

Paediatric headaches

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Brevity, levity, repetition

Learning objectives

Learn the **answers** to the question –

- When should I worry about a paediatric headache?
- When should I do a CT?
 - A long time to develop a radiation induced cancer
- Migraine and Tension headache diagnosis and some management issues

Reg flags



- **A**cute (a new headache)
- **N**eurological signs
- **S**udden onset
- **W**ould I know you had a headache
- **E**xacerbating factors – morning, lying flat
- **R**elentless, progressive
- **S**inister stuff – certain diseases, cancer, age < 3, VP shunt, neurocutaneous

Acute

- First or worst ever headache

Diagnosis of a child's first migraine headache
= a job for someone else

Neurology

- Headache specialists agree that the vast majority of pediatric patients who seek consultation for recurring, disabling headache are migraineurs.³
- In a study by Ward and colleagues,⁴ **meningitis, shunt malfunction, and hydrocephalus** were diagnosed in only 6% of all emergency department visits prompted by severe headache.
- All cases of secondary headache disorders in that study were associated with abnormal physical and **neurologic findings**.⁴

Neurology

History from the patient and the patient's parents.

- Key features in children with intracranial disease
 - altered mental status,
 - abnormal eye movements,
 - optic disc distortion,
 - motor or sensory asymmetry,
 - balance disturbances, and
 - abnormal deep tendon reflexes.
- Those patients who have abnormalities on examination should undergo additional diagnostic testing.

Sudden

- Sudden onset thunderclap headache
 - Especially if occipital
- Think Subarachnoid haemorrhage
 - Even if the headache has resolved...

Would I worry?

- Clinical gestalt.
- Would the parents worry?

Exacerbating factors

- Raised intracranial pressure – **exacerbations** in the morning headache or lying flat
 - The likelihood of finding a brain tumor in a child with migraine headache who is older than 6 months and whose neurologic function is normal is approximately 0.4%.
 - Headaches occur in fewer than 50% of all patients with brain tumors and emerge as the tumor causes an increase in **intracranial pressure**.

Acute, Relentless

- Focus the history on the patient's headache patterns. Intermittent, disabling headaches in an otherwise healthy and fully functioning person are typical of a primary headache disorder such as migraine.
- An **acute** headache that **progressively and relentlessly** increases in severity over time warrants further investigation to identify possible intracranial disease.

Sinister stuff

- Trauma
- Anticoagulated – haemophilia
- Cancers
- Neurocutaneous syndromes
- Age < 3
- Occipital headaches

Would I do a CT?

- **A** – first or “worst headache”
- **N**eurology – focal findings, papilloedema, ataxia, abnormal reflexes
- **S**udden onset thunderclap
 - **W**ould I think you are sick?
 - **E**xacerbations – morning or lying flat
- **R**elentless headache worse over time
- **S**inister – Age < 3 years, V-P shunt, neurocutaneous syndrome, occipital headache

The following should prompt consideration of intracranial imaging (CT or MRI if available) and discussion with senior medical staff: RCH guide.

- Abnormal neurology
- Meningism (consider LP)
- Marked changes in behaviour
- Symptoms of raised intracranial pressure
- Increasing frequency of undiagnosed headaches
- Onset of severe headache
- NB: May require CT prior to performing LP (discuss with consultant)

NB2: All children with a serious underlying condition are likely to have one or more objective findings on neurological examination.

From: **Radiation Dose Associated With Common Computed Tomography Examinations and the Associated Lifetime Attributable Risk of Cancer**

Arch Intern Med. 2009;169(22):2078-2086. doi:10.1001/archinternmed.2009.427

Table 2. Median Effective Radiation Dose (IQR, Minimum and Maximum) for Each Type of CT Study

Anatomic Area	Type of CT Study	No.	CT Effective Dose, mSv		Conventional Radiographs Resulting in Equivalent Dose	
			Median (IQR)	Absolute Range, Min-Max	Chest Radiography Series	Mammography Series
Head and neck						
	Routine head	120	2 (2-3)	0.3-6	30	5
	Routine neck	115	4 (3-6)	0.7-9	55	9
	Suspected stroke	87	14 (9-20)	4-56	100	33
Chest						
	Routine chest, no contrast	120	8 (5-11)	2-24	117	20
	Routine chest, with contrast	120	8 (5-12)	2-19	119	20
	Suspected pulmonary embolism	120	10 (7-14)	2-30	137	23
	Coronary angiogram	34	22 (14-24)	7-39	309	51
Abdomen-pelvis						
	Routine abdomen-pelvis, no contrast	120	15 (10-20)	3-43	220	37
	Routine abdomen-pelvis, with contrast	117	16 (11-20)	4-45	234	39
	Multiphase abdomen-pelvis	110	31 (21-43)	6-90	442	74
	Suspected aneurysm or dissection	56	24 (20-37)	4-68	347	58

Abbreviations: IQR, interquartile range; mSv, millisievert.

Figure Legend:

Median Effective Radiation Dose (IQR, Minimum and Maximum) for Each Type of CT Study



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Table 4. Estimated Number of Patients Undergoing Computed Tomography (CT) That Would Lead to the Development of 1 Radiation-Induced Cancer, by Type of CT Examination and Age at the Time of Exposure, Based on the Median and Interquartile Radiation Dose Observed

Anatomic Area, Type of CT Study	Patients, Median (Interquartile Range), No.					
	Age, 20 y		Age, 40 y		Age, 60 y	
	Female	Male	Female	Male	Female	Male
Head and neck						
Routine head	4360 (3290-5110)	7350 (5540-8620)	8100 (6110-9500)	11 080 (8350-12 990)	12 250 (9230-14 360)	14 680 (11 070-14 680)
Routine neck	2390 (1640-3540)	4020 (2770-5970)	4430 (3050-6580)	6058 (4170-8990)	6700 (4620-9940)	8030 (5530-8030)
Suspected stroke	660 (460-980)	1120 (770-1650)	1230 (850-1820)	1682 (1170-2490)	1860 (1290-2750)	2230 (1550-2230)
Chest						
Routine chest, no contrast	200 (200-620)	1040 (770-1670)	720 (540-1160)	1566 (1170-2520)	1090 (820-1760)	2080 (1550-2080)
Routine chest, with contrast	380 (270-650)	1020 (710-1740)	720 (500-1210)	1538 (1070-2620)	1070 (750-1830)	2040 (1420-2040)
Suspected pulmonary embolism	330 (230-460)	880 (610-1220)	620 (420-850)	1333 (920-1840)	930 (640-1280)	1770 (1220-1770)
Coronary angiogram	150 (130-230)	390 (350-610)	270 (250-420)	595 (540-920)	420 (370-640)	790 (710-790)
Abdomen and pelvis						
Routine abdomen-pelvis, no contrast	500 (380-770)	660 (510-1024)	930 (710-1430)	1002 (770-1540)	1400 (1080-2160)	1330 (1020-1330)
Routine abdomen-pelvis, with contrast	470 (380-700)	620 (510-930)	870 (710-1300)	942 (770-1400)	1320 (1080-1960)	1250 (1020-1250)
Multiphase abdomen-pelvis	250 (180-370)	330 (240-490)	460 (330-680)	498 (360-730)	700 (500-1030)	660 (480-660)
Suspected aneurysm or dissection	320 (210-390)	420 (280-510)	590 (390-710)	636 (420-770)	890 (580-1080)	840 (550-840)

Figure Legend:

Estimated Number of Patients Undergoing Computed Tomography (CT) That Would Lead to the Development of 1 Radiation-Induced Cancer, by Type of CT Examination and Age at the Time of Exposure, Based on the Median and Interquartile Radiation Dose Observed

Investigations

Progressive, Neurology

MRI

- warranted for those patients who have a chronic-**progressive** headache pattern or any worrisome features

EEG is indicated only when the child's headaches are associated with **neurology**

- alterations in consciousness or with abnormal involuntary movements.⁵

Lumbar puncture

- acute CNS infection is suspected or in those patients with signs of meningeal irritation or lateralizing signs on **neurologic** examination.
- Or if subarachnoid hemorrhage, or meningitis is suspected.

Reg flags

- Acute (a new headache)
- Neurological signs
- Sudden onset
- Would I know you had a headache
- Exacerbating factors – morning, lying flat
- Relentless, progressive
- Sinister stuff – age < 3, cancer, V-P shunt

Migraines

- **What do I need to know about migraines?**
 - Usually occur less than once per week
 - Occipital rare
 - Exac by exercise, relief with vomit or rest
- **If occurs at school**
 - Medication should be given asap
 - For relief the child will avoid exercise, go home, lie down, seek a dark room

Migraines

Details – sorry no brevity

Revised International Headache Society diagnostic criteria for paediatric migraine without aura

- A. At least five attacks fulfilling criteria B–D (below)
- B. Headache attacks lasting 1 h to 72 h
- C. Headache has at least two of the following characteristics:
 - Unilateral location, may be bilateral, frontotemporal (not occipital)
 - Pulsating quality
 - Moderate or severe pain intensity
 - Aggravation by or causing avoidance of routine physical activity (eg, walking, climbing stairs)
- D. During the headache, at least one of the following:
 - Nausea, vomiting or both
 - Photophobia and phonophobia, which may be inferred from behaviour
- E. Not attributed to another disorder

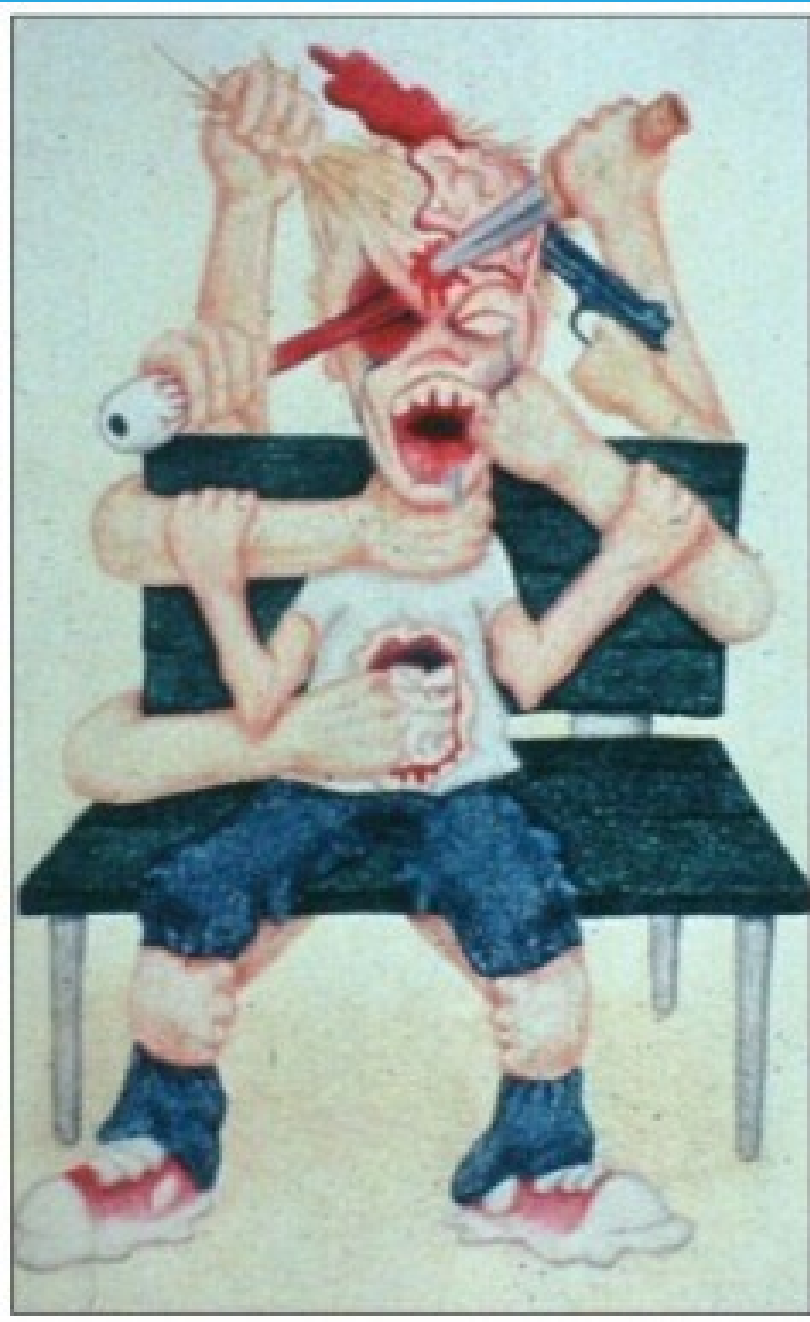
Table

Table 1 – Clues to the diagnosis of pediatric migraine

- If there are autonomic symptoms and the headache pattern is acute and recurrent, the diagnosis is migraine.
 - A migraine attack may be preceded by such symptoms as sluggishness, hunger, difficulty with words, or a feeling of doom (similar to that experienced by some patients with seizures).
 - Pediatric migraine usually occurs without an aura.
 - Migraine is often accompanied by dizziness, light-headedness, pallor, or purple “bags” around the eyes. (Parents may be able to make the diagnosis just by looking at the child.)
 - Migraine duration is shorter in children than in adults (1 to 72 hours) and is more often bilateral.
 - During a migraine attack, a child or adolescent will typically want to retreat to a dark quiet place and lie down. Exercise exacerbates the headache.
-

Childs view

- This is a self portrait by a child who suffered from migraines



Patient fact sheets

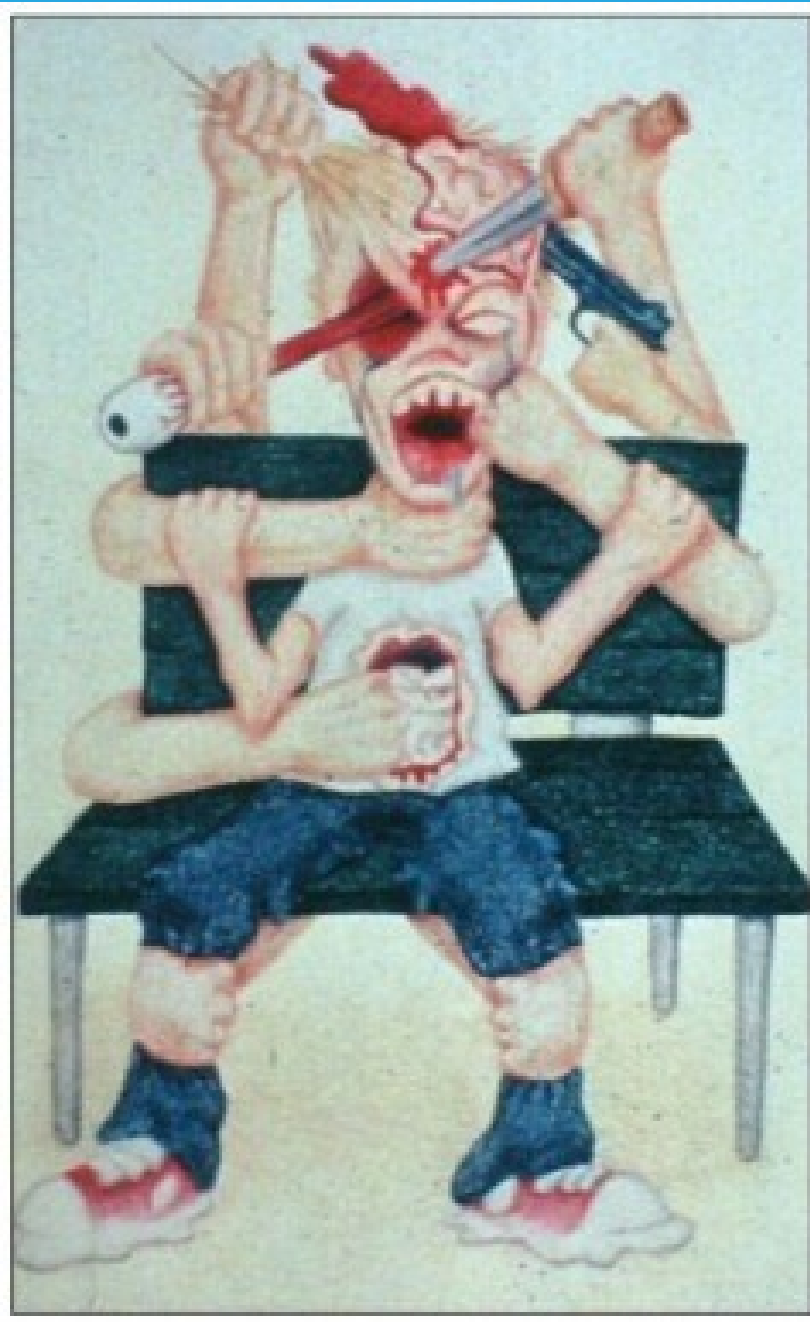


- http://www.achenet.org/resources/patient_to_patient/
- Resources developed by patient are available using the above link, accompanied by this photo...
- RCH :
http://www.rch.org.au/kidsinfo/fact_sheets/Headaches_in_children_and_teenagers/



Childs view

- This is a self portrait by a child who suffered from migraines



Tension headaches

Criteria for episodic tension-type headaches

- 1. At least 10 episodes fulfilling criteria 2 to 4 (below)
- 2. Headache lasting 30 min to seven days
- 3. Two or more of the following:
 - Pressing/tightening quality
 - Mild to moderate severity
 - Bilateral
 - Not aggravated by routine activity
- 4. Both of the following:
 - No nausea or vomiting
 - Phonophobia or photophobia is absent

Tension headaches

- **Tension type headaches**
 - 2-3 times per week
 - for relief a child may watch TV or play computer games
- **Take a medication history, and note that many of the medications do not work, and cessation is associated with withdrawal and rebound headaches.**

Migraine treatments

- Simple analgesics paracetamol and NSAIDS work
 - Medication overuse headache - withdrawal
- Triptans. Several large multicenter double-blind, placebo-controlled trials have shown that triptans are safe and well tolerated in children aged 12 years and older.⁸
 - Unfortunately, because of trial design flaws, placebo response rates are high in pediatric migraine studies, which limits our ability to determine the true effectiveness of oral triptans. Open-label trial evidence supports the effectiveness of oral zolmitriptan and subcutaneous sumatriptan in patients 12 to 17 years old.¹⁸
 - Unlike oral sumatriptan, the nasal spray formulation has been found to be safe and effective in acute adolescent migraine.¹

Management Simple Headache:

1. Environment adjustments
2. Paracetamol 15mg/kg PO

NB: consider ondansetron (4mg 15-30Kg, 8mg >30Kg) if active vomiting

If Migraine most likely diagnosis:

> 12yrs

< 12yrs

3. Aspirin 1g PO
4. Sumatriptan
 - Nasal 10-20mg
 - May repeat dose once
5. Prochlorperazine:
 - 0.15mg/Kg IV in 1L N.Saline
 - Over 1 hour
 - Caution hypotension, monitor

3. Ibuprofen 10mg/kg PO
4. Prochlorperazine:
 - 0.15mg/Kg IV in 1L N.Saline
 - Over 1 hour
 - Caution hypotension, monitor

Consider “red flag” symptoms/signs RCH statewide guide (Vic)

- Acute and severe
- Progressive chronic headaches
- Focal neurology
- Age under 3yrs
- Headache/vomiting on waking
- **Consistent location of recurrent headaches**
- Presence of VP shunt
- **Hypertension**

Reg flags

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- **R**elentless, progressive
- **S**inister stuff – neurological signs, cancer,
- Age < 3, bleeding risks, neurocutaneous