



NEUROLOGICAL
FOUNDATION
OF NEW ZEALAND

Migraine

A PATIENT'S GUIDE

Migraine

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Introduction

Migraine is one of the most common neurological disorders. It occurs in about 18% of women, mainly between the ages of 15 and 55, and 12% of men, and was identified by the World Health Organisation as one of the four most disabling chronic medical disorders. Many people with migraine manage it without too much trouble, but for a few it is a distressing, frustrating and horrible disorder which has a major impact on their lives. Although numerous text books have been written about the disorder, and there is a strong family predisposition to it, the underlying causes are unknown. Ongoing research, however, is beginning to unravel some answers.

This is not a comprehensive review and I am well aware of the personal bias because of my background as a neurologist; others have a differing view of migraine, depending on their background and experience.

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Definition



Migraine is a disorder characterised by recurrent headaches, often preceded by an aura (loss of vision and flashing lights) and accompanied by nausea and vomiting, with normal health between the attacks. There is no laboratory test for migraine and conventional scans (both CT and MRI) are normal.

The diagnosis is based on the description of the headache and other symptoms, and the neurological examination will be normal. The difficult question is how many of the clinical features need to be present to make a definite diagnosis; some people have just the typical migrainous visual symptoms without headache, while others have recurrent headaches consistent with migraine but without sufficient features to make the diagnosis certain.

Clinical Features

Headache

Headache is the major feature of migraine. Typically, it affects one side much more than the other, although it can start on one side of the head and then change to the other. It is a throbbing ache which usually builds up in intensity over an hour or two, lasts a matter of hours and then resolves within a day or so. It can be aggravated by bending over and by exercise, and is often better when sitting up than lying down. It is associated with hypersensitivity, particularly to light and noise but also to strong smells. Sometimes the headache gets worse as the day goes on, but severe headaches may be present upon waking or strike on relaxing after a period of pressured work. The severity of the headache varies from a mild ache to an unbearable discomfort. During a severe attack, some people feel they would rather be dead, in contrast to people who have had a heart attack and worry that they may die.



Aura

In about 30% of migraineurs, the headache is preceded by an **aura**. Commonly, this is a visual disturbance. It usually starts with a sensation that things are out of focus and then there may be a scintillating, shimmering or flickering alteration of vision to one side of where the person is looking. This disturbance may have a zigzag edge which then gradually spreads outwards, leaving behind a patch in the field of vision in which the patient cannot see anything. Sometimes things may appear fragmented like looking through a kaleidoscope. The aura is usually the same each time it occurs for a particular person although occurring on one or other side in different attacks. The disturbance progresses over 2-10 minutes and can last from 10 minutes to about an hour. It is the **gradual spread** of the bright zigzag edge of disturbed vision that is characteristic of migraine. This sort of visual aura is due to altered function of the

visual cortex of the brain and not the eye itself. It is rare for people to have blurred vision in one eye as a feature of migraine but this does occur.

The next most common symptom of an aura is **altered sensation** and, like the visual symptoms, this starts gradually and spreads. It can start in the hand and gradually spread to the face, or it can start in the lips and/or tongue and spread to the hand. Some patients describe this as weakness but actual weakness of the face, arm or leg does not occur in ordinary migraines. In some people there is an orderly progression of the aura, starting with visual symptoms, progressing to sensory symptoms and if these symptoms are on the right side, then there may be progression to impairment of speech, with some difficulty in understanding speech and significant difficulty in saying what they want to (**dysphasia**). The onset of dysphasia may cause the patient to think that they are having a stroke; however it resolves as the aura phase ends. Towards the end of the aura or after it has resolved, the headache starts. In people who only occasionally get an aura, the headache can be more severe when it is preceded by an aura.



Nausea and Vomiting

Nausea is often a feature of migraine, and in a few people recurrent vomiting is a major problem. Conversely, some people find that vomiting eases the headache and hastens the resolution of the migraine. In childhood, recurrent attacks of nausea and vomiting (bilious attacks) may be the only

manifestations of migraine, without the usual headache.

Additional Features

Some people have diarrhoea with their migraine and some feel the need to pass urine frequently. People with severe migraine headache tend to get scalp tenderness when the headache has been present for an hour or two. Attacks of spinning (vertigo), lasting a matter of several minutes, may occur without other symptoms in people who have migraine at other times. Vertigo does not usually occur with an attack of migraine but some people do get vertigo and other symptoms suggestive of brain-stem dysfunction, when it is called basilar migraine.

Lifetime Pattern

The pattern of migraine in the course of the life of an individual is very variable but typically the onset of migraine begins with puberty in a female, improvement in late teenage years and throughout their twenties, worsening with having children and then improving at menopause. Sometimes, with the menopause there is a temporary worsening of the migraine. However, there is a general tendency for improvement to occur in migraine in late middle age. There may also be a change in the migraine so that a person who had migraine with aura for most of their lives, finds in their sixties that the headache may diminish but the visual aura may occur with increasing frequency.

The frequency of attacks is greatly variable – some people have only a few attacks in their lifetime, while it is quite common for some people to have a headache occurring every month or so. There is a tendency for attacks to occur in clusters with a few attacks in the course of a week or two, then periods of freedom for a month or two. Not all of the headaches are severe; some patients describe having ‘ordinary’ headaches and only call the severe headaches migraine.

Precipitating Factors

The number of different factors which can precipitate migraine is one of the most frustrating features of the disorder. For example, it can be triggered by a purely physical factor (glare), something ingested (e.g. alcohol), a direct blow to the head, or stress.

Over-tiredness commonly triggers an attack of migraine.

Foodstuffs causing migraine is a controversial subject. Chocolate is commonly incriminated and alcohol can be a consistent trigger. A particular type of alcoholic drink such as red or white wine, or even a particular type of beer may be identified as a cause.



Food colouring or flavouring may be incriminated. Dairy products or gluten sensitivity may be considered possible causes; occasionally a specific substance such as monosodium glutamate (often used in Chinese foods) can trigger a headache. It seems that dietary factors more often trigger a migraine in children than in adults. Strangely, it seems that migraineurs can eat particular foodstuffs at some time without any migraine whereas at other times, it brings on the headache.

The relationship of migraine to **hormonal changes** in women is well-recognised. It is relatively common for an attack to start around the onset of a period. Migraine often improves during pregnancy but a small proportion of patients become worse during the first trimester of pregnancy. Resolution of migraine with the menopause is a welcome benefit of the hormonal changes.

A **direct blow to the head** may induce the onset of an attack of migraine. An experienced rugby league player had recurrent episodes brought on by a stiff arm tackle. Immediately after being hit, he would go numb in the right hand and this would spread to the right side of his mouth and he would become unable to talk within about five minutes; the symptoms would last for ten minutes and he would then have a dull headache. He thought he was having recurrent small strokes. It was interesting that he recognised similar symptoms in his 19-year-old son, some years later. This so-called **traumatic migraine** occurs more commonly in children and is misdiagnosed as concussion.



Glare, such as sunlight reflected off a car or walking from the shade into bright light, can trigger an attack.

Strong smells can trigger the headache in some people. The usual odour triggers are perfumes or fumes from volatile substances such as paints.

Strenuous exercise can cause an attack such as after sport on a Saturday afternoon, when a person may not have had lunch. Missing meals may also trigger an attack.

Dehydration is frequently mentioned by patients as a trigger for their migraine but I am unsure that this is important; I doubt that these people are significantly dehydrated but they are quite sure the headache may be prevented by drinking water. However, ensure you drink sufficient water during exercise and hot weather.

Psychological factors can be very important. However, as it was once thought that peptic ulcers were caused by psychological factors until it was discovered they were due to a *helicobacter pylori* infection, caution is

necessary in attributing this as cause for the migraine. Nevertheless, factors such as having too much to do and too little time to do it in, emotional pressures generated by a catch-22 situation, unrealistic parental expectations and many other circumstances do seem to be the underlying cause of migraine in some people. The stress or pressure may be self-generated by having increased responsibilities thrust upon them because of an inability to say “no”.

Dysfunction of the neck or sinuses inflammation

are often attributed as the major cause of migraine, but my experience is that these factors are not all that important. The headache of migraine may start with muscle tension in the neck but

I do not feel that migraine is due to any displacement of a cervical structure.

Frequent ingestion of analgesic medications for headache can lead to ‘rebound’ headaches so that the headaches recur as the analgesic medication wears off, leading a

person to take further analgesic medication and so on, creating a vicious cycle of recurring headache.

Symptomatic Migraine

Some uncommon disorders start with migraine, for example Moyamoya disease (a gradual narrowing of the termination of the internal carotid artery), CADASIL (a rare inherited disorder with migraine coming on in

the thirties or forties, strokes in the fifties progressing to dementia and death in the sixties) and meningioma. Most patients who get increasingly frequent and severe attacks of migraine over the course of a few months, have bad migraine but an underlying disorder such as benign intracranial hypertension needs to be considered. An unusual form of migrainous headache with prominent and sometimes persistent symptoms with aura, with several severe attacks occurring in a matter of a few weeks or

months, can be associated with the presence of some white cells in the spinal fluid and this is known as HANDL syndrome. Some genetic disorders can cause migraine-like symptoms and one of these is familial hemiplegic migraine.



Related Disorders

Migraine-related syndromes

Very severe, sudden (**thunderclap headache**), occurring at orgasm, is one of the varieties of benign sex headache and it is more common in people with migraine. Thunderclap headache can also be caused by a bleed into the space between the brain and its coverings (subarachnoid haemorrhage) so that thunderclap headaches need to be taken seriously. The pattern of migraine may change into a persistent headache occurring most days in a month. This may be termed '**transformed migraine**' or '**chronic daily headache**'.

Cluster headache (migrainous neuralgia) is distinguished from migraine by a number of clinical features; it is more common in men, it can be triggered by alcohol, it tends to occur at a particular time of the day, it is of abrupt onset and usually behind one eye and may be associated with reddening of the eye, watering of the eye and blockage of the nose together



with a temporary drooping of the eyelid and small pupil. Cluster headache may respond to similar medications used in the treatment of migraine. Some people have a combination of some features of cluster headache and some of migraine, so that the distinction may not be altogether clear.

Overlapping Syndromes

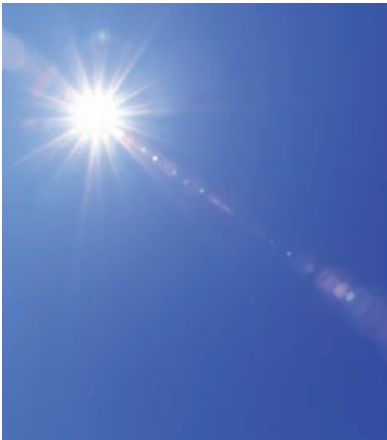
Mention has already been made of the overlap between migraine and migrainous neuralgia (cluster headache). In addition, there may be overlap between the symptoms of **tension headache** and migraine. Typically, tension headaches are felt as a dull symmetrical ache or a feeling of pressure around the head, often starting in the neck, becoming worse during the day and often better with alcohol rather than worse. These persistent dull headaches are not associated with photophobia (discomfort experienced with sensitivity to light) or nausea. However, many patients have features of both tension headache and migraine and these may be categorised as **tension-vascular headache**.

Cause of Migraine

Genetic factors are clearly important with around 75% of people having a first-degree relative who also has migraine. However, no particular genetic abnormality has been identified and it may well be that several genes are implicated in migraine.

The extraordinary range of factors that can trigger a migraine make it difficult to envisage the basic abnormality. The almost immediate reaction to a relatively minor knock to the head or to glare,

precipitating an aura, suggests a primary disorder of nerve cell function. The visual aura, sensory aura and speech disturbance all point to an abnormality of the cortical brain cells and the rate of spread over the brain cortex (3mm/minute) is the same rate of progression of an abnormality first described in experimental animals



in 1944 – **the spreading depression of Laeo, or cortical spreading depression**. However, the neuronal mechanism underlying this spreading depression of cortical brain cells has not been specified. As the aura (when it occurs) is the first indication of a migraine developing, it seems reasonable that the primary disorder is one of brain cells. There is no real doubt that the migraine headache arises from the blood vessels over the skull and scalp; the meningeal arteries and the scalp arteries may be affected, together with the large intracranial venous sinuses. The link between the nerve cell abnormality and the vascular headache probably involves brain-stem mechanisms, particularly through the 5th cranial nerve. The changes in the walls of the blood vessels causing the headache are triggered by changes in serotonin levels but it is difficult to correlate this change in the blood vessels with a disorder of the brain nerve cells. It is **not** now thought that constriction of the blood vessels (spasm) and subsequent dilatation are the primary cause of the migraine headache, but secondary events due to changes in the walls of the arteries.



Management

Lifestyle changes

It is appropriate to review your diet. Regular meals are important. Elimination diets are very difficult to maintain but with persistent headaches, it is worth looking at significant restriction of dairy products and considering a gluten-free diet. Most people recognise sensitivities to particular foodstuffs such as chocolate or monosodium glutamate but one of the difficult variables is varying sensitivity to the foodstuffs at different times.

Sleep deprivation can sometimes be improved by sleep hygiene or occasional use of appropriate medication. Underlying stresses resulting in worry at night time



can be helped with counselling.

Making time for yourself and not trying to be all things to all people all of the time requires a change in

outlook. All too often, the migraineur has been unable to change the psycho-social stressors despite their best efforts and may say to the doctor “cure my headaches and I will be alright” when they really know that they have not come to terms with their problems.

Hormonal manipulation is helpful only in a few people; continuing to take the combined oral contraceptive pill for three months rather than having the headaches each month on stopping the pill, changing to a Progestogen only pill, using the injection of Progestogen or a Mirena IUD may all be appropriate in certain cases.

Varying techniques can be used to unwind the build-up of pressures on the nervous system.

Strenuous exercise, for half an hour on at least three occasions a week can be helpful; other people may find yoga and meditation helpful.

Treatment of the acute attack

It is important to take medication early in an attack, partly because medications are not well absorbed when nausea develops, and partly because a severe headache may not be relieved by **analgesic medication** such as paracetamol or codeine.

These two medications can be used in combination, sometimes with the addition of aspirin. An alternative is a **non-steroidal anti-inflammatory agent**. For many people, particularly children, a simple analgesic and bed rest is

sufficient treatment. The dose of medication needs to be effective; it is better to take a full dose at the onset rather than seeing whether a modest dose taken at the onset will be helpful and then taking another dose if it is not.

Specific treatment for migraine is the **triptans**; these are not analgesic medications but block the cascade of biochemical changes in the walls of the blood vessels that cause the headache and may also have an effect on the brain itself. The triptans are most commonly taken



by mouth but Imigran can be given by a self-administered subcutaneous injection. These need to be taken as soon as the patient is aware a migraine is starting.

Some patients find that **pethidine** enables them to get to sleep which may often relieve the headache; however, pethidine is highly addictive and best avoided.

General measures can make the attack more variable – a quiet, darkened room, the use of a hot or cold pack (or alternating hot/

cold packs), pressure on the superficial temporal arteries or firm pressure over the temples may be helpful. With apprehension and pain, a particular type of hyperventilation may occur which exacerbates the symptoms. Frequent sighing respirations may cause secondary symptoms. Instead of taking deep breaths, slow diaphragmatic breathing is appropriate during an attack of migraine. It is usually beneficial for the patient to get to sleep. In contrast, some patients find caffeine to be of benefit.

Medication includes analgesics (pain relieving medication), non-steroidal anti-inflammatory agents (NSAIDs), triptans and medication for nausea. The analgesics include paracetamol, aspirin, codeine, Tramadol and pethidine.

The NSAIDs include diclofenac, Ibuprofen, Naproxen and Cox-2 inhibitors. The triptans specifically relieve the headache of migraine by a direct action on the blood vessels of the skull and scalp. They do not relieve other painful disorders. The medications for nausea include metoclopramide (Maxolon) and prochlorperazine (Antinaus, Buccastem or Stemetil).



In treating an attack of migraine it is important to take the medication at the onset, before nausea develops, if possible. This may be difficult as the patient may be unable to tell whether

they are going to have a severe attack or whether a mild headache, which they otherwise would not treat, may develop into a severe attack. It is important to take a full dose of the medication at the onset, rather than taking a small dose and then another small dose later on. For example, paracetamol could be given as three tablets in an adult and four tablets for a large adult. Different patients find that a particular medication will suit them and in particular, combinations of analgesics such as Panadeine, Codalgin, Paradex, Mersyndol and Pirophen could be appropriate.

A combination of two Paramax tablets and 50-100mgm of diclofenac (Voltaren) may be used. It is important to note that taking analgesic medication more than three times a week is likely to lead to rebound headaches, with the headaches becoming increasingly frequent and only partly relieved by medication.

The simplest management would be to take paracetamol and sleep; this can be sufficient for many children with migraine. If a simple analgesic does not give reasonable relief, then the combination medications can be tried or, alternatively, a non-steroidal anti-inflammatory agent could give better relief. If nausea is a problem then the medication needs to be taken early on before the

nausea becomes established. One of the problems is that with the nausea, medications are not well absorbed from the stomach. The triptans successfully relieve the attacks in up to half of patients with migraine. These are given by tablet (Imigran) or by a wafer which dissolves in the mouth (Maxalt). Imigran can be given by self-administered subcutaneous injection and this is more effective than the tablet but may give rise to side effects more frequently. The triptans do not usually work if administration is delayed to the point where scalp hypersensitivity has developed. The triptans are relatively short-acting and when the headache has been relieved, a slow release NSAID can be taken to prevent recurrence of the headache. It is best to avoid pethidine, Tramadol and morphine; although some patients say these are the only medications that relieve their headache, dependence on these medications develops quickly.

Using an **anti-emetic** (anti-nausea medication) such as Maxolon can improve the absorption of analgesic medications so that combinations of the two (for example Paramax) are commonly used. Prochlorperazine (Stemetil) can be given in a dissolving tablet under the lip, by tablet or by suppository. It tends to be more sedating than Maxolon and this can be an advantage.

When medications are not absorbed from the stomach because of nausea or vomiting, they can be given by injection. However, this requires a visit to the hospital or to the doctor which is inconvenient, uncomfortable and expensive. Absorption from the rectum is better than from the stomach but it is surprising how many people are averse to using suppositories, even for very debilitating attacks. Suppositories of diclofenac and/or Stemetil can be very useful.

Prophylactic Medication

Depending on the frequency and severity of attacks, it may be best to take regular medication to prevent the attacks of migraine from occurring. The fact that a number of different medications have been used, indicates that no one medication is particularly effective. The selection of the most appropriate prophylactic medication depends on a number of factors. For example, if there is an allergic history such as eczema or asthma, then Sandomigran may be appropriate, while if sleep disturbance is prominent then amitriptyline or nortriptyline would be more appropriate. Beta blockers (Nadalol or propranolol) can be effective, particularly in the presence of hypertension. Surprisingly, medications used in the treatment of epilepsy (sodium valproate or



Transformed migraine – chronic daily headache

A few patients develop increasingly frequent and prolonged headache; the headaches may not necessarily be any more severe but when they occur on more than 14 days a month, then this is known as transformed migraine or chronic daily headache. Sometimes this may be due to rebound headaches associated with the frequent use of analgesic medication. Sometimes, psychosocial factors may be important but no reason for the change can be identified in many patients. This is a difficult problem to manage, usually requiring prophylactic medication, modification of lifestyle and possibly counselling.

topiramate) can be beneficial in intractable migraine. An NSAID can be used for up to two weeks as a prophylactic agent and sometimes can prevent exercise-induced migraine in sports people. These are all standard treatments. A wide range of other measures are sometimes used such as Botox, but the place of each of them in the management of intractable migraine has not been defined.

Summary

Because of its varying presentation in different patients and the several possible factors involved in causing the attacks, migraine is of great interest to the neurologist. And as it is so common and sometimes very disabling, it is important to a large number of patients. Not surprisingly, when the cause of a disorder is not known and it continues for a number of years, with normal health between attacks, so-called alternative medicine has a field day. Research has produced the migraine-specific triptans as treatment for migraine and with continuing research, it is very likely that more effective medical treatment will become available.

Further Resources

Neurological Foundation of New Zealand
www.neurological.org.nz then enter migraine in the search box.

The Migraine Trust
www.migrainetrust.org

Migraine Action Association
www.migraine.org.nz

Migraine 4 kids
www.migraine4kids.org.nz

National Headache Foundation
www.headaches.org

National Migraine Association
www.migraines.org

Organisation for the Understanding of
Cluster Headaches (OUCH)
www.ouch-us.org

Neurological Foundation of New Zealand

The Neurological Foundation is an independent body and charitable trust that raises funds to ensure this country's top neuroscientists can continue leading-edge research into neurological disorders.

The Foundation shares a noble vision with these scientists: to progress research so that significant advances can be made in the prevention and cure of neurological disorders. One day, this will greatly reduce the level of suffering and premature death from diseases of the brain and nervous system – Alzheimer's, Parkinson's and Huntington's diseases, migraine, stroke and multiple sclerosis to name just a few.

The Foundation also funds valuable educational initiatives such as Brain Awareness Week, and regularly provides its members and the wider public with information about the latest advances made in neurological disorder prevention and research.

If you would like to know more about the work of the Neurological Foundation, or to ask for information about neurological conditions or support groups, contact our national office or visit our website.

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