

In this article...

- How headaches and migraine are associated with haemorrhagic and ischaemic stroke
- Paucity of research into the link between headaches and haemorrhagic stroke
- Importance of recognising and treating headaches in patients recovering from stroke

Exploring the relationship between stroke and headache

Key points

Headache and migraine – both of which are disabling but treatable – are common at stroke onset and after stroke

It has been suggested that headache and migraine may be precursors of stroke

Improved recognition of headache and migraine after stroke would lead to better treatment and outcomes

There is confusion among health professionals about whether, and how aggressively, they should treat headaches

More research is needed to improve awareness and treatment of headache and migraine post stroke

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Abstract Headaches and migraine – debilitating disorders in their own right – are often seen both at the onset of, and after, strokes. However, there is still not enough conclusive evidence regarding their relationship with stroke and their effects on patient outcomes. Post-stroke headaches and migraine are often left untreated, despite the fact that they compound the difficulties of survivors, slow down their recovery and reduce their ability to resume normal life. This article explores what we know of the relationship between headaches/migraine and stroke, and highlights the importance of treating headaches and migraine occurring after a stroke.

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Headaches and migraines are seen both at the onset of stroke and after a stroke, yet little is known about their relationship with stroke and their effects on patient outcomes. This lack of evidence means there is a lack of guidance and clarity regarding management, so stroke-related headaches and migraines are often left undiagnosed and untreated. This article explores the relationship between headaches/migraines and stroke, discusses the importance of recognising and treating headaches and migraine occurring after a stroke, and highlights the need for further research.

Headache and migraine Causes and symptoms

Headache and migraine are common problems and present in a range of neurological conditions. Box 1 shows the broad classification of headache disorders according to primary and secondary causes. The International Headache Society (IHS) publishes a detailed and comprehensive headache classification according to cause (Box 2).

Very little is known about the true cause of primary headache and primary migraine, although it has been suggested that they could be linked to genetic factors, iron deficiencies and/or inflammation of the blood vessels (Spector et al, 2010).

Migraine is a complex but common primary headache disorder of the brain. It is a particularly aggressive form of headache often associated with nausea, photophobia, light intolerance, sound intolerance and, in rare cases, sensory disturbances. It often manifests as disabling attacks requiring medical treatment. It is classed as:

- Episodic – the presence of symptoms for <15 days a month;
- Chronic – the presence of symptoms for at least 15 days a month (Goadsby and Sprenger, 2010).

Migraine can present with or without aura – that is, temporary visual or sensory symptoms occurring before the migraine, often in the preceding hour. An aura can manifest as blind spots, flashing lights, coloured spots, numbness or pins and needles, and, in rare cases, confusion and

Clinical Practice Discussion

Box 1. Classification of headache disorders

Headache disorders can be classified as:

- Primary – for example, migraine, tension headache and medication-overuse headache
- Secondary – linked to underlying disorders such as infection, raised intracranial pressure or giant cell arteritis (this includes stroke)

Source: National Institute for Health and Care Excellence (2012)

memory changes. Roughly 20% of people with migraine report experiencing an aura (World Health Organization, 2011).

Burden

Global figures suggest that 47% of adults have had a headache in the previous 12 months (WHO, 2011). Women are more likely to be affected: >18% of women experience headaches and migraines compared with only 6-7% of men (Lipton et al, 2001).

Headache disorders are painful and debilitating. They are known to be one of the most common neurological disorders for which people seek treatment, whether at their GP or in accident and emergency (A&E) departments (National Institute for Health and Care Excellence, 2012). Around 2-4% of A&E attendances are attributed to headache disorders. Headache disorders also create a substantial burden for society, notably in terms of absence from work or school (Dowson, 2001).

Treatment

Headaches and migraine are treatable, but despite their associated burden they are still under-recognised, under-diagnosed and undertreated. A few years ago, the WHO ran a global campaign to improve the recognition, management and prevention of headaches called Lifting the Burden. In a survey of health professionals, the two main reasons cited for under-recognising and undertreating headaches were a lack of specific professional education (34% of respondents) and a lack of dedicated resources (33% of respondents) (WHO, 2011).

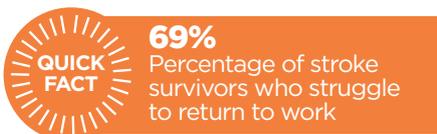
In 2012, NICE published a clinical guideline on the diagnosis and management of headaches, but there is still misunderstanding and confusion among health professionals about whether – and how aggressively – they should be treating headaches or whether these simply improve with time (Harrison and Field, 2015). Improved recognition of headaches

Box 2. International Headache Society classification

The International Headache Society (IHS) publishes a headache classification (ichd-3.org). Currently, in its third version, this classification has been translated into many languages. It provides universal coding for headaches and their causes, and is widely used in research (IHS, 2018). Headaches attributed to stroke are recognised as a category of their own in the IHS classification, which distinguishes between headaches attributed to haemorrhagic stroke and headaches attributed to ischaemic stroke.

allows more effective management and targeted treatment, which in turn improves the quality of life of people who experience headaches independently of other health disorders (NICE, 2012).

A large range of medications is approved for use in migraine, both for preventive and acute treatment. There is ongoing research into alternative treatment options, including Botox injections and acupuncture. People who experience migraines are often encouraged to adjust their lifestyles – for example, by reducing their caffeine intake – so, contrary to common belief, migraine is very much a treatable disorder.



Migraine and stroke

It has long been suggested that headache and migraine may be precursors of stroke, in particular ischaemic stroke (Lantz et al, 2015). A large amount of evidence has been published linking migraine with aura to stroke and other cardiovascular events, including several meta-analyses examining the actual risk of ischaemic stroke in people with migraine. They all suggest the overall risk of stroke is higher in people with migraine. Some also establish a consistent link between migraine with aura and:

- Increased cardiovascular risk;
- Increased risk of stroke;
- Increased mortality (Kurth et al, 2016; Etminan et al, 2005).

Specific evidence on haemorrhagic stroke is much less reliable. Kurth et al (2005) and Chang et al (1999) found no increased risk of intracerebral haemorrhage (ICH) in people with migraine. However, the two studies looked only at women and their risk of both ischaemic and haemorrhagic stroke.

Specific studies into migraine and risk of ICH have been published since. Kurth et al (2010) found that there was no increased risk of ICH in people with migraine generally but, when they examined subgroups, they did find an increased risk of

haemorrhagic stroke in people experiencing migraine with aura. A 2013 meta-analysis established that:

- People who experienced migraine were more at risk of ICH than a non-migraine comparison group;
- The risk of haemorrhagic stroke was higher in women with migraine than in men with migraine (Sacco et al, 2013).

However, even if there is now more data linking migraine and ICH, the evidence is still too inconsistent to be used to predict the risk of ICH in people with migraine.

Headaches and stroke

Headache is a well-recognised symptom of stroke in general and occurs frequently in acute ischaemic stroke; numerous studies have examined the relationships between headache and factors such as stroke location, severity and aetiology. Some even look at very specific causes of stroke, such as patent foramen ovale (a hole in the heart), as a risk factor for headache (Lantz et al, 2015). The figures reported in the literature mean that thousands of patients with stroke – especially those with haemorrhagic stroke – are at risk of headaches, whether after stroke, at stroke onset, or both.

Headaches after stroke

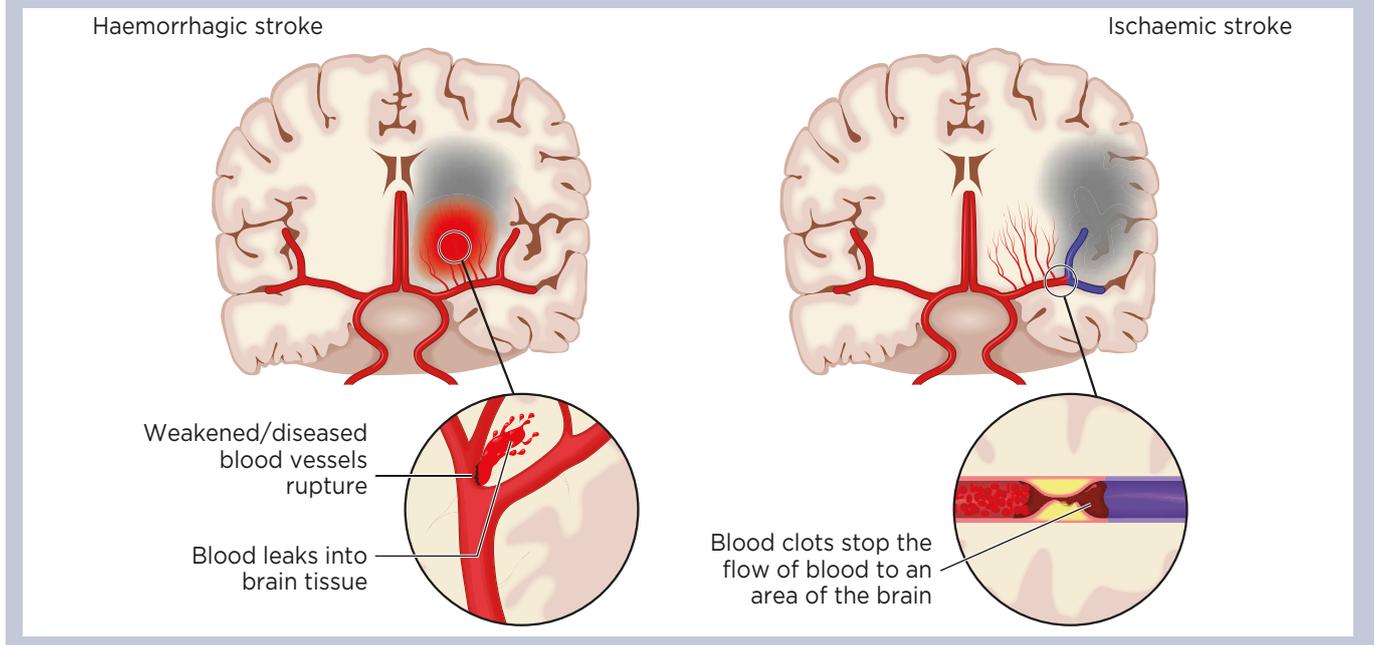
Post-stroke headaches are generally thought to be more common and more severe in patients who have had haemorrhagic stroke than in those who have had ischaemic stroke (IHS, 2018) (Fig 1); however, the actual evidence varies from study to study. The overall reported incidence of headache after stroke ranges from between 23% and 54% of patients (Hansen et al, 2015). Despite this high incidence, there is still a lack of clear guidance, in stroke units, on how to prevent and treat post-stroke headaches. Also, little is known or understood about the true incidence and prevalence rates of headaches after ICH, as most of the published evidence seems to focus on ischaemic stroke (Spector et al, 2010).

Headaches at stroke onset

Headache at stroke onset is a commonly reported but poorly described phenomenon.

Clinical Practice Discussion

Fig 1. Haemorrhagic and ischaemic stroke



Migraine studies have alluded to headaches being associated with the dilation of intracerebral arteries, particularly those at the base of the brain, so it would not be unreasonable to expect headaches to occur in stroke, where those arteries can be occluded or damaged. Harrison and Field (2015) acknowledge that the exact pathophysiology of headache after stroke is unclear. However, alongside the interruption of pain pathways resulting from stroke, it could be explained by blood vessel damage, alterations and inflammation.

Previously, bleeding in the brain after a haemorrhagic stroke was thought to stop within minutes of onset; however, advanced imaging techniques have shown the process is more complex, with bleeding continuing for several hours and potentially causing more swelling. That swelling can then cause a distortion of the brain structures and increase intracranial pressure (Morgenstern et al, 2010). As many as 40% of patients who have had a haemorrhagic stroke may experience this ongoing bleeding (Edlow and Selim, 2011), which can lead to other medical complications such as low consciousness levels, seizures, hydrocephalus and brain herniation (Alexander, 2013). These patients commonly experience headaches both at stroke onset and after stroke.

Vestergaard et al (1993) suggested that headache at stroke onset occurs in a quarter of patients with acute stroke. They looked at all types of stroke, not just ICH, and found that headache occurred in 50% of patients with ICH but only 26% of patients

with ischaemic stroke. They reported no difference in headache rates between male and female recruits. Hansen et al (2012) found that headache at stroke onset was a relatively good predictor of headaches persisting at six months post-stroke, with 70% of patients still experiencing them six months after the event. A similar study by Klit et al (2011) reported 63.5% of patients experiencing headaches after stroke.

Other studies have suggested that high rates of headache at stroke onset and after stroke are seen in haemorrhagic stroke, implying that it is more common than in ischaemic stroke. One of these studies (Tendschert et al, 2005) reports that women are more likely to develop headache at stroke onset than men.

Coping with life after stroke

Each year an estimated 150,000 people in the UK have a stroke. Since the introduction of the National Stroke Strategy in 2007 (Department of Health, 2007), the stroke pathway has been significantly improved, bringing about better patient outcomes and fewer deaths. More people survive stroke for longer, with an estimated 1.2 million stroke survivors in the UK alone (Stroke Association, 2017).

Stroke causes a vast array of disabilities not seen in other conditions and, despite improved management, it is still the third largest cause of disability in adults (Stroke Association, 2017). It can also provoke a range of after-effects that diminish the person's ability to resume normal life. As

well as physical disabilities, patients may experience a number of hidden after-effects of stroke (Box 3). Having headaches or migraine while recovering from stroke and dealing with its many other after-effects may slow down recovery and hinder returning to work, reducing the person's quality of life and contributing to low mood, anxiety and depression.

Stroke is no longer a disease of older people and this needs to be recognised. The number of people aged 20-64 having a stroke has increased by 25% in the last 20 years and 69% of survivors are struggling to return to work (Stroke Association, 2017). One in six people who survive a stroke report that they have lost income. Not treating stroke-related headache or migraine compounds the difficulties of survivors in returning to work, therefore affecting them financially as well as physically and emotionally.

Post-stroke reviews

Many after-effects of stroke do not come to light until the person is back home trying to go back to living a normal life. The National Stroke Strategy (DH, 2007) states that all survivors would be entitled to a follow-up review six months after their stroke. When the strategy was launched, most acute hospital trusts focused on the acute elements of the stroke pathway, such as diagnosis and treatment. As a result, other aspects of the pathway, such as follow-up reviews after discharge, were not implemented until a few years later and are still not implemented everywhere.

Box 3. Common after-effects of stroke

- Fatigue – affects up to half of all stroke survivors and precludes a return to work (Stroke Association, 2017)
- Low mood, anxiety and depression – affect up to 50% of stroke survivors (Stroke Association, 2017)
- Emotional lability – overwhelming emotional responses such as crying, anger or laughter (Torbey and Selim, 2013)
- Cognitive issues – problems with memory, attention, concentration, organisation skills and judgement

Post-stroke reviews at six months are a good way of assessing a person's unmet needs, managing complications, and discussing how to prevent future strokes. It is also an opportunity for specialist nursing teams to ask patients who have had a haemorrhagic stroke whether they have ongoing headaches and whether they are being treated for this. Nurses working in stroke teams need to ensure post-ICH patients are actively treated for headaches, as for any other complication or after-effect of stroke.

Need for further research

Many of the studies examining the links between migraine and haemorrhagic stroke are outdated, so their findings are difficult to apply to the current ICH population. In addition, the general stroke population is evolving, with increasing numbers of younger patients, while access to advanced treatments and improved imaging mean we understand and treat stroke differently than we did 20 years ago. As such, more-recent trials may hold more clinically appropriate answers. As there is so much we still do not know about ICH, and a national gap in research, using findings from older trials is currently the best way to develop our knowledge base.

Traditionally, research into the subgroup of unwell haemorrhagic stroke patients has been much sparser than research into ischaemic stroke. Despite an increase in research in the last 10 years, haemorrhagic stroke is still under-researched. It is hardly surprising, therefore, that the knowledge base for the care of patients with ICH is smaller than the knowledge base for ischaemic stroke. This issue is likely to be compounded by difficulties with recruiting participants and completing trials in a cohort of people who are clinically unstable (especially in the

acute phase) and have high mortality rates (Alexander, 2013). This may explain why so little is known about the links between headaches/migraine and haemorrhagic stroke, and about the effects on patients.

Past research has done little to explore how headaches affect people's quality of life after haemorrhagic stroke. If we could better understand the impact of post-stroke headaches on daily life, there would be more pressure on health professionals to investigate and treat these headaches. Patients and health professionals would benefit from better understanding of the rates and impact of headaches after haemorrhagic stroke, so these can be effectively managed and treated.

Future research, for example in the form of a systematic literature review, would be a good way to start answering the pending questions. It could help identify research questions leading to the design of larger clinical studies and randomised controlled trials of preventive medications for post-stroke headache. Other benefits of such research could include the development of a care pathway, changes in clinical practice, improved patient care, enhanced recovery and improved quality of life for individuals.

“Post-stroke reviews at six months are a good way of assessing a person's unmet needs”

Implications for practice

Haemorrhagic stroke is often more severe than ischaemic stroke and, due to the pressure on the brain, headaches and migraine are more likely to present in haemorrhagic stroke – both at stroke onset and as long-term after-effects. Headache and migraine are debilitating disorders in their own right. Combined with other after-effects of stroke, they can slow down recovery, diminish people's ability to return to normal life and dramatically reduce quality of life. Improved recognition of headache and migraine after stroke would lead to better treatment and better patient outcomes. Nursing staff are well placed to identify headache and migraine after stroke, both on wards and in outpatient settings. **NT**

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