



Modernising Patient Pathways Programme:

Access to Imaging in Headache

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Most patients presenting to health services with headaches have primary headache (up to 95% presenting to primary care and over 50% presenting to A&E). The most common primary headache is migraine, making up the majority of these patients.

Most patients with primary headache do not require investigation. Evidence based guidelines on neuroimaging in patients with non-acute headache estimate a rate of 0.2% of relevant intracranial abnormalities in patients diagnosed with migraine.

Neuroimaging is often considered in patients with migraine for the following reasons: unusual, prolonged or persistent aura, increasing frequency severity or change in migraine clinical features, worst migraine, migraine with brainstem aura, hemiplegic migraine, migraine without aura.

Neuroimaging is also, not uncommonly, carried out in patients for reassurance, both physician and patient. While some patients / clinicians may request neuroimaging hoping to ease anxiety, the initial reduction in anxiety is lost at 1 year follow up in patients with chronic headache.

Apparently asymptomatic incidental abnormalities of potential significance are problematic and are an unintended consequence of brain imaging in clinical situations where the prevalence of any relevant finding is likely to be low.

There is no evidence that imaging is more likely to reveal meaningful abnormalities in patients with primary headache compared to the general population. Several studies affirm that routine neuroimaging for migraine is more likely to identify incidental abnormalities than identify serious problems, potentially leading to more anxiety and leading to further investigations and follow up.

The incidental abnormality pick-up rate on MRI scans can be up to 10%, with the chance of detecting an infarct in 1 in 14, aneurysm in 1 in 55 and a benign tumour such as a meningioma in 1 in 62.

RED FLAGS

Most patients do not have serious secondary headache. Red flags indicate the need for urgent assessment to exclude a secondary cause. The most consistent indicators for serious secondary causes for headache are:

- 1) Thunderclap (sudden onset) headache (consider SAH and its differential)
- 2) New focal neurological deficit on examination (e.g. hemiparesis)
- 3) Systemic features (considering GCA, infection such as meningitis or encephalitis, etc)
- 4) New progressive headache in a patient over 50 (most headaches presenting in patients over 50 are benign, but there is an increased risk of secondary pathology with increasing age)

Headache suggesting the possibility of a brain tumour

- 1) New headache plus sub-acute progressive focal neurology
- 2) New headache plus seizures
- 3) New headache with personality or cognitive change not suggestive of dementia, with no psychiatric history and confirmed by witness

AMBER FLAGS

Features that may indicate a secondary cause but may also be seen in primary headaches:

- 1) Changes in headache intensity with changes of posture (upright consider low pressure / headache when lying flat consider high pressure)
- 2) Worsening/Triggering headache with Valsalva (e.g. coughing, straining)
- 3) Atypical aura (duration >1 hour or including motor weakness)
- 4) Progressive headache (worsening over weeks or longer)
- 5) Head trauma within the last month
- 6) Previous history of cancer or HIV
- 7) Re-attendance to A&E or GP surgery with progressively worsening headache severity or frequency

Consider a secondary cause if any of these are present

Features that do not help to differentiate primary from secondary headaches are:

- 1) Severity
- 2) Treatment response

GREEN FLAGS

Features that are supportive of a diagnosis of primary headache:

- 1) Recurrent episodic headache, particularly with features of migraine
- 2) Long history of daily headache

If there are no concerning features then it is appropriate to manage these patients for migraine. Other features that are pointers to migraine include a previous migraine history and a family history of migraine.

Pathway recommendations



GP open access CT scan for Headache (where available) should be available for:

- Adult patients above the age of 16 years
- No red flags
- Normal neurological examination

Patients should not be routinely imaged for migraine

Patients with red flags should be referred as emergency / urgently to secondary care for appropriate assessment / investigation

Patients with amber flags should be considered for urgent referral to secondary care for investigations, unless the primary care physician decides that a GP open access CT is more appropriate

Referral to secondary care for open access CT brain imaging

If there is diagnostic uncertainty or concern about a secondary cause, at this point consider open access CT as an alternative to secondary referral. For some patients, CT may not be the most appropriate investigation e.g. ESR/CRP/Plasma viscosity in GCA and LP (after appropriate imaging) in Idiopathic Intracranial Hypertension.

Dealing with incidental findings from CT and MRI scans

There must be a clear local pathway for management of patients who have an abnormality detected on their GP open access CT scan.

Pathway recommendations



Evidence base – MRI in the general population

The overall prevalence of incidental brain findings in 2000 asymptomatic volunteers aged 46-97 using high resolution MRI was more than 10%. Asymptomatic brain infarcts were present in 7.2% and brain aneurysms in 1.8%. Benign tumours (mostly meningiomas) were present in 1.6%, arachnoid cysts in 1.1% and Chiari malformations in 0.9%

A further meta-analysis subdivided incidental findings on MRI scans in 19559 participants into

Potentially symptomatic or treatable abnormalities

- Neoplasms
- Cysts
- Structural vascular abnormalities
- Inflammatory lesions
- Others – chiari malformations, neoplasms

Markers of cerebrovascular disease

- White matter abnormalities
- Silent brain infarcts
- Brain microbleeds

The meta-analysis reported an incidental abnormality pickup rate of 1.7% using low resolution MRI and 4.3% using high resolution MRI. The age range of patients was 3-97 which perhaps explained the lower pick-up rate. They also reported an age-related increase in white matter hyperintensities and brain infarcts and also in all neoplastic incidental brain findings.

Evidence base – Neuroimaging in patients with migraine

CT

In a study of 1111 patients with headache who were scanned, 10.8% scans were abnormal, the majority in patients above the age of 40. This included 4% with a brain infarct and 1.6% with a primary neoplasm

In a study looking at direct access CT brain scan for patients with a chronic headache, abnormal findings were reported in 10.5%

MRI

The HUNT study reported that patients with any headache disorder did not have a higher incidence of any intracranial abnormality as compared to the non-headache population except for non-specific white matter changes.

References and further resources



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