

# HEADACHES

## Facilitators Guide

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(Edits by the DFTB Team)

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Duration **1-2 hours**

Facilitator level **Senior trainee/Advanced Nurse Practitioner (ANP) and above**

Learner level **Junior trainee/Staff nurse and Senior trainee/ANP**

Equipment **None**

## OUTLINE

- **Basics: 15 min with sharing of any departmental guidelines that exist**
- **Main session: 2x 15min case discussions**
- **Covering key take home messages - red flags, safety netting**
- **Advanced session: 2x 30min grey case discussions, thoughts around follow up/review timelines, decisions around imaging, evidence base for treatments**
- **Quiz (10 mins)**
- **Summary: (5 mins)**

## PRE-READING FOR LEARNERS

The list of link should be sent out in advance to allow time for people to access the resources at a convenient time

**[www.headsmart.org.uk/symptoms/sam-animation/](http://www.headsmart.org.uk/symptoms/sam-animation/)**

**(2 min video)** headsmart website contains around 20 min of reading around symptoms which could suggest an intracranial tumour

**[www.pemplaybook.org/podcast/pediatric-headache-some-relief-for-all/](http://www.pemplaybook.org/podcast/pediatric-headache-some-relief-for-all/)**

**(30 mins)** A good podcast including risk stratification, diagnosis and management of headache

**[www.nice.org.uk](http://www.nice.org.uk)**

Quality standard 42 and clinical guideline 150

**[www.youtube.com/watch?v=7FOcgVqXPk8](https://www.youtube.com/watch?v=7FOcgVqXPk8) (16 min video)**

**[www.pemcincinnati.com/blog/headaches-in-the-pediatric-ed/](http://www.pemcincinnati.com/blog/headaches-in-the-pediatric-ed/)**

**[www.pemcincinnati.com/podcasts/?p=89](http://www.pemcincinnati.com/podcasts/?p=89)**

This is a lecture and a podcasts from PEM Currents which talks succinctly about the emergency management of migraine in ED and the likely treatment outcomes.



[www.youtube.com/watch?v=WhKkd-uEJL4&t=1102s](http://www.youtube.com/watch?v=WhKkd-uEJL4&t=1102s) (43 min video)

Lecture by a US doctor specialising in headaches. Great review over the first 18 min of both the history and examination red flags and where she considers imaging. The second half is a question and answer session which is less useful.

[www.youtube.com/watch?v=fpUBfqAyY1A](http://www.youtube.com/watch?v=fpUBfqAyY1A) (30 min video)

This is a lecture from a 2016 conference. It is pretty involved in the chronic management of headaches in children so quite advanced for the majority of attendees but might interest paediatricians who run follow up with outpatient clinics.

## BASICS OF PAEDIATRIC HEADACHES

### (from PEM Currents)

Headaches are common in children with 75% of children having experienced a headache by age 15. Our primary jobs in emergency are to provide effective symptom relief and filter out the headaches that are more likely to be concerning in their origin. The aetiology of headaches relies enormously on the history and, even in sinister causes, there are often few or no examination findings.

The most common cause of headache in children is a viral infection and the most worrying an intracranial space occupying lesion. Happily the latter is rare.

### **A good history is key:**

1. Onset, gradual or sudden?
2. Location & severity, these questions will be incredibly age dependent. Younger children find localisation of pain difficult.
3. Duration of the problem? How many times has this been reviewed and by who.

Is there a lead professional. Be aware of cognitive bias created at this point by knowing what labels others have used. Here there should also be some investigation into what treatment strategies have been tried previously.

**4.** Timing and associated symptoms? Compare a morning headache with some nausea/vomiting to one which worsens during the day and is relieved with sleep.

**5.** Background medical history

**6.** Family history sp of migraines. The presence or absence of this can be incredibly important when establishing aetiology. High prevalence of migraines running in families.

Full examination is necessary but here it should be stressed that abnormal neurological findings are rare in children with headaches. Where they exist there is a clear reason to pursue investigation by imaging, however, their absence cannot be wholly reassuring.

## CASE 1

A 12yo boy is brought to ED with a headache. He does not ordinarily suffer from headaches but today came home from school with a throbbing headache on the right side of his head. It is now 8pm and there has been no change. He has never been seen for headaches before but had a number of attendances for abdominal pain between the ages of 5 & 9 years.

On examination you see an afebrile child, holding his head with his eyes closed. His neurology is otherwise normal (GCS 14 M 6 V 5 E 3).

**What additional information would you consider important in the history?**

**What would be your next management steps?**

**Would you discharge this child?**

## DISCUSSION POINTS

- With the additional history what are we trying to establish? Is this a primary or secondary headache. Here the presence of a family history of migraine can contribute to a likely 'primary headache' history. We also need to be clear about whether there is any possible infectious aetiology. How do we distinguish between a viral infection with a headache and meningitis?

- **Clinical features suggestive of meningitis in children: a systematic review of prospective data, Curtis et al, Pediatrics 2010**

**Having either a bulging fontanelle or neck stiffness (older child) increases the likelihood of meningitis by 8 fold**

- Without either of the above treating symptoms and re-evaluating seems reasonable.

## **Treatment of headache**

- The ongoing management of this child is based around clinical judgement of the underlying cause. There aren't any features of space occupying lesion (SOL) so it seems reasonable to proceed with either simple analgesia (with an antiemetic if migraine seems likely).

## **Treatment of pediatric migraine headaches: a randomized, double-blind trial of prochlorperazine versus ketorolac, Brousseau et al, Annals of Emergency Medicine 2004**

- Migraine symptoms more optimally treated with analgesia with additional antiemetic with >90% resolution of symptoms at 3 hours compared to either analgesia alone (55% symptom resolution) or antiemetic alone (85% resolution)
- <https://bpna.org.uk/uploads/pet/chat-pre-course-june-2017.pdf> Offer combination therapy with an oral triptan and an NSAID, or an oral triptan and paracetamol, for acute treatment of migraine with or without aura.
- [https://www.rch.org.au/clinicalguide/guideline\\_index/Headache/](https://www.rch.org.au/clinicalguide/guideline_index/Headache/) Acute migraine management on presentation to ED to consider is Chlorpromazine 0.25mg/kg (max 12.5mg) IV over at least 30 minutes with 10 - 20mL/kg sodium chloride 0.9% (max 1L); may cause hypotension, monitor BP.

## **CASE 2**

A 2yo girl is brought to your emergency with a headache. She has been unsettled at night and wakes slapping the back of her head. She has been seen on four previous occasions over a 5 month period with similar presentations (varying grades of staff involved including a paediatric consultant). The first presentation was related to the appearance of her molars, an MRI was booked but cancelled as symptoms had resolved when the molars erupted. Subsequent attendances have been documented as teething.

The parents history corroborates the above. She is waking at night with increasing

frequency and have come today because it has been worse over the past week. Full neurological examination is normal and she is developing normally. There are some areas of white bulging on the lower gums.

**Are there any features here which suggest additional investigation is necessary?**

- If so, what would you plan?
- If not, how do you proceed

**What non-medical features of this cases should we be aware of?**

## **DISCUSSION POINTS**

- There are red flags in this history, however, due to the ages of the child these are difficult to clearly elicit through the history. Waking at night holding the occiput would seem unusual and a primary headache at this age is less likely.
- Given that clinical examination findings are unlikely even in sinister diagnoses, we should endeavour to find those red flags embedded in the history.
- There are no neurological examination findings and the behaviour change is not sustained so here evidence would suggest that, although imaging is required, it should be of the most optimal type ie MRI

Children with headache suspected of having a brain tumor: a cost-effectiveness analysis of diagnostic strategies, Medina et al, Pediatrics 2001

- Here is an optimal time to discuss cognitive bias. Many people had seen this child before, it is easy to 'plan' an MRI in a teaching session on headaches but in reality, if your consultant had seen and discharged this child with a diagnosis of teething how would you actually feel?
- Much has been written on cognitive bias in business and it has been extrapolated to clinical medicine. It could be useful to explore way we can individually become more aware of this as a process in day to day practice.

[www.researchgate.net/publication/327473427\\_Cognitive\\_bias\\_in\\_clinical\\_medicine](http://www.researchgate.net/publication/327473427_Cognitive_bias_in_clinical_medicine)

## ADVANCED CASE 1

A 13yo boy presents with a headache. He has been seen on four previous occasions spanning your hospital and another local emergency department over a 6wk period. His mother is particularly distressed by the headaches as she has previously lost a child. The boy's mother clearly voices her anxieties and feels that things are worsening. This morning she reports witnessing an episode of vomiting with some 'shaky walking'.

It is clear during your assessment that the boy is less concerned than his mother about these headaches. Neurological examination is normal while seated as he fears this will bring the headache back on lying down.

**How do you proceed, is any further information required?  
What investigations are indicated?**

In practical terms this history and examination will need elucidating from both the mother and child independently being sympathetic to the overlying anxieties this mother is carrying from her deceased child. In saying this, there are already red flags appearing here:

- Worsening headaches
- Morning vomiting
- Shaky walking (might indicated cerebellar signs)
- Refusal to move to a supine posture

Again, we have a normal neurological examination (aside from the whole examination being conducted in a seated position).

How is imaging arranged within your department? This boy does require neuroimaging, but what would happen, CT or MRI? Does a refusal to lie down constitute enough information for a non-contrast CT head in emergency?

As you are deciding to neuroimage this child, you may wish to discuss:

- Process of gaining CT at different times of day
- Who reports this
- If there are abnormalities on the imaging suggestive of raised intracranial pressure, what are the local arrangements to discuss this and where will definitive treatment be arranged?

A non-contrast CT head was undertaken which showed an obstructive posterior fossa mass requiring intervention by neurosurgery. The child required urgent transfer to a different unit for definitive treatment.

Some further discussion points could be:

- How is a time critical transfer arranged in your department?
- What staff should go and what skills set would be required?
- What would you prepare for if you were transferring this child (not ventilated, with a 6 week history of headaches but whom you now know has significant hydrocephalus)?

## ADVANCED CASE 2

A 14yo girl arrives immediately following an ophthalmology appointment for a general paediatric review. She has been suffering from mild headaches which have been controlled with simple analgesia for 2 months. These last from 1-4 hours, usually after school and have not worsened over this period. In the past 4 weeks she has become more aware of intermittent visual changes. She sees flashes of colour or 'lego bricks' which fall across her vision. This occurs daily, usually in the afternoon. Her ophthalmology appointment was unremarkable, including fundoscopy.

She is afebrile and lucid with no headache currently. Full neurological examination including co-ordination is normal.

**Does this girl fit criteria for additional investigations?**

• **What would you do?**

**You are intending to discharge her, what follow up should be arranged?**

We refer back to:

Children with headache suspected of having a brain tumor: a cost-effectiveness analysis of diagnostic strategies, Medina et al, Pediatrics 2001

as an evidence base for imaging. She would not meet the criteria for urgent imaging. Consensus opinion from the American Academy of Neurology would suggest neuroimaging should be considered on the basis of new headaches with some features suggestive of neurological dysfunction. With a normal neurological examination, which here includes fundoscopy by an ophthalmologist, time is on our side so if imaging is pursued this should be MRI. Here it might be pertinent to consider other investigative strategies:



- Would blood tests offer additional value? If not in this particular case then might they help in the context of low grade fever?
- Would you consider an EEG?

In this case headaches aren't really the major feature as they are easily controlled with analgesia. These do not sound epileptic – episodes are too frequent to not have a nonvisual epileptic manifestation by now and the associated headache is not severe so an EEG may not be helpful. In childhood, migraine can encompass many other features and headache may not be the most prominent. Where patients are being discharged counselling/advice cannot be underestimated. A headache (or symptom in this case) diary can be a fast track to diagnosis in the outpatient setting and can easily be started from an emergency setting. Taking the time to talk about what your number one diagnosis is, and what environmental strategies might help and what features should prompt a further review, prior to discharge is vital.

## ADVANCED CASE 3 (20 MINS)

A 10 year old boy presents with a 2 day history of a headache. He was referred by the GP to rule out meningitis. He appears uncomfortable but is alert and cooperative. The pain is throbbing and bilateral with a degree of photophobia. There is nausea but no vomiting. He is coryzal and has a temperature of 37.8C. The heart rate is 105 BPM and oxygen saturation rate 99% in room air. Neurological examination does not reveal any abnormalities and he has no problem lying flat for the exam. There is no meningism. On systemic examination there is only mild costophrenic tenderness.

### What is the next best step in the management of this patient?

If a urinalysis is requested it shows microscopic haematuria and microscopic proteinuria but no pyuria.

### What is the next step?

#### Discussion

Participants may become fixated on headache characteristics at this point and may wish to ask additional questions about the character, timing and intensity and about associated symptoms. But these are vague and unspecific in this case.

There is a heavy clue in the systemic findings including a mild tachycardia, low grade pyrexia and costophrenic tenderness. This is where the focus should shift towards investigating the cause of all of the patient's findings, not just the headache.

The blood pressure was intentionally omitted from the vignette, an omission which also occurs frequently in real life. If it is requested it's revealed to be 161/102. If it is not requested the vignette can continue with the patient developing seizures, which constitutes hypertensive emergency. The cause appears to be renal and the history, clinical findings and urinalysis are more in keeping with glomerulonephritis than acute infection. The most likely is IgA nephropathy. The management is behind the scope of this discussion – starting an anti-hypertensive and consulting a renal service is appropriate in the first instance. Here it is demonstrated that headache can be a sign of systemic illness and a thorough history and exam is always required including a full set of vital signs.

## ADVANCED CASE 4 (20 MINS)

A 12 year old girl presenting with a 2 month history of headache. The pain is throbbing, bilateral, worse at night and is accompanied by nausea. She is anxious as the headache is now affecting her sleep. The GP started her on Amitriptyline but she stopped it due to daytime somnolence. She has a history of chronic abdominal pain. There is a family history of essential hypertension and diabetes. She has long been bullied about her weight. Her BMI is >99th centile.

**Are there any red flags in the history?**

**What is the most likely diagnosis and the differential diagnosis?**

**What are the most important aspects of the exam?**

### Discussion

This patient has symptoms which could suggest increased intracranial pressure. Given the history idiopathic intracranial hypertension is probably most likely but other causes like mass or syringomyelia must be considered. If these are ruled out then a primary headache disorder is most likely.

Participants will likely list important aspect of the neurological examination. Visual fields and extraocular

movements are of particular importance to screen for complications of ICP and a thorough screen for lateralizing signs to outrule mass. Ultimately this patient will need a scan prior to lumbar puncture but these findings will determine urgency.

A bedside fundoscopy can be used as a test for papilloedema but is it really possible? Most children are not fully cooperative and most ED are equipped with direct ophthalmoscopes which give a very small field of view (a panoptic ophthalmoscope is better). Additionally, the exam is usually undilated, adding another layer of difficulty. Overall a reliable ophthalmoscopy under these conditions requires significant expertise, so it should not be relied on unless a specialist is available. If the history is concerning, than the child should be worked up.

## MCQS

### Question 1.

**Which of the following is not a sign of raised intracranial pressure when co-existing with a headache?**

**1**  
Increasing head circumference in <1 year old

**2**  
Vomiting

**3**  
Behavioural change/irritability

**4**  
Fever

**5**  
Waking from sleep with pain 5.  
Waking from sleep with pain

Fever may suggest meningism but not raised ICP. All the others are concerning features of raised ICP.

## Question 2.

**What is the investigation of choice in headaches with clinical neurological signs?**

- |                             |   |
|-----------------------------|---|
| <b>1</b><br>MRI             | <b>3</b><br>EEG   |
| <b>2</b><br>Non-contrast CT | <b>4</b><br>Bloods including infection markers/<br>clotting profile |

Children who present with headaches and clear neurological signs are the cases where an in department non-contrast CT is indicated. Where there are no clinical findings MRI is the preferred imaging modality.

## Question 3.

**In paediatric migraine, what is the most effective single treatment for children presenting to emergency?**

- |  |                                      |
|--|--------------------------------------|
| <b>1</b><br>Analgesia                    | <b>4</b><br>Antiemetic               |
| <b>2</b><br>Rest and reassess            | <b>5</b><br>Keeping a headache diary |
| <b>3</b><br>Modify environmental factors |                                      |

All of the above have a role in the treatment of migraine, however, in the acute setting evidence points to antiemetics are most effective in symptom relief. Analgesia and antiemetics together are even more beneficial. Modification of environmental factors, including rest/exercise/diet and keeping a diary of symptoms will not help acutely but hand some control to the patient in the long term management of symptoms.

## Take home tips

- 1 Know the headache red flags both within history and examination, understanding that examination is unlikely to be abnormal
- 2 Think about the specific cases where a non-contrast CT would be indicated as an emergency and how this is locally arranged
- 3 In cases where there is some uncertainty but no examination findings you have time, seek opinions/advice if necessary and arrange MRI as the investigation of choice
- 4 Paediatric migraine may not present with headache initially
- 5 In paediatric migraine, analgesia and antiemetics together are more effective than either alone
- 6 Cognitive bias exists for everyone, awareness of this is (at least) half the battle

## REFERENCES

[www.headsmart.org.uk/](http://www.headsmart.org.uk/)

Clinical features suggestive of meningitis in children: a systematic review of prospective data, Curtis et al, Pediatrics 2010

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