

## To scan or not to scan in headache

*Some patients with primary headaches may need imaging*

Some life threatening brain disorders present with secondary headache, where the headache is caused by the disease. A brain tumour, for example, is best diagnosed by brain imaging early in the course of the disease, which is essential for optimal management of this and other secondary headache disorders. However, brain tumours, as an example, account for less than 0.1% of the lifetime prevalence of headache.<sup>1</sup> This contrasts with the fact that most headaches in the community are either associated with mild systemic infection or due to primary headache,<sup>1</sup> where the headache is itself the disorder. Dissecting primary from secondary headache is the problem, since, by definition, primary headache does not need brain imaging because no disease process exists that leads to macroscopic change in general terms.

How does one dissect primary from secondary headache? This question can have only a clinical response since no controlled trials have been conducted to identify causes of secondary headache. In clinical practice we generally accept that the so called red flags of headache should trigger a search for secondary headache.<sup>2</sup> Thus change in the pattern of headache; new onset of headache in people older than 50; onset of seizures or headache associated with systemic illness, including fever; personality change; or with symptoms suggestive of raised intracranial pressure, such as new onset headache in the early morning; or headache that is worsening with coughing, sneezing, or straining should each be viewed with concern. Acute onset of the worst headache of the patient's life should trigger immediate referral for consideration as a sentinel headache of an intracranial aneurysm. An abnormal neurological finding is a clear indication to investigate, unless the finding is longstanding.<sup>2</sup> Fortunately most worsening of headache is probably longstanding primary headache going into a more troublesome period, which mercifully is not a marker of a life threatening problem.

Randomised controlled prospective studies of brain scanning, computed tomography and magnetic resonance imaging, in headache have not been done. Blinding and randomising such a study would present some complex ethical questions. The American Academy of Neurology has produced a summary of published studies as they are. If 897 patients with migraine that fulfils criteria of the International Headache Society<sup>3</sup> are scanned by either method and neurological examination is normal, then four of those

scans will be abnormal.<sup>4</sup> In that series, two patients—one with a tumour and the other with an arteriovenous malformation—had had seizures. Of the other two, one had a papilloma of the choroid plexus and the other a glioblastoma. Since the two patients with seizures had red flag symptoms, the yield was extremely low. Contrast this with 1825 patients in the same series with non-migraine headache and a normal neurological examination. The yield was 40 patients, including 21 tumours. In practice, most headaches that are sufficiently troublesome to be mentioned by patients and do not have features of secondary headache are migraines.<sup>5</sup> Of 9322 patients visiting a primary care practice in the United States, 5869 had migraine.<sup>6</sup> If neurological examination is normal then brain scanning is next to useless to plan management. However, this may not hold true in every clinical encounter.

Which patients with headache should have a scan? To say that patients with headache suggestive of a secondary cause should have a scan, either computed tomography or magnetic resonance imaging, is easy. In the absence of red flags and in the presence of a normal examination one might scan headache that is not migrainous. Bilateral, non-throbbing headache without nausea, and with no sensitivity to light (photophobia), sound (phonophobia), or smells (osmophobia) could be investigated by scan. This approach would have a 2% yield of patients with treatable causes. Alternatively, the focus might be narrowed to featureless headache made worse by jarring, head movement, coughing, sneezing, or straining. Ultimately this is a public health question, perhaps a medicolegal question: how many potentially normal scans would society wish to pay for to diagnose treatable brain disease—98 in every 100? What is reasonable in terms of missing a reversible cause, such as a meningioma, which can do exceedingly well in the hands of the neurosurgeons? Unfortunately, properly done controlled studies are unavailable, and the lowest common denominator is what a convincing expert might tell a court.

Should patients ever have a scan to reassure all parties involved? I have scanned patients for reasons of reassurance: for the patients, for their relatives—spouses or parents—and because they perturbed me. So it seems unrealistic and elitist of me to suggest no one ever be scanned for reassurance. Whether 'tis nobler to scan the brain or suffer the slings and arrows

of the aggrieved patient or relative, that is the clinical problem.

Most often the reassurance the patient seeks is a diagnosis, or an explanation of the problem, which, given the increased understanding of primary headache, is now possible in most instances.<sup>7</sup>

If a brain scan, computed tomography or magnetic resonance imaging, is arranged, it should be made clear to the patient why this is being done, particularly with primary headache—if the patient wants an explanation he or she will be back with the normal scan seeking that explanation. Failing to provide one could understandably cause anxiety in a patient.

Lastly, I found general practitioners extremely sensible about scanning in Australia, where they could order it directly, and I have no reason to assume they would be different in the NHS. To limit requests for a computed tomography scan of the brain to specialists only seems unfair to general practitioners, who must live with the clinical concern, or to patients, who live

with the personal concern. Perhaps identifying and training one interested partner in a general practice and allowing them access to CT brain scanning would make life easier for everyone.

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## Screening research papers by reading abstracts

*Please get the abstract right, because we may use it alone to assess your paper*

The *BMJ* receives approaching 8000 manuscripts each year and accepts only about 7% of them. Editors reject about 60-70% of original articles without external review. When a paper is clearly unsuitable for the *BMJ* just one editor can make the decision to reject it. When the decision is less clear other editors are involved.

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How do *BMJ* editors make decisions about research papers? During initial screening, the first editor makes judgments about originality, importance, and relevance. The ideal paper, given that the *BMJ* is a general medical journal with an international readership, would be useful to as many readers as possible around the world and appeal to a broad medical readership. Its findings would be directly relevant to patient care or to healthcare policy that would affect patients. The research question would be one that really needed answering, and the findings would be credible and

would add enough to existing evidence, rather than simply comprising another small brick in the wall of knowledge. The authors would have used the right research design to answer the question, and any weaknesses in the design would be outweighed by important strengths. Our focus is on the research question and then the methods used. We do not decide the paper's fate on whether the findings are positive or negative.

A couple of years ago it became clear that several *BMJ* editors were making at least preliminary decisions on submitted research papers by reading only the abstracts, and we decided to test whether this was valid. We conducted an experiment to see if editors at the *BMJ* could make decisions about research papers based on reading only the abstracts, and to compare how each initial decision differed from the final one after reading the whole submission.<sup>1</sup> Only original research papers containing a structured abstract were included in the study. Medical editors acting as first readers of *BMJ* submissions had to read the abstract of each manuscript allocated to them and read no other material related to the submission.

Editors recorded the time taken to read each abstract and either their decision (immediate rejection, send to external peer reviewer, need for further in house consultation) or their inability to make a decision based on the abstract alone. Having made a decision based on the abstract, editors then read the whole manuscript and recorded on a separate form the time taken to do this and their decision based on reading the whole submission. The papers then continued through the rest of the process as normal,

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