

Clinical Pearl

## Neuroimaging for Patients with Nonacute Headaches

**Neuroimaging is not usually warranted in patients with migraine and a normal neurologic examination, but physicians need to be able to identify the red flags in patients who may have a more serious underlying cause for their headaches.**

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Patients who request (or demand) diagnostic tests that are not medically indicated pose a challenge to physicians dedicated to quality care. Nonacute headaches such as migraine commonly provoke such patient requests.

Migraine is a common disorder with a prevalence of 17.2 percent in females, 6 percent in males, and 13 percent overall in the adult population [1]. It is a chronic disorder with recurrent attacks. Migraine is classified into 2 major subtypes: (1) migraine without aura and (2) migraine with aura. The typical symptoms include unilateral pulsatile headache with associated nausea, vomiting, or sensitivity to light and sound. The aura consists of neurologic symptoms that occur before or at the onset of headache. An aura can include flashing lights, blind spots, a hemianopia, paresthesias, or dizziness [2].

In the majority of patients who consult with a primary care physician for treatment of nonacute headache, the headache does not have a serious underlying etiology. Neuroimaging is usually not warranted in patients with migraine who have normal results on neurologic examination. Studies have shown that in such patients the prevalence of significant abnormalities on neuroimaging ranged from zero to 3.1 percent. Meta-analysis revealed a summary prevalence of 0.0018 (approximately 0.2 percent) [3].

The low diagnostic yield on Computerized Tomography (CT) scans in patients with unspecified headache is shown below [4]:

• Brain tumor	0.8%
• Arteriovenous malformation	0.2%
• Hydrocephalus	0.2%
• Aneurysm	0.3%
• Subdural Hematoma	0.2%
• Stroke, including chronic Ischemic processes	1.2%

It is important to identify patients with "red flag" signs and symptoms that come to light during the history and physical and neurologic exam who may have a serious cause to their headache. Some of these patients would benefit from neuroimaging to rule out causes, such as aneurysm, arteriovenous malformation, tumor, meningitis, or arterial dissection. In a retrospective study of patients with headache who underwent neuroimaging, Sobri et al chose 20 red flags to predict abnormal neuroimaging results [5]. (See list, below.) Multivariate analysis revealed that paralysis, reduced level of consciousness, and papilledema were significant features in predicting abnormal imaging [5].

## List of red flags

- Onset of new or different headache
- Nausea or vomiting
- Worst headache ever experienced
- Progressive visual or neurologic changes
- Paralysis
- Weakness, ataxia, or loss of coordination
- Drowsiness, confusion, memory impairment, or loss of consciousness
- Onset of headache after age of 50 years
- Papilledema
- Stiff neck
- Onset of headache with exertion, sexual activity, or coughing
- Systemic illness
- Numbness
- Asymmetry of papillary response
- Sensory loss
- Signs of meningeal irritation

The US Headache Consortium has published guidelines for neuroimaging in patients with nonacute headache based on the available evidence and through consensus [3].

Consider neuroimaging in:

1. Patients with an unexplained abnormality on the neurologic examination (Grade B).
2. Patients with atypical headache features or those that do not fulfill the strict definition of migraine or other headache disorder (Grade C).

Neuroimaging is not usually warranted in patients with migraine and a normal neurologic examination (Grade B) [6].

No evidence-based recommendations are established for the following:

1. Presence or absence of neurologic symptoms (Grade C).
2. Tension-type headache (Grade C).
3. Relative sensitivity of MRI as compared with CT in the evaluation of migraine or other nonacute headache (Grade C) [6].

The above are just guidelines, and exceptions to the recommendations will occur in the individual patient. For example, neuroimaging should be considered for the patient who is disabled from a fear of an underlying brain tumor or for a patient in whom a physician suspects a serious pathology for a headache despite any "red flags" [3].

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## References

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