

Bibliographic Cite	PMID Link	Literature Type	Level of Evidence	Purpose	Population	Intervention and Outcome Measures	Results / Recommendations	Study Limitations
Chen WH, Chu MY, Lin YC. Sexual behavior, function and satisfaction with headache associated with sexual activity: A systematic review of literature. <i>Advances in Sexual Medicine</i> . 2017; 7:65-81.	N/A	Systematic review	Low	Complete a systematic review of literature covering the sexual behavior, function and satisfaction in patients with headache associated with sexual activity (HSA) and their partners to provide strategy for prevention or correction of sexual adversity in HSA patients and their partners.	The authors searched on patients with headaches related to sexual activity and their partners before and after treatment. The main interests were to find out the sexual history (premorbid sexual history like sexual orientation, preference, abuse and others), sexual behavior (partnering, pattern of sexual act, specificity of sexual act, trigger of pain, pain factor), and sexual function (libido, arousal, and orgasm) in HSA patients, and sexual satisfaction in HSA patients and their partners.	A systematic review of literature using results from English scientific databases PROQUEST, PUBMED and Cochrane Database of Systematic Reviews, and the Taiwan Periodical Literature System. All papers, books, proceedings, and abstracts published before December 2016 were considered. A total of 97 publications were eligible for inclusion.	Most of the studies focused on the etiopathogenesis or treatment of HSA. Sexual change was mentioned in 23 publications. Organic headache was the most frequent type of headache associated with sexual activity. The HSA occurs more frequently in dyadic than extradyadic sexual activity. Pain was found to rapidly cease in half of patients when sexual activity was halted. Sexual function and sexual satisfaction may decrease in HSA patients and their partners, but improve after pain reversal. The authors note that a shortage of sexuality data of HSA is documented in the literature. However, the literature still clarifies the extradyadic and masturbatory effect on HSA occurrence. The pathogenesis of pain includes two components, the hypersympathetic status and exertional action. Therefore, physicians can schedule their education and counseling for HSA according to these findings. Further investigation for sexual function and satisfaction is warranted.	The authors note a primary study limitation that almost all of the HSA studies and reports focused only on the etiology, diagnosis, and treatment. The data of sexual behavior, function, and satisfaction before, under, and after treatment is sparse.
Dubosh NM, Bellolio MF, Rabinstein AA, et al. Sensitivity of Early Brain Computed Tomography to Exclude Aneurysmal Subarachnoid Hemorrhage: A Systematic Review and Meta-Analysis. <i>Stroke</i> . 2016;47(3):750-5.	26797666	Systematic review and meta-analysis	High	To determine the sensitivity of brain CT using modern scanners (16-slice technology or greater) when performed within 6 hours of headache onset to exclude SAH in neurologically intact patients.	The authors included original research studies of adults presenting with a history concerning for spontaneous SAH and who had noncontrast brain CT scan using a modern generation multidetector CT scanner within 6 hours of symptom onset. A total of 882 titles were reviewed and 5 articles met inclusion criteria, including an estimated 8907 patients.	Thirteen of the estimated 8907 patients had a missed SAH (incidence 1.46 per 1000) on brain CTs within 6 hours of headache onset. Overall sensitivity of the CT was 0.987 (95% confidence intervals, 0.971-0.994) and specificity was 0.999 (95% confidence intervals, 0.993-1.0).	A total of 882 titles were reviewed and 5 articles met inclusion criteria, including an estimated 8907 patients. Thirteen had a missed SAH (incidence 1.46 per 1000) on brain CTs within 6 hours. Overall sensitivity of the CT was 0.987 (95% confidence intervals, 0.971-0.994) and specificity was 0.999 (95% confidence intervals, 0.993-1.0). The pooled likelihood ratio of a negative CT was 0.010 (95% confidence intervals, 0.003-0.034). CONCLUSIONS: In patients presenting with thunderclap headache and normal neurological examination, normal brain CT within 6 hours of headache is extremely sensitive in ruling out aneurysmal SAH.	Small number of included studies
Evans RW, Burch RC, Frishberg BM, et al. Neuroimaging for migraine: The American Headache Society systematic review and evidence-based guideline. <i>Headache</i> . 2020; 60(2):318-336.	31891197	Systematic review	Moderate	To provide updated evidence based recommendations about when to obtain neuroimaging in patients with migraine.	Articles were included in the systematic review if they studied adults 18 and over who were seeking outpatient treatment for any type of migraine and who underwent neuroimaging (MRI or CT). The initial search yielded 2269 publications. Twenty three articles met inclusion criteria and were included in the final review. The majority of studies were retrospective cohort or cross-sectional studies.	Medline, Web of Science, and Cochrane Clinical Trials were searched from 1973 to August 31, 2018. Reviewers identified studies, extracted data, and assessed the quality of the evidence in duplicate. We assessed study quality using the Newcastle-Ottawa Scale.	Ten studies evaluated the utility of CT only, 9 MRI only, and 4 evaluated both. Common abnormalities included chronic ischemia or atrophy with CT and MRI scanning, and non-specific white matter lesions with MRI. Clinically meaningful abnormalities requiring intervention were relatively rare. Clinically significant neuroimaging abnormalities in patients with headaches consistent with migraine without atypical features or red flags appeared no more common than in the general population. Recommendations.—There is no necessity to do neuroimaging in patients with headaches consistent with migraine who have a normal neurologic examination, and there are no atypical features or red flags present. Grade A Neuroimaging may be considered for presumed migraine for the following reasons: unusual, prolonged, or persistent aura; increasing frequency, severity, or change in clinical features, first or worst migraine, migraine with brainstem aura, migraine with confusion, migraine with motor manifestations (hemiplegic migraine), late-life migraine accompaniments, aura without headache, side-locked headache, and posttraumatic headache. Most of these are consensus based with little or no literature support.	
Kamtchum-Tatuene J, Kentueu B, Fogang YF, et al. Neuroimaging findings in headache with normal neurologic examination: Systematic review and meta-analysis. <i>J Neurol Sci</i> . 2020; 416:116997.	32623142	Systematic review and meta-analysis	Moderate	To determine if pooled estimates of the prevalence of unexpected findings in patients with headache and normal neurologic examination support current expert opinion-based neuroimaging guidelines.	A total of 41 studies (15,760 participants) were included. All observational studies reporting neuroimaging findings in patients with headache and normal neurologic examination, from inception to September 30, 2017, and without language restriction were included in the search. Case series (< 30 participants), letters, editorials, commentaries, and studies with insufficient description of the methods or not reporting specific data for patients with headache and normal neurologic examination were excluded.	Disagreements regarding study inclusion were resolved through consensus. The inter-rater agreement for study selection was assessed using a non-weighted Cohen's kappa. For each study included, the risk of bias was independently assessed by two investigators using an adapted version of the Risk of Bias Tool for Prevalence Studies. The overall and disease-specific prevalence of unexpected findings were pooled through random-effects meta-analysis.	The inter-rater agreement for study selection was 99.1% ($\kappa = 0.63$). The 41 studies were all classified as having low to moderate risk of bias, with 37 (90.2%) having a low risk. There was 86% agreement between the investigators for the risk of bias assessment ($\kappa = 0.60$). The overall prevalence of unexpected findings and normal variants was 17.5% (95% CI: 13.1–22.3). The prevalence was 26.6% (95% CI: 15.5–39.4) in studies using MRI only. The prevalence of vascular, neoplastic, and non-neoplastic findings was 6.6%, 1.4%, and 9.6%. The pooled disease-specific prevalence was 2.0% for stroke, 1.8% for aneurysms, 0.8% for subdural hematoma, 0.7% for hydrocephalus, 0.2% for glioma, and 0.1% for meningioma. In secondary analysis, there was 0.4% increase in the prevalence of vascular unexpected findings with each 1% increase in the proportion of migraine with aura (p value for meta-regression = 0.005). The authors conclude that in patients with headache and normal neurologic examination, important vascular and neoplastic unexpected findings are rare and better detected with MRI. This supports current American College of Radiology and European Headache Federation recommendations to avoid systematic imaging in such patients and prefer MRI when imaging is needed.	The included studies did not provide data on the cardiovascular risk factors (atrial fibrillation, diabetes mellitus, smoking, obesity) and other comorbidities (HIV infection, auto-immune and coagulation disorders, history of stroke or seizure) that may not cause an abnormal neurologic examination but could influence the prevalence of abnormal findings on neuroimaging. Detailed information about the clinical characteristics of headaches were also not provided, notably the presence and nature of red flags. The authors also note that they could not perform an in-depth assessment of the relative impact of recent high-resolution imaging techniques on the prevalence of unexpected findings because most of the included reports did not provide a comprehensive description of the imaging device and protocols used.

<p>Walton M, Hodgson R, Eastwood A, et al. Management of patients presenting to the emergency department with sudden onset severe headache: Systematic review of diagnostic accuracy studies. Emerg Med J. 2022; 39(11):818-825.</p>	<p>35361627</p>	<p>Systematic review</p>	<p>Moderate</p>	<p>To evaluate diagnostic strategies in the management of neurologically intact patients presenting to the ED with non-traumatic sudden onset severe headache with a clinical suspicion of subarachnoid hemorrhage (SAH).</p>	<p>A total of 37 studies were included. To meet inclusion criteria, studies had to assess any care pathway for ruling out SAH (including clinical decision rules and specific diagnostic tests, such as CT or LP) in neurologically intact adult patients presenting to hospital with a sudden onset severe headache (reaching maximum intensity within 1 hour), with a clinical suspicion of SAH. Studies of patients who had suffered a head injury (ie, traumatic headache) were excluded. Any primary study design (other than single case study) was eligible for inclusion.</p>	<p>Data were extracted on study methods, patient, intervention and reference standard characteristics, outcome measures, adverse events and results. Where sufficient information was reported, diagnostic accuracy data were extracted into 2x2 tables to calculate sensitivity, specificity, false positive and false negative rates. Subgroups were analyzed separately to account for underlying differences in diagnostic strategies. Where results could not be pooled, they were synthesized narratively along with reported adverse event data.</p>	<p>Twelve studies had a low risk of bias for all domains, the other 25 were at risk of bias. Eight studies assessing the Ottawa SAH clinical decision rule were pooled; sensitivity 99.5% (95% CI 90.8 to 100), specificity 24% (95% CI 15.5 to 34.4). Four studies assessing CT within 6 hours of headache onset were pooled; sensitivity 98.7% (95% CI 96.5 to 100), specificity 100% (95% CI 99.7 to 100). The sensitivity of CT beyond 6 hours was considerably lower (≤90%; 2 studies). Three studies assessing lumbar puncture (LP; spectrophotometric analysis) following negative CT were pooled; sensitivity 100% (95% CI 100 to 100), specificity 95% (95% CI 86.0 to 98.5). The authors conclude that the Ottawa SAH Rule rules out further investigation in only a small proportion of patients. CT undertaken within 6 hours (with expertise of a neuroradiologist or radiologist who routinely interprets brain images) is highly accurate and likely to be sufficient to rule out SAH; CT beyond 6 hours is much less sensitive. The CT-LP pathway is highly sensitive for detecting SAH and some alternative diagnoses, although LP results in some false positive results.</p>	<p>A limitation of this review was the substantial heterogeneity in the study methods and population characteristics of the included studies. The evidence base included too few patients, given the rarity of SAH events, missed diagnoses and alternative non-SAH pathologies. This led to heterogeneity in the results of some meta-analyses, and potentially meant uncertainty was underestimated in others. There was a lack of research evidence on the small subgroup of patients who present to hospital several days after headache onset. Diagnosis of SAH in such patients is particularly challenging and there is a lack of guidance and consistency in how these patients are assessed.</p>
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