(7):436-41	4	Observational study	case series	Non-contrast HCT has significant limitation in evaluating sinuses for thrombosis due to artifact from temporal bone due to signal averaging. Cord sign on non-contrast HCT is rarely seen, and empty delta sign on contrast HCT is seen in only 35% of patients with sigmoid sinus thrombosis, and is more useful in diagnosing sagittal sinus thrombosis.	Combination of MRI brain with MR angiography specifically with 2D ToF is sensitive to slow-flow states and is optimal imaging for diagnosis venous sinus thrombosis. This imaging can differentiate slow flow (which can mimic thrombus on spine echo sequence) from thrombosis, and is ideal for longitudinal imaging to visualize sinus recanalization.
#435 - Issar 2017	2017	Issar P.; Chinna S.; Issar SK.	Evaluation of Cerebral Venous Thrombosis by CT, MRI and MR Venography.	The Journal of the Association of Physicians of India Nov 2017;65(11):16-21	1c	OR	Absolute SnNout / Diagnosis	CT scan showed sinus abnormalities in 36% of patients with CVT and parenchymal abnormality in 46% MRI with 2D TOF venous imaging showed sinus abnormality in 100% and parenchymal abnormality in 52%. GRE T2 sequence is superior at detecting CVST and small hemorrhages than spin echo sequence. Superior sagittal sinus was most common sinus affected (50%). Headache (78%) and seizure (32%) were the most common presenting symptoms	Dry HCT is important for use in the ED for pts presenting with acute headache or seizure, but MRI brain with MRI venography is the best imaging technique for diagnosing CVT.
#400 - Iurlaro 2004	2004	Iurlaro S.; Beghi E.; Massetto N.; Guccione A.; Autunno M.; Colombo B.; Di Monda T.; Gioanco M.; Cortelli P.; Perini F.; D'Onofrio F.; Agostoni E.	Does headache represent a clinical marker in early diagnosis of cerebral venous thrombosis? A prospective multicentric study.	Neurological sciences : official journal of the Italian Neurological Society and of the Italian Society of Clinical Neurophysiology Oct 2004;25 Suppl 3():S298-9	3b	Observational Study	symptom prevalence/case-control	Headache qualities most associated with CVT include (77%): focal, continuous, acute to subacute, moderate to severe intensity. 54% of people had focal deficits, seizures present in 40%.	Acute headache onset and severe quality of pain were statistically significant descriptors in patients with CVT compared to matched controls by Chi-squared analysis. Identifiable risk factors (OCP's, pregnancy, tumors, venous hypercoagulability mutations, etc.) were absent in 1/5 of patients with CVT.
#63 - Findlay 1997	1997	Findlay JM.	Current management of aneurysmal subarachnoid hemorrhage guidelines from the Canadian Neurosurgical Society.	The Canadian journal of neurological sciences. Le journal Canadien des sciences neurologiques May 1997;24(2):161-70	3a, 5	Review of level 2 and 3 studies	Practice Guidelines	Characteristics symptoms of SAH are sudden, severe onset headache 'worst of life', emesis, and development of meningismus over hours, though in mild SAH these symptoms may not all be present or minimal.	Non-contrast CT is recommended in patients within 24 hours of sudden, severe headache onset and is 95% sensitive for detecting aneurysmal bleed (category A rec). If negative and SAH is suspected or within few days of onset of headache, Lumbar puncture should be done for xanthochromia evaluation(category A rec). If both CT and LP are normal within several days of suspected aneurysmal bleed, then SAH can be effectively ruled out and cerebral artery imaging is not indicated (Category D). All patients with spontaneous SAH who are not moribund should have conventional CTA (Category B Rec). CTA was not evaluated as a surrogate to conventional angiography but is likely will have adequate sensitivity.
Pulled from references Chu	2017	Kevin H. Chu, MBBS, GCBiostat, MS, FACEM, Tegwen E. Howell, BEcon, MECSt, Gerben Keijzers, MSc (Biomed Health Sci, Epi), MBBS, FACEM, PhD, Jeremy S. Furyk, MBBS, MSc, MPH&TM, FACEM, Robert M. Eley, BSc(Hons), MSc, PhD, CBiol, CSci,FRSB, Frances B. Kinnear, MBChB, BSc(Hons), PhD, FACEM, Ogilvie Thom, MBBS, GCClinResMethods, FACEM, Ibrahim Mahmoud, MBBS, GCEpid, MSc, MPH, PhD, and Anthony F. T. Brown, MBChB, FRCP, FRCSEd, FRCM, FACEM	Acute Headache Presentations to the Emergency Department: A Statewide Cross-sectional Study	ACADEMIC EMERGENCY MEDICINE 2017;24:53-62.		prospective cross-sectional			"Intracranial hemorrhage (SAH or intraparenchymal hemorrhage) and bacterial meningitis were associated with being >40, being male, arriving by ambulance, instantly peaking, more severe, worst ever, different from past episodes, and related to exertion including cotus. It was also associated with impaired consciousness, neck stiffness on examination, and persistent neurologic deficits."
#398 - Grimaldi 2009	2009	Grimaldi E.; Nonino F.; Cevoli S.; Vandelli A.; D'Amico R.; Cortelli P.	Risk stratification of non-traumatic headache in the emergency department.	J Neurology	2b	cross-sectional cohort	Prospective exploratory cohort study with good reference standards	Algorithm-based guide to work-up of headache to ED to differentiate malignant non-traumatic Headache (NTH) from benign/primary headache	256 pts assigned to one of 4 scenarios based on clinical symptoms and history of their headache: Scenario 1: severe HA, acute, 'worst headache of life' stabbing, vomiting, syncope. Scenario 2: HA with fever and/or neck stiffness. Scenario 3: persistent recent HA or progressively worsening. Scenario 4: history of HA, similar quality, not responsive to regular home treatments. HCT used initially, negative/normal or positive/abnormal, followed by further diagnostic work-up by ED physician, some undergoing LP. 82% completed follow-up phone interview. 0 patients in scenario 4 had malignant headache, algorithm screening had 100% sensitivity for excluding malignant headache in that category. 23% of patients in scenarios 1, 2, or 3 were found to have malignant headache cause (SAH, neoplasm, ischemic stroke, temporal arteritis), 66% of which was identified by HCT and 33% identified by LP
#530 - Kim 2015	2015	Kim JG.; Choi JY.; Kim SU.; Jung JM.; Kwon DY.; Park MH.; Oh K.	Headache characteristics of uncomplicated intracranial vertebral artery dissection and validation of ICHD-3 beta diagnostic criteria for headache attributed to intracranial artery dissection.	Cephalalgia	4	case-series	Review of case reports for detailed headache descriptors	Detailed headache semiology of patients with uncomplicated intracranial vertebral artery dissection. 14 patients analyzed. 1/3 of patients had history of migraine headache.	Red flags for vertebral artery dissection include: acute onset (80%), severe intensity, ipsilateral and occipito-nuchal location (86-93%), relieved by head extension and supine position (83%), and intensified by head flexion and rotation (50%). Headache of all patients identified with ICVAD met all criteria of ICHD-3 beta for headache attributed to intracranial artery dissection.
#699 - Knox 2012	2012	Knox J.; Chuni C.; Naqvi Z.; Crawford P.; Waring W.	Presentations to an acute medical unit due to headache: a review of 306 consecutive cases.	Acute medicine	4	case series	Retrospective chart review of outcomes	306 patients reviewed. 62% had HCT. 4 out of 306 (1.3%) had SAH, of which 3/4 had positive HCT and 1/4 had normal HCT, and LP positive. 10 out of 306 had meningitis, these patients were more likely to have rash, photophobia, neck stiffness, elevated CRP. 5 out of 306 had intracranial tumor, with 2/5 having focal neurologic deficits and 3/5 with history of primary malignancy (breast). 44% of patients had primary headache disorder, with migraine being most common sub-type.	Clinical features of headache were not accurately able to distinguish SAH from other headache. Sensitivity of HCT to detect SAH depends on interval from headache onset, with higher false negative rate after 24hrs, and suggestion that if clinical suspicion warrants that further investigation with LP is recommended for xanthochromia. There was low readmission rate for patients with migraine, due to center giving neurology follow-up appointments to these patients, compared to readmission or re-presentation rate of up to 15% elsewhere for patients with migraine.
#492 - Mitsikostas 2015	2015	Mitsikostas DD.; Ashina M.; Craven A.; Diener HC.; Goadsby PJ.; Ferrari MD.; Lampl C.; Paemeleire K.; Pascual J.; Siva A.; Olesen J.; Osipova V.; Martelletti P.;	European Headache Federation consensus on technical investigation for primary headache disorders.	The journal of headache and pain 2015;17(1):	5	Expert Opinion	consensus	Internal and external committees of the European Headache Federation.	Red Flags that raise suspicion of a secondary headache disorder include: headache that peaks in intensity in less than 5 minutes, new headache type vs worsening of previous headache, change in previous stable headache pattern, headache associated with positional changes, or precipitated by physical activity or Valsalva, headache that awakens patient, first onset after age 50, neurologic signs/symptoms on exam, trauma, fever, seizures, history of malignancy, and history of HIV or active infection. MRI is recommended for patients with migraine with aura that persists on one side or with brainstem aura to differentiate between persistent aura without infarction and migraines infarction. Brain MRI with particular emphasis on the pituitary and cavernous sinus is recommended for all Trigeminal Autonomic Cephalalgias. Brain MRI is recommended for primary cough headache, exercise headache, thunderclap headache, headache associated with sexual activity, and hypnic headache. Some experts recommend MRA imaging with T1 Fat saturation for patients with migraine over age 50 or with cerebrovascular comorbidities.
#568 - Pfefferkorn 2009	2009	Pfefferkorn T.; Crassard I.; Linn J.; Dichgans M.; Boukobza M.; Bousser MG.	Clinical features, course and outcome in deep cerebral venous system thrombosis: an analysis of 32 cases.	Journal of neurology Nov 2009;256(11):1839-45	2b	Observational study	Retrospective cohort and telephone interview follow up	Headache (81%) and reduced consciousness (72%) were the most frequent symptoms on presentation. 75% of patients stabilized on systemic heparin or LMWH and later improved, 25% deteriorated and with progressive coma with poor outcomes.	MRI with MRA confirmed deep cerebral venous sinus thrombosis and delay to diagnosis and treatment with heparin can lead to poor outcomes.

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	Year	Author	Title	Journal	Grade (oxford level of evidence)	Study type	Study details	Rule	Rule (simplified)
#440 - Qu 2017	2017	Qu J.; Zhou T.; Zhong C.; Deng R.; Lü X.	Comparison of clinical features and prognostic factors in HIV-negative adults with cryptococcal meningitis and tuberculous meningitis: a retrospective study.	BMC infectious diseases 01 2017;17(1):51	3b	Observational study	retrospective case-control	Analysis of clinical features of non-HIV patients with either cryptococcal meningitis or Tuberculous meningitis. CSF cell count and protein were statistically significant lower than in patients with tuberculous meningitis. There was no statistically significant difference in glucose or opening pressure between the two types of meningitis. A higher and statistically significant percentage of CM patients had cerebral ischemia and/or demyelination than TBM patients, but encephalitis and cerebral edema were more common in TBM patients.	Headache was initial symptom in 96.7% of patients with cryptococcal meningitis, and in 83% of patients with tuberculous meningitis. Crypto meningitis pts were more likely to present with headache and abnormal vision or hearing than patients with tuberculous meningitis who were more likely to have fever and cough. Certain features of LP (cell count and protein) as well as MRI can be useful in differentiating cryptococcal meningitis from tuberculous meningitis to expedite appropriate treatment without delay prior to culture data being available.
#709 - Sili 2014	2014	Sili U.; Kaya A.; Mert A.; .	Herpes simplex virus encephalitis: clinical manifestations, diagnosis and outcome in 106 adult patients.	Journal of clinical virology : the official publication of the Pan American Society for Clinical Virology	2a	SR	SR of retrospective cohort study	The main symptom that brought patient to ED was most often seizure, abnormal behavior, or impaired consciousness, however the first symptom that was present from onset was found to be headache (50%) and fever (22%). Time/duration to treatment start with acyclovir was associated with worse prognosis and neuropsychiatric outcomes.	Red Flags most commonly found in patients with HSV encephalitis were mental status changes: abnormal level of consciousness (90%), confusion/disorientation (81%), abnormal behavior (66%), fever (76%), and headache (70%). MRI showed abnormalities in 95% of patients with HSV encephalitis, and may be useful imaging tool in working up concern for HSV and preventing delay to treatment with anti-virals. CSF HSV PCR positive in only 67%.
#670 Practice Parameter	1994	No author	Practice parameter: the utility of neuroimaging in the evaluation of headache in patients with normal neurologic examinations (summary statement). Report of the Quality Standards Subcommittee of the American Academy of Neurology.	Neurology Jul 1994;44(7):1353-4	3a	Summary statement - AAN Quality Standards Subcommittee	Retrospective SR of case series	Incidence of finding intracranial lesion on CT or MRI in patients with migraine and undefined headache was 0.4%, and 2.4% in review of patients imaged for headache and normal neurologic exam without additional clinical information.	Moderate clinical consensus that in adult patients with recurrent headaches defined as migraine including those with visual aura, with no recent change in pattern, history of seizures, or focal neurologic signs or symptoms, no indication for imaging. In patients with atypical headache patterns, history of seizures, or focal neurologic exam or symptom, imaging with CT or MRI may be indicated
#406 : Clinical policy: Critical Issues	2002	No author	Clinical policy: critical issues in the evaluation and management of patients presenting to the emergency department with acute headache.	Annals of emergency medicine Jan 2002;39(1):108-22	1a	SR to develop clinical policy	Clinical decision rule with 1b studies from multiple centers	Critical analysis of peer-reviewed literature using classification of evidence by strength	No well-designed prospective studies exist to evaluate emergent imaging indication in ED, so no level A recommendation available. Level B recommendation exists for: emergent non-contrast HCT indicated for adult presenting with headache + abnormal exam (AMS, focal neuro deficit, altered cognition) or for adult with acute/sudden-onset headache. Urgent imaging recommended for patient with HIV with new-onset headache and for patients older than age 50 with new-headache type and normal neurologic exam. Patients with 'thunderclap headache' with normal HCT and LP with normal OP and normal CSF profile/xanthochromia absent do not need emergent angiography and can be discharged with follow-up with PCP or neurologist. No evidence in any trial or research to suggest response to therapy is appropriate reflection or to be used of assessment of underlying etiology of non-traumatic headache (Level C rec). Adults with headache with evidence of elevated ICP (papilledema, absent venous pulsations, AMS, or focal neurologic deficit) should undergo imaging prior to LP (Level C rec).
Pulled from references Pascual	2008	Julio Pascual&Andrés Gonzá lez-Mandyl&Rubén Martí n&Agustín Oterino	Headaches precipitated by cough, prolonged exercise or sexual activity: a prospective etiological and clinical study	J Headache Pain (2008) 9:259-2		Observational study			"cough headache is the most frequent, accounting for 70% of provoked headaches. Sixty percent of cough headache cases were symptomatic to posterior fossa lesion"... "The etiologies for secondary cases of these two headaches [sexual activity/exertional] subarachnoid bleeding and, in one case, hydrocephalus. Therefore, diagnostic investigation in these headaches must begin first with a neuroimaging study (CT or MRI) to rule out subarachnoid bleeding followed by an angio MR"
Pulled from references Donnet	2013	Anne Donnet&Dominique Valade&Emmanuel Houdart&Michel Lanteri-Minet&Charles Raffaelli&Geneviève Demarquay&Marc Hermier&Evelyne Guegan-Massardier&Emmanuel Gerardin&Gilles Geraud&Christophe Cognard&Olivier Levrier&Pierre Lehmann	Primary cough headache, primary exertional headache, and primary headache associated with sexual activity: a clinical and radiological study	Neuroradiology (2013) 55:297-305		multicentre, observational, non-interventional consecutive cohort conducted by six specialist headache centers in France and including an unmatched control group of headache-free subjects			Sinus stenosis on MRI in 20-71%
#356 - Masdeu 2000	2000	Masdeu JC.; Drayer BP.; Anderson RE.; Braffman B.; Davis PC.; Deck MD.; Hasso AN.; Johnson BA.; Masaryk T.; Pomeranz SJ.; Seidenwurm D.; Tanenbaum L.	Atraumatic isolated headache--when to image. American College of Radiology. ACR Appropriateness Criteria.	Radiology Jun 2000;215 Suppl(1):487-93	5	Expert Panel	ACR Appropriateness Criteria	In patients with non-traumatic headache with normal neurologic exam, overall yield of discovering lesion/treatable finding on imaging was less than 1% (0.4-0.5%). Special types of headache presentations however vary in level of recommendation to prompt imaging.	In review of patients presenting with severe, sudden onset HA described as 'thunderclap' or 'worst headache of life', up to 47% have been found to have SAH. HCT w/o contrast is recommended and if negative and suspicion high, LP should be performed. In patients with severe, unilateral headache with radiation to neck, MRI/MRA is particularly useful to evaluate for dissection given frequency of isolated headache in these patients with delayed neurologic abnormalities/stroke. New-onset headache in patients at risk for intracranial pathology (HIV, cancer hx or active, etc.) results in higher yield of findings on imaging. Screening patients with imaging (CT or MRI) is not warranted in isolated non-traumatic headache with normal neurologic exam and without warning features to headache or epidemiologically/comorbidities.