HEADACHES IN CHILDHOOD

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Introduction

Recurrent headache is one of the three common pain syndromes (the others are recurrent abdominal pain and recurrent limb pain) in childhood. Parents become concerned because they often assume that headaches are rare in childhood and therefore indicate a serious disease. A detailed history and physical examination allows the practitioner to make a specific diagnosis and decide which children need neuroimaging. In most cases, one can reassure the parents and the child as to the benign course of this common though annoying disorder.

Aetiology

The brain, meninges and bony skull are insensitive to pain. Pain appreciated as headache arises from intra- and extracranial blood vessels, cranial and spinal nerves, cranial and cervical muscles and adjacent structures (teeth, sinuses and ears). The neurogenic hypothesis of migraine proposes that afferent inputs to the brainstem result in a spreading cortical neuronal depression that is followed by dilation and inflammation of the cranial vasculature innervated by the trigeminal nerve. Serotonin plays an important and complex role in this process. The neurogenic hypothesis is currently favoured over the vascular hypothesis (vasoconstriction producing an aura followed by painful vasodilation) in the pathogenesis of migraine.

Prevalence

Headaches have been reported to occur in 20% of children. The reported frequency of migraine varies from 4 to 10%.

The prevalence of headache and migraine have not been studied in either of the two major longitudinal studies of children in New Zealand. However, children with recurrent headaches are seen commonly in general practice and are a common reason for referral to paediatricians. The prevalence of headaches in children has increased over the last 20 years.

Approach to the Child with Headaches

Clinical assessment is the most effective screening procedure in children with headaches. The aims are not only to make a specific diagnosis but also to establish a therapeutic relationship with the child and the parents. This is crucial to successful management particularly if the headaches are recurrent.

It is usually possible to establish whether the headaches are acute (e.g. due to viral or other infection: if severe consider causes in Table 3), acute recurrent (e.g. migraine or cluster headaches), chronic non-progressive (e.g. tension headaches) or chronic progressive (e.g. raised intracranial pressure).
History

Children older than eight years of age can usually give a detailed account of their symptoms. Younger children require the assistance of their parents.

Table 1: Features to establish on history

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are all the headaches the same</td>
<td></td>
</tr>
<tr>
<td>The course of the headache</td>
<td>acute, acute recurrent, chronic progressive/non-progressive</td>
</tr>
<tr>
<td>Description of typical episode</td>
<td>Aura; site of maximal intensity; duration; frequency; associated nausea; vomiting; abdominal pain or pallor; interference with daily activities; aggravating, precipitating and relieving factors</td>
</tr>
<tr>
<td>Abnormal neurological signs, symptoms</td>
<td>Before, during or after an attack</td>
</tr>
<tr>
<td>Medications</td>
<td>Type, dose and frequency</td>
</tr>
<tr>
<td>Family history</td>
<td>Headache or migraine</td>
</tr>
</tbody>
</table>

The history establishes the site, frequency, duration and periodicity of the headaches. The presence of a preceding aura can be established by asking the child whether he or she gets any warning before the headaches start. Auras include flashing lights (photopsia), visual field defects (scotomata) and distortions of size (micropsia or macropsia).

Describing the character of the pain is difficult for young children even when given a number of options, but older children can usually describe whether the headache is throbbing. The severity of the pain is best judged by whether the headache interferes with the child’s play or other activities and whether he or she needs to lie down with the pain. Children with migraine often look unwell and pale during an attack. A detailed description of a typical attack is often helpful and may also lead to the recognition that the child has more than one type of headache.

A “headache diary” is very helpful in gaining further details of triggering factors and the effectiveness of medications.

Table 2: Headache Diary

<table>
<thead>
<tr>
<th>Date</th>
<th>Time of onset</th>
</tr>
</thead>
<tbody>
<tr>
<td>What I was doing when my pain started</td>
<td>How bad was my pain (1, 2, or 3)</td>
</tr>
<tr>
<td>What made my pain worse</td>
<td>What I did to make my pain better</td>
</tr>
<tr>
<td>What else happened with my pain: e.g. nausea, vomiting, visual symptoms etc.</td>
<td>How long my pain lasted</td>
</tr>
<tr>
<td>Medication (type and dose)</td>
<td>Other</td>
</tr>
</tbody>
</table>

Sinister features include localised pain, night waking, onset on rising, associated vomiting and increasing frequency and severity.

Table 3: Features of headaches that indicate the need for further investigations

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young age (&lt; 5 years) of onset</td>
<td>Headache of recent onset</td>
</tr>
<tr>
<td>Increasing severity and / or frequency</td>
<td>Headaches that wake the child from sleep</td>
</tr>
<tr>
<td>Early morning headache with or without vomiting</td>
<td>Abnormal neurological examination e.g. abnormal gait</td>
</tr>
<tr>
<td>Focal neurological signs or symptoms during or after the headache</td>
<td>Constant daily headache</td>
</tr>
<tr>
<td>Localised pain</td>
<td>Change in behaviour or loss of skills</td>
</tr>
<tr>
<td>Headaches not relieved by analgesics</td>
<td></td>
</tr>
</tbody>
</table>
Assessment of the child’s daily activities is important. Academic progress, relationship with peers and teachers are all important in formulating a management plan.

School absenteeism often needs to be addressed in its own right. How the parents decide whether to send the child to school or keep him/her at home must be established.

A family history of migraine or other headaches should be sought. Parents with tension headaches often consider that their headaches are migraine so they should always be asked about the features of their own headache to help the practitioner decide whether they truly have migraine. Because most children outgrow migraine, parents may have forgotten that they suffered from migraine as a child.

Only one in eight families seek medical attention for their children’s headaches, so it is important to determine why the parents are seeking help at this time. Sometimes a neighbour or family member who has recently suffered a serious neurological disorder (e.g. a stroke or brain tumour) precipitates the parents into bringing their child with chronic headaches for assessment.

It is advisable to spend some time with older children without their parents present. During this interview the child is asked about difficulties at home or at school, peer relationships, activities outside school and possible substance abuse. Other issues that are best addressed in an individual interview include bullying and the possibility of sexual abuse.

Recurrent headaches may be a manifestation of depression. A simple way to assess children’s mood is to ask them to rate how they feel most of the time on a scale of one to ten where one indicates “very happy” and ten “very sad”. A score above seven correlates well with clinical depression. With significant depression the possibility of suicidal ideation must always be explored.

**Physical Examination**

Assess the child’s overall growth and development assessment. Always measure the blood pressure. Look for signs of sinusitis, chronic otitis media and temporomandibular joint dysfunction. Emphasis, of course is placed on a detailed neurological examination.

Fundoscopy is difficult in the younger child but with assistance from the parents it is usually possible. In children most intracranial tumours arise in the posterior fossa or supra sellar region so assessment of gait and coordination as well as eye movement, visual acuity and visual fields must always be assessed. Refractive errors are an uncommon cause of headache in childhood but must be considered if headaches are precipitated by reading and relieved by rest.

At the conclusion of the clinical assessment it is usually possible to decide whether the child’s headache is typical of a recognisable clinical syndrome such as tension headache or migraine or whether there are features that indicate that further assessment is required. (See Table 2)

Occasionally parental anxiety is so extreme that neuro-imaging is required.
Types of Headache in Childhood

The International Headache Society Criteria are applicable in childhood. In practice, the criteria which divide headaches into thirteen categories with one hundred and twenty nine subtypes are cumbersome. A simpler approach is to consider the common types of headaches encountered in practice.

Headaches with fever

Headaches are common during viral illnesses of childhood. Less commonly headaches with fever may be due to sinusitis, otitis media or intracranial infection but associated signs and symptoms usually make the diagnosis clear.

Sudden onset of severe headache

These usually indicate serious underlying pathology and require urgent diagnosis and treatment. Causes include meningitis, encephalitis, intracranial bleed, acute hypertension, acute elevation of intracranial pressure or first attack of migraine.

Migraine

Acute recurrent headaches are likely to be migraine. Classical migraine or migraine with aura (throbbing unilateral headache, preceded by an aura, associated with nausea and vomiting, photophobia and relief by sleep) is less common in children than common migraine (migraine without aura).

The following criteria are used in the International Classification of Headache Disorders (International Headache Association. Cephalgia 2004)

Migraine without aura

A. At least 5 attacks fulfilling following criteria
B. Lasts 4-72 hrs (children 1-72 hours)
C. At least 2 of : Unilateral
   Pulsating
   Moderate /severe pain
   Aggravation by /avoidance of physical activity
D. At least one of :
   Nausea /vomiting
   Photo/phonophobia (in children may be implied eg child prefers dark room)
E. Not attributed to another disorder
Migraine with aura

A. At least 2 attacks fulfilling criteria B – D
B. Aura (at least 1 of following fully reversible neurological symptoms)
   Visual symptoms (positive eg flickering lights, or negative eg loss of vision)
   Sensory symptoms (positive eg pins and needles, or negative eg numbness +/-)
   Dysphasic speech
C. At least 2 of:
   Homonymous visual symptoms +/- unilateral sensory symptoms
   At least one aura symptom lasting more > 5 minutes and/or different aura symptoms
   occur in succession over > 5 minutes
   Each aura lasts > 5 & < 60 minutes
D. Headache begins during aura or follows it
E. Not attributed to another disorder
   (Occasionally aura may occur without headache)

Potential triggering factors should be sought.

Table 4: Common trigger factors for migraine

<table>
<thead>
<tr>
<th>Stress</th>
<th>Foods and chemicals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Chocolate, monosodium glutamate, beef concentrates, certain fruits e.g. oranges,</td>
</tr>
<tr>
<td></td>
<td>pineapples, caffeine-containing beverages (caffeine ingestion or withdrawal)</td>
</tr>
<tr>
<td>Behaviour</td>
<td>Missing meals, sleeping less than normal</td>
</tr>
<tr>
<td>Drugs</td>
<td>Salbutamol, oral contraceptive</td>
</tr>
</tbody>
</table>

Perform neuroimaging for complicated migraine where there is headache and a confusional state, paralysis of external ocular muscles, ataxia and incoordination or delusional states.

**Tension Headaches**

In this type of headache the pain is diffuse, starts gradually, is symmetrical and sometimes described as “band-like”. Though there may be symptom-free periods, typically pain is present most of the time but is not progressive. It is usually not severe enough to interrupt the child’s daily activities but if not managed appropriately may lead to school absenteeism.

**Mixed migraine and tension headaches**

Some children give a clear history of more than one type of headache. Migraine and tension headaches, the two commonest types of headaches in childhood may occur together.
Cluster Headaches
These as their name implies occur in series. They are uncommon in childhood but are occasionally encountered in older children. Headaches lasting from a few minutes to a few hours occur over a few days and are followed by long symptom–free periods. The pain is characteristically maximal around one eye and spreads to involve one side of the face. Ipsilateral autonomic findings may occur in older children (lacrimation, rhinorrhoea, conjunctival injection and Horner’s syndrome).

Raised intracranial pressure
Expanding intracranial lesions and benign intracranial hypertension (pseudotumour cerebri) produce headaches that are present on waking and are aggravated by coughing, sneezing and straining at stool. The headaches associated with these conditions are progressive with frequency and severity increasing over time.

Benign intracranial hypertension is diagnosed, after a normal CT or MRI scan in a child with papilloedema, by measuring the opening pressure at lumbar puncture.

Headaches associated with trauma
Headaches may occur acutely following trauma or as part of a post-concussion syndrome.

Analgesic headaches
These are rare in childhood but do occur and may be missed if children and their parents are not asked how frequently medications are taken. In this condition headaches occur during daily intake of medication (e.g. paracetamol, aspirin, etc.) for symptomatic headache. The headaches, which occur daily or almost daily, disappear within a few weeks after withdrawal of medication.

Management
This varies according to the type of headache.

Tension Headaches
Reassurance that there is no serious underlying pathology goes a long way to allaying fears. Stressors in the child’s environment need to be actively managed whilst accepting that many are difficult to change (bullying, poor academic progress, poor peer relationships etc).

It is important to present stressors as precipitating events in an individual with a predisposition to headaches because not all children who are stressed suffer from headaches.

Similarly many well-meaning parents often fill their child’s life with so many activities that there is little opportunity for free-time in which to relax.

Simple analgesics are helpful and should be used in full dosage at the onset of the headache (Appendix 1).

School attendance must be managed in its own right often with the assistance of the schoolteacher. Children who get headaches in the morning whilst preparing for school should only be excused school until their headaches start to improve. Likewise going to sick bay at school should be limited to when the headache is particularly severe with a return to class as soon as there is any improvement.
HEADACHES IN CHILDHOOD

Relaxation techniques are helpful in the cooperative older children.

A pain diary is helpful in establishing a pattern (see Table 2) and can be completed by the older child without parental assistance. Younger children will require the help of their parents. However, always leave it to the child to tell their parents when they have a headache rather than the parent asking, because younger children if asked will almost always say yes. Headache diaries are helpful in assessing severity and may detect precipitants and effective interventions.

Migraine

Many of the strategies described under tension headaches e.g. addressing stressors in the child’s life, are also useful in the management of migraine. Many children with migraine are high achievers who set themselves unrealistically high standards.

Only a few double-blind placebo controlled drug trials have been carried out in children. The results have not always been reproducible.

Explanation of the nature of migraine, reassurance that there is no serious underlying pathology and explanation of how to use medication are all important.

Obvious precipitants e.g. missing meals and late nights should be avoided (Table 4).

First line management is simple analgesics at the onset of the headache before it becomes severe, or better still during the aura (Appendix 1). Once the migraine is established it may be difficult to administer oral medications because of nausea and vomiting. Prochlorperazine in combination with an analgesic is often effective.

Sumatriptan, a selective serotonin agonist is effective if administered nasally or orally.

Bio-feedback and relaxation techniques, if available, may be of value.

Dihydroergotamine may have a role in older children but should never be use in complicated (i.e. with focal signs or symptoms) migraine.

Prophylaxis is indicated for frequent disabling migraines that are interfering with daily activities. Drugs used for the prophylaxis of childhood migraine have not been well studied and so practice is based in extrapolation from adult studies. Propranolol and pizotifen are the most commonly used drugs in migraine prophylaxis (See Appendix 1). Topiramate and valproate are also useful.

Because of the good prognosis with childhood migraine attempts should be made to withdraw the prophylaxis after six months.

Cluster headaches

Acute attacks may treated with sumatriptan and corticosteroids are used for prophylaxis.

Medications commonly used to treat headaches in children - see Appendix 1.

Prognosis

The prognosis for most headaches in childhood is good. The most significant prognostic factor in children with migraine is age of onset. Younger children have a better prognosis whilst onset after puberty is associated with a lower remission rate.
Conclusion

Headaches are common in childhood. It is usually possible to classify the child's headache into one of a number of types, identify the small group that require investigation and the much larger group that are best managed with parental reassurance and simple analgesics.

Further reading

Up to date
Approach to the child with headache; Classification of migraine in children; Management of migraine headache in children latest literature review 19.1 : January 2011.

RCH Practice guideline: headache guideline at:

Useful resources for parents and children


International Classification of Headache Disorders 2nd Ed Cephalgia Vol 24 Supplement 1,2004
Appendix 1. Medications

Please consult the manufacturer’s literature for full information on dose forms, dose, monitoring and side effects before dispensing

<table>
<thead>
<tr>
<th>Simple analgesia</th>
<th>Drug</th>
<th>Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Paracetamol</td>
<td>10-15 mg/kg/dose 4hourly&lt;br&gt;Total daily maximum 90/mg/kg/day&lt;br&gt;Adult dose 500 – 1000 mg 4-6hrly, maximum 4g/24 hours</td>
</tr>
<tr>
<td></td>
<td>Ibuprofen</td>
<td>20 mg/kg /day In 3-4 divided doses&lt;br&gt;Adult dose 200-400 mg/dose 4-6 times a day</td>
</tr>
</tbody>
</table>

**Migraine**

<table>
<thead>
<tr>
<th>Acute attack</th>
<th>Drug</th>
<th>Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple analgesia</td>
<td>As above</td>
<td>Administer during the aura or at onset of attack</td>
</tr>
<tr>
<td>Anti-emetic</td>
<td>Prochlorperazine</td>
<td>IV, IM, Oral (consult manufacturer’s literature for information for intravenous route)&lt;br&gt;100-250 microgram /kg/dose&lt;br&gt;Adult dose 12.5 mg IM or 10mg oral</td>
</tr>
<tr>
<td>Specific agents</td>
<td>Ergotamine (contraindicated in complicated migraine)</td>
<td>Must be used early in attack, so use in children less than 10 years is difficult&lt;br&gt;1 mg at onset. Increase by 1mg every 30 minutes until there is relief, vomiting or maximum dose has been taken&lt;br&gt;Max. dose: &lt; 12years 3 mg ; &gt; 12years 6 mg</td>
</tr>
<tr>
<td></td>
<td>Sumatriptan (not to be used with Ergotamine, in children with cardiac disease or those on SSRIs.)</td>
<td>Nasal administration: young children 5mg -10mg. Adolescents up to 20 mg. Oral administration: over 12years 25 mg repeat in 20minutes. Maximum 50mg.</td>
</tr>
</tbody>
</table>

**Prophylaxis**

<table>
<thead>
<tr>
<th></th>
<th>Propranolol (avoid or use with caution in children with asthma)</th>
<th>1-2 mg /kg /day&lt;br&gt;&lt; 35kg 10 –20 mg 8hourly&lt;br&gt;35 kg 20-40 mg 8 hourly&lt;br&gt;Side-effects: Fatigue, nausea, depression</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pizotifen</td>
<td>&lt; 12 years 0.5 –1 mg at night&lt;br&gt;12 years 1-2mg at night</td>
</tr>
<tr>
<td></td>
<td>Carbamazepine</td>
<td>Start at 5- 10 mg/kg/day increasing to 10 – 20 mg/kg /day in 2-3 divided doses</td>
</tr>
<tr>
<td></td>
<td>Amitryptyline</td>
<td>1-2 mg/kg at night Adult dose 50-75 mg</td>
</tr>
</tbody>
</table>