Headache in Children
For the General Practitioner
EHMTIC 2012
Thursday 20th September 2012

Dr Prab Prabhakar
Consultant Paediatric Neurologist & Honorary Clinical Lecturer
Great Ormond Street Hospital for Children & UCL Institute of Child Health
Headache Prevalence

- Children up to 18 years 58%
- 1.5/1 Female/Male
- Migraine incidence 7.7%
  - Females 9.7%
  - Males 6%

Abu-Arafeh 2010
A child with a headache – The Parent

- I am worried my child has a serious illness (perhaps a brain tumor or meningitis)
- There is no such thing like this in our family – even my headaches are not as severe
- Anyway children do not get headaches – it means something is wrong
- He is missing school so often – can you not fix this
A child with a headache
In the real world of primary care

- GP research database
- 1987-2005
Table 1 General practitioners' diagnoses of headache

8/10 children are not given a diagnosis

<table>
<thead>
<tr>
<th>Age band</th>
<th>Total with headache n = 48 575</th>
<th>Number (%)</th>
<th>Primary headache n = 9321 (19.2% of all headaches)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>female n = 27 395 (56.4%)</td>
<td></td>
<td>Cluster n = 288 (3.1% of primary headaches)</td>
</tr>
<tr>
<td>5–8 years</td>
<td>3623</td>
<td>17 (0.47%)</td>
<td>Migraine n = 7468 (80.1% of primary headaches)</td>
</tr>
<tr>
<td>9–12 years</td>
<td>13 804</td>
<td>75 (0.54%)</td>
<td>Tension n = 1565 (16.8% of primary headaches)</td>
</tr>
<tr>
<td>13–17 years</td>
<td>31 148</td>
<td>196 (0.63%)</td>
<td>Secondary headache n = 549 (1.1% of all headaches)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5298 (17.01%)</td>
<td>Undifferentiated headache n = 38 705 (79.7% of all headaches)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1363 (4.38%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>355 (1.14%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>23 936 (76.9%)</td>
<td></td>
</tr>
</tbody>
</table>

Table 4 Number of migraine cases (n = 7468) receiving prescribed drug treatment

1 in 5 with a diagnosis of migraine are on medication

<table>
<thead>
<tr>
<th>Drug type</th>
<th>Total (%)</th>
<th>5–8 years</th>
<th></th>
<th>9–12 years</th>
<th></th>
<th>13–17 years</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Propranolol</td>
<td>289 (3.9%)</td>
<td>2</td>
<td>2</td>
<td>22</td>
<td>31</td>
<td>70</td>
<td>162</td>
</tr>
<tr>
<td>Pizotifen</td>
<td>1254 (16.8%)</td>
<td>28</td>
<td>35</td>
<td>234</td>
<td>215</td>
<td>324</td>
<td>418</td>
</tr>
<tr>
<td>Propranolol and pizotifen</td>
<td>55 (0.74%)</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>10</td>
<td>15</td>
<td>28</td>
</tr>
<tr>
<td>Triptans</td>
<td>258 (3.5%)</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>102</td>
<td>148</td>
</tr>
</tbody>
</table>

You are likely to see them more than the usual

Table 2 Mean consultation rate in the year before the index date

<table>
<thead>
<tr>
<th>Time period</th>
<th>Case</th>
<th>Control</th>
<th>9–12 years</th>
<th>Mean (S.D.)</th>
<th>Mean (S.D.)</th>
<th>13–17 years</th>
<th>Mean (S.D.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5–8 years Mean (S.D.)</td>
<td>5.03 (4.04)</td>
<td>3.95 (3.5)</td>
<td>4.03 (3.5)</td>
<td>3.41 (3.24)</td>
<td>4.81 (4.58)</td>
<td>3.72 (3.58)</td>
<td></td>
</tr>
</tbody>
</table>

Note: All comparisons significant ($P < 0.001$).
**Table 3 Important diagnoses in cases and controls in year following presentation.**

Headache alone is a poor discriminator of serious intracranial pathology

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Total in cases</th>
<th>Total in controls</th>
<th>Hazard ratio (95% CI)</th>
<th>P-value</th>
<th>Cases according to primary or undifferentiated headache</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Primary headache (n = 9321)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Male Female</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Male Female</td>
</tr>
<tr>
<td>Tumours benign</td>
<td>1 (0.002%)</td>
<td>0</td>
<td></td>
<td></td>
<td>1 0</td>
</tr>
<tr>
<td>Malignant</td>
<td>13 (0.03%)</td>
<td>2 (0.004%)</td>
<td>6.5 (1.5, 29)</td>
<td>0.014</td>
<td>0 0</td>
</tr>
<tr>
<td>Cerebrovascular disease</td>
<td>8 (0.016%)</td>
<td>0</td>
<td></td>
<td></td>
<td>0 0</td>
</tr>
<tr>
<td>Hydrocephalus/benign intracranial hypertension</td>
<td>21 (0.04%)</td>
<td>1 (0.002%)</td>
<td>21 (2.9, 160)</td>
<td>0.003</td>
<td>0 1</td>
</tr>
<tr>
<td>Depression</td>
<td>701 (1.5%)</td>
<td>310 (0.67%)</td>
<td>2.1 (1.9, 2.4)</td>
<td>&lt;0.001</td>
<td>28 128</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Undifferentiated headache (n = 38 705)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Male Female</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Male Female</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>0 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6 14</td>
</tr>
</tbody>
</table>

Molly - 11 yrs

- Am I dying?
- Will this get worse?
- Nothing works?
- Paracetamol works perhaps it will get better if I take this regularly
- If I say something about my headache, no one takes it seriously anyway
Do we need a scan?

- Wober-Bingol et al 1996, Vienna – unselected consecutive series 462 - 2 had (0.4%) tumor. Both scanned on the basis of clinical history +/- examination
Preface to IHS-ICH-D-2 website

Two years after the publication of the 2nd Edition of The International Headache Classification (ICH-D-2), we are now ready to launch a web based edition. This web based version has many facilities that are not present in the printed version or a simple electronic file.

Since a Headache Classification cannot be learned by heart, it is of immense value that doctors all over the world are now able to go on the web and look after whatever question they may have regarding ICH-D-2.

Table of Contents

This classification is hierarchical and you must decide how detailed you want to make your diagnosis. This can range from the first-digit level to the fourth. First one gets a rough idea about which group the patient belongs to. Is it for example 1. Migraine or 2. Tension-type headache or 3. Cluster headache and other trigeminal autonomic cephalalgias? Then one obtains information allowing a more detailed diagnosis. The desired detail depends on the purpose. In general practice only the first- or second-digit diagnoses are usually applied whilst in specialist practice and headache centres a diagnosis at
Primary Headaches

- Migraine
- Tension Type Headache
- Trigeminal Autonomic Cephalagias
- Others (we haven’t worked out yet)
Secondary Headaches

- Trauma
- Drugs (including withdrawal)
- Infection
- Vascular
- Non vascular ie Tumor/IIH
- Homeostasis
- ENT/Eyes/
- Psychiatric illness
Childhood syndromes related to migraine

- Abdominal migraine
  - Interfering, dull, periumbilical, at least an hour, well in-between, nausea/anorexia/vomiting/pallor

- Cyclical Vomiting Syndrome
  - Recurrent, severe, discreet episodes, stereotypic, associated features

- Benign Paroxysmal Vertigo
  - At least 3/yr, usually mins, vertigo, nystagmus, vomiting
Childhood syndromes related to migraine

- Alternating Hemiplegia of Childhood
  - onset <18 mo
  - Phase 1 dev delay, abn eye mvt, dystonia
  - Phase 2 Hemiplegia, ataxia, chroeathetosis
  - Phase 3 Fixed deficit, epilepsy

- Reccurent Limb Pain
<table>
<thead>
<tr>
<th></th>
<th>Migraine in Adult</th>
<th>Migraine in a child</th>
<th>Tension Headache in a child</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Site</strong></td>
<td>Temporal</td>
<td>Frontal</td>
<td>Frontal</td>
</tr>
<tr>
<td><strong>Laterality</strong></td>
<td>Unilateral</td>
<td>Bilateral</td>
<td>Bilateral</td>
</tr>
<tr>
<td><strong>Pain</strong></td>
<td>Moderate to severe</td>
<td>Mild to severe</td>
<td>Mild to Severe</td>
</tr>
<tr>
<td><strong>Time</strong></td>
<td>4 to 72 Hours</td>
<td>Minutes to hours</td>
<td>Minutes to hours</td>
</tr>
<tr>
<td><strong>Nature of pain</strong></td>
<td>Throbbing</td>
<td>Any form</td>
<td>“Band like” Compressive</td>
</tr>
<tr>
<td></td>
<td>Stabbing</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Associated</strong></td>
<td>Nausea or Vomiting</td>
<td>Not always</td>
<td>No associated symptoms</td>
</tr>
<tr>
<td><strong>symptoms</strong></td>
<td>Photophobia or</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Phonophobia</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Aura</strong></td>
<td>1/3</td>
<td>Rare</td>
<td>Not present</td>
</tr>
<tr>
<td><strong>Disability</strong></td>
<td>High</td>
<td>High</td>
<td>Mild to moderate</td>
</tr>
<tr>
<td>Symptom/Sign</td>
<td>Red Flag Diagnosis</td>
<td>Probable “benign” diagnosis</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>---------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Fever and headache</td>
<td>Meningitis, encephalitis, brain abcess</td>
<td>? Systemic illness</td>
<td></td>
</tr>
<tr>
<td>Sudden-onset headache after: coughing sneezing straining exercise intercourse any Valsalva manoeuvre</td>
<td>Sub Arachnoid Haemorrhage Pituitary apoplexy Bleeding in to a pre existing mass lesion</td>
<td>Primary exertional headache, primary cough headache, primary coital headache</td>
<td></td>
</tr>
<tr>
<td>Focal neurology</td>
<td>Stroke, TIAs, Vascular malformation, mass lesion</td>
<td>Migraine with aura</td>
<td></td>
</tr>
<tr>
<td>Papillodema</td>
<td>Mass lesion, Hydrocephalus</td>
<td>Idiopathic intracranial Hypertension</td>
<td></td>
</tr>
<tr>
<td>Symptom/Sign</td>
<td>Red Flag Diagnosis</td>
<td>Probable “benign” diagnosis</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>----------------------------------------------------------</td>
<td>--------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Early morning headache</td>
<td>Raised Intra Cranial Pressure</td>
<td>Idiopathic Intracranial Hypertension</td>
<td></td>
</tr>
<tr>
<td>Headaches despite analgesic</td>
<td>Sub dural or sub arachnoid haemorrhage</td>
<td>Medication Overuse Headache</td>
<td></td>
</tr>
<tr>
<td>Headache and lethargy</td>
<td>Carbon Monoxide Poisoning</td>
<td>Chronic Fatigue</td>
<td></td>
</tr>
<tr>
<td>Red eye</td>
<td>Acute Glaucoma</td>
<td>Trigeminal Autonomic Cephalalgia</td>
<td></td>
</tr>
</tbody>
</table>
Red Flags

- Diagnosis of exclusion
  - History, history and history
  - Examination and documentation (the curve ball)

- Bottom line – you need time to do this
  - Book a double appointment!
  - Information gathering
Clinical Examination

- Nature of pain – poor discriminator
- Postural headache – worse in morning, worse on valsalva
- Occipital headaches
Examination

- Blood pressure
- Gait
- Eyes
  - pupil size
  - Pupilary reaction
  - nystagmus
  - Fundoscopy
  - Saccades
Clinical Examination

- Fever
- Meningism
- Rash
- Trauma
- Eye signs – diplopia, nystagmus
- Fundoscopy
- Raised ICP
Pattern recognition

- Acute headache
- Acute recurrent headache
- Chronic progressive
- Chronic non progressive

Rothner 2001
Chronic Non Progressive

- Usually an evolution of a primary headache
- Chronic daily headache
  - Transformed migraine
  - Medication overuse
  - New daily persistent headache
Chronic and Progressive

- Headaches worse over time
- Typically weeks or months
- Cause – Brain tumor and Idiopathic Intracranial Hypertension
Acute headaches

- No prior history
- Just appears
- Usually easy to spot
- Cause - viral illness, bacterial infections, SAH
Acute recurrent headache

- Commonest presentation

- Cause
  - Migraine
  - Tension type headache
  - TACs
At least 5 attacks fulfilling criteria

- Headache attacks lasting 4-72 hours (untreated or unsuccessfully treated)

- Headache has at least two of the following characteristics:
  - unilateral location
  - pulsating quality
  - moderate or severe pain intensity
  - aggravation by or causing avoidance of routine physical activity (e.g., walking or climbing stairs)

- During headache at least one of the following:
  - nausea and/or vomiting
  - photophobia and phonophobia

Not attributed to another disorder
Triggers

- Stress
- Regularity
  - Meals
  - Sleep
- Change in weather
- Exercise
- Food – Caffeine, Alcohol, Drugs
- Dehydration

- Tendency for parents and practitioners to administer small doses of analgesia, leading to chronicity
Pitfalls

- Recognition
  - Location of pain – cheek (sinusitis)
  - Neck pain
  - Eye strain
  - Periodic syndromes

- Acceptance

- Too little too late
  - Treat early and give adequate (not half hearted) doses
  - (eg 20mg/Kg of paracetamol or 10mg/Kg of Ibuprofen) (5mg or 10mg domperidone)
  - (Sumatriptan 10mcg per actuation)

Cady 2005, Swadron 2010, Cuvellier 2010
Treatment principles

- Healthy lifestyle – eating breakfast, sleep hygiene, exercise and hydration
- Tools to cope with stress – time out, breathing, counting
- Treat early and with good doses
  - Chronification
  - Gastroparesis
- School attendance and social participation is part of outcome measure so insist on this
- Allow child to participate – some elect not to have medication
BNF and Licensing

- Paracetamol
- Ibuprofen
- Sumatriptan nasal spray for children >12 yrs
Treatment principles - Medication

- Triptans can be an useful adjunct (do not use in hemiplegic migraine)

- Prophylactics – start slow and increase until desired outcome or side effect

- Caution – side effects come early

- Minimum of 3 months of drug trial in good dose before giving up

- Choice of medication could relate to co morbidity – sleep, anxiety, depression

- Manage expectations – “No cure”
School Policy Guidelines for School Students with Migraine and Troublesome Headache
# Migraine prophylactics

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose range (mg per day)</th>
<th>Evidence base</th>
<th>Side effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pizotifen</td>
<td>0.5 to 1.5mg Nocte</td>
<td>Weak evidence but relatively safe and reasonable first choice</td>
<td>Sedation, weight gain</td>
</tr>
<tr>
<td>Propanalol</td>
<td>40 to 180 mg BD</td>
<td>Good evidence</td>
<td>Weight gain, lethargy, night mares, can make asthma and diabetes worse</td>
</tr>
<tr>
<td>Topiramate</td>
<td>25 to 200 mg OD or BD</td>
<td>Good evidence</td>
<td>Weight loss, tingling and numbness, word finding difficulties</td>
</tr>
</tbody>
</table>
# Migraine prophylactics

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose range (mg per day)</th>
<th>Evidence base</th>
<th>Side effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gabapentin</td>
<td>300 to 900mg TDS</td>
<td>Weak</td>
<td>Relatively clean -</td>
</tr>
<tr>
<td>Flunarizine</td>
<td>5 to 20mg OD</td>
<td>Strong - first choice for Hemiplegic migraine</td>
<td>Weight gain, extrapyramidal movements, depression</td>
</tr>
<tr>
<td>Valproate</td>
<td>80 to 1000 mg BD</td>
<td>Weak</td>
<td>Weight gain, hair loss, teratogenicity</td>
</tr>
</tbody>
</table>
Non Pharmacological Therapy

- Behavioral therapies
  - Hypnosis – 144 children CDH self reported 4.5 to 1.4 per week
  - Biofeedback
  - CBT
  - Meditation

- Acupuncture
  - 47 patients “pleasant and helpful”

Non Pharmacological Therapy

- Non-proven options
  - homeopathy

- Proven not to work
  - chiropractic
  - osteopathy
Nutraceuticals

“Natural” OR “Alternative”

<table>
<thead>
<tr>
<th>Compound</th>
<th>Notes</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coenzyme Q10</td>
<td>Electron transport, anti inflammatory, protective against glutamate toxicity</td>
<td>150mg per day (Rozen 2002)</td>
</tr>
<tr>
<td>Butterbur Extract</td>
<td>Antispasmodic, anti inflammatory and vasodilator</td>
<td>25 to 50mg per day (Pothman 2005, 81.6% improvement)</td>
</tr>
<tr>
<td>Magnesium</td>
<td></td>
<td>9mg/kg/day as tds (Wang 2005, decrease in headache days)</td>
</tr>
</tbody>
</table>
**Nutraceuticals**

<table>
<thead>
<tr>
<th>Compound</th>
<th>Notes</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Riboflavin (Vitamin B2)</td>
<td>Precursor for flavin – coenzyme for mitochondrial oxidation</td>
<td>40mg per day (Bruijn 2010, equivocal results) 200/400mg per day (Condo 2009, 50% ↓ in 68%)</td>
</tr>
<tr>
<td>Feverfew (pyrethrum parthenium)</td>
<td>Serotonin inhibitor</td>
<td>MIG-99, 6.25mg tds (CO2 extraction) (Deiner 2005)</td>
</tr>
<tr>
<td>Ginkolide</td>
<td>Platelet activating factor antagonist and a free radical scavenger</td>
<td></td>
</tr>
</tbody>
</table>
Summary...

- Give yourself some time to make the diagnosis (it will save time eventually)
- Migraine is more common than we think
- Secondary headaches occur but are uncommon
- An easy paradigm for teasing out secondary (red flag) headaches
- Treat early with adequate doses
- If you decide to image, better get the paediatricians involved.

Children’s Headache Clinic

Great Ormond Street Hospital

Prab.prabhakar@gosh.nhs.uk
### Sumatriptan

<table>
<thead>
<tr>
<th>Tablets 50mg and 100mg <em>(unlicensed)</em></th>
<th>Repeat after 2 hrs for recurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td><strong>Dose</strong></td>
</tr>
<tr>
<td>6 to 10</td>
<td>25mg</td>
</tr>
<tr>
<td>10 to 12</td>
<td>50mg</td>
</tr>
<tr>
<td>12 to 18</td>
<td>50 – 100 mg</td>
</tr>
</tbody>
</table>

**6mg/0.5ml prefilled syringe with auto injector subcutaneous *(unlicensed)*
Repeat after 1 hr for recurrence

<table>
<thead>
<tr>
<th><strong>Age</strong></th>
<th><strong>Dose</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>12 to 18</td>
<td>6 mg</td>
</tr>
</tbody>
</table>

**Intranasal spray** 10mg/0.1ml (2 dose units) or 20mg/0.1ml (2 or 6 dose units) *(licensed)*
Repeat after 2 hrs for recurrence

<table>
<thead>
<tr>
<th><strong>Age</strong></th>
<th><strong>Dose</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>12 to 18</td>
<td>10 to 20mg</td>
</tr>
</tbody>
</table>
### Some practical suggestions

#### Clinical problem

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible solutions</th>
</tr>
</thead>
</table>
| Early nausea/tablet problems | - Wafers
|                          |   - Rizatriptan 10mg
|                          |   - zolmitriptan 2.5mg
|                          | - Spray
|                          |   - zolmitriptan 5mg
|                          |   - sumatriptan 20mg
| Headache recurrence      | - DHE spray
|                          | - Naratriptan
|                          | - Eletriptan
|                          | - Almotriptan
|                          | - Naratriptan
| Tolerability issues      | - Almotriptan
|                          | - Frovatriptan

MIGRAINE

- Lifestyle management
- Education, support, manage expectations, close follow up
- Trigger management
- Medication
- Behavioural therapy
Greater Occipital Nerve Block (Injection) - GONI

Occipital nerve block

This information sheet explains about occipital nerve block injections and how they can reduce severe headaches in children. It also gives guidance on what the procedure involves and what to expect when your child comes to Great Ormond Street Hospital (GOSH) to have the injection.

What is an occipital nerve block and why does my child need one?

An occipital nerve block is an injection of steroid (methylprednisolone) and local anaesthetic (lidocaine) into the occipital nerve. The occipital nerve runs from the back of the neck up and over the top of the head. The injection is carried out as a day case, that is, your child will have the injection and then be able to go home later that day.

An occipital nerve block injection is a minor procedure that can be very effective so is worth trying. They are particularly successful for children with one-sided headaches or headaches where the scalp is tender, indicating nerve involvement. However, they do not work for everyone, in which case, other treatments will be suggested.
When to refer to a specialist?

- To refine diagnosis
- Intractable headaches – failed 2 or more prophylactics
- Rare headache syndromes

What can we offer?

- Reiterate/confirm diagnosis – reassure families/child
- Diagnostic tests – Indo test, DHE
- Offer (specialist) treatments – Flunarazine, GONI, DHE, Lidocaine
- CNS, Psychologist