CASE 4

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LEARNING OBJECTIVES

Understand the aetiologies of headache in children

Understand the importance of history and examination

Understand the indication for neuroimaging in headache

Understand the key components in the management of headache in children

REFERENCES

NELSON TEXTBOOK PF PEDIATRICS

***PEDIATRICS IN REVIEW* 2012;33;562**

Laila is a 9 year old child who presented to your clinic for evaluation of headache

Her mother is worried that she has brain tumour and she wants you to do all needed investigations

How do you proceed ? What else do you want to know ?

HISTORY AND EXAMINATION

- History
- Elaborate more History : more details regarding headache
- Review of systems
- Family and social history
- Drug history
- Examination
- Vital signs , growth parameters
- General and neurological exam

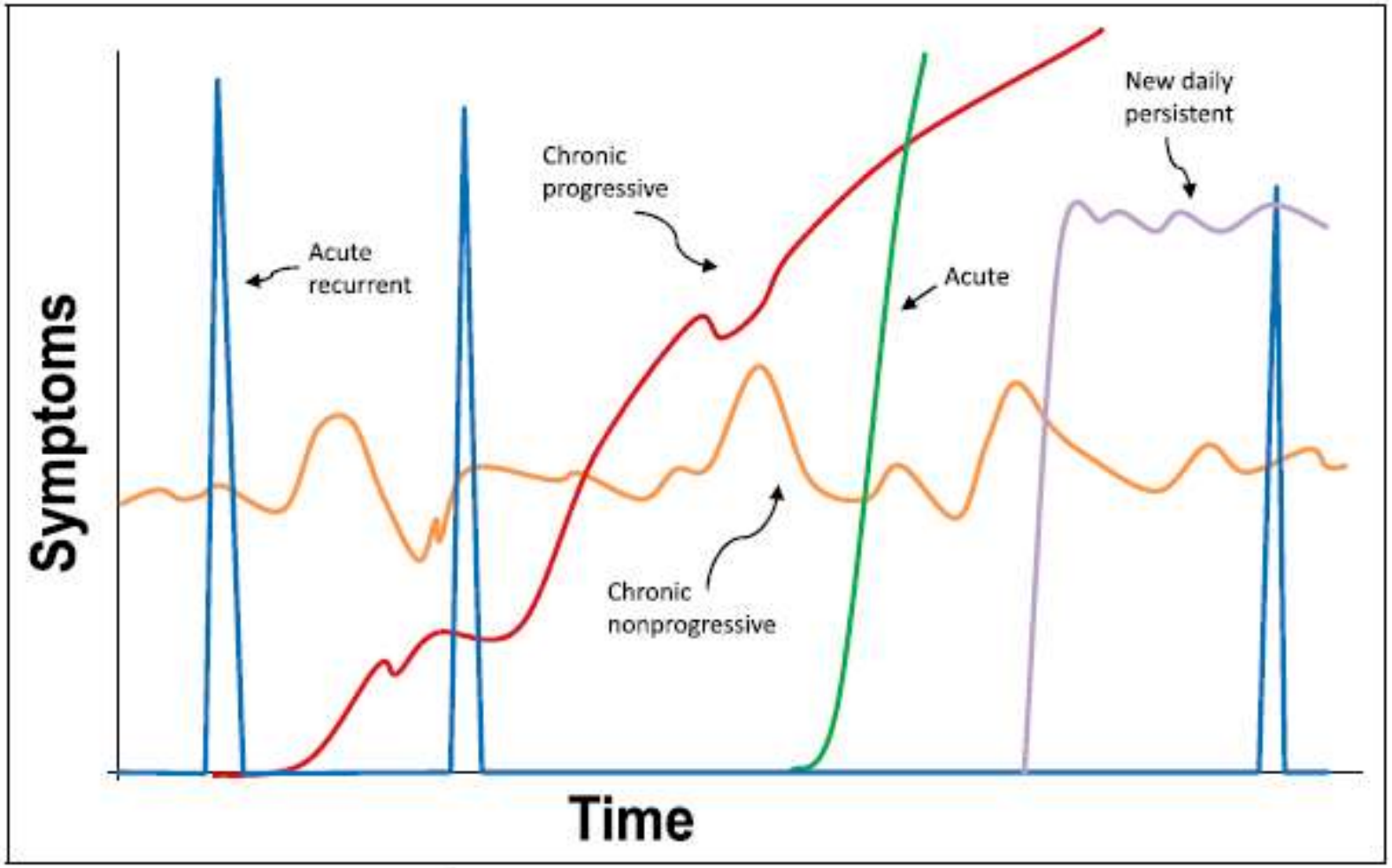


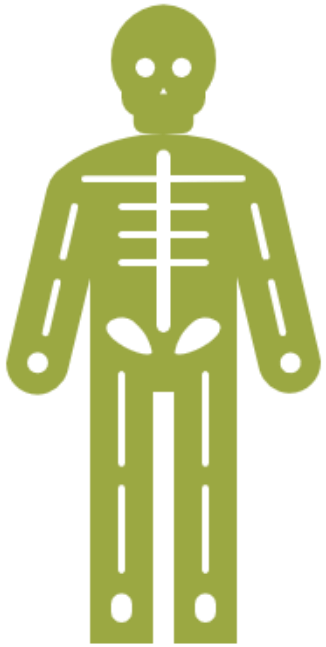
Figure. Headache patterns. (Adapted with permission from Rothner AD. The evaluation of headaches in children and adolescents. *Semin Pediatr Neurol*. 1995;2[2]:109–118.)

HEADACHE CHARACTERISTICS

- How many different types of headache does the child have
- When did the headaches begin? Was anything associated with headache onset?
- Are the headaches getting worse, staying the same, or improving? Are they getting more or less frequent? Are they more or less intense?
- Are there any triggers for the headaches?
- What are the headaches like? Where is the pain located?
- What does the pain feel like?
- Does the headache wake the child from sleep?
- Are there any headache patterns or triggers?
- Are there any other symptoms associated with the headache, or warning signs that a headache is coming(aura)?
- What does the child do during a headache?
- How long does the headache last?
- What makes the headache better or worse

REVIEW OF SYSTEMS

Check for underlying aetiologies as the cause of headache



CNS : meningitis , tumours , malformations , pseudotumor cerberi , head trauma

Respiratory : sinusitis , otitis

Dental : caries , temporomandibular joint dysfunction

Eyes : visual problem

Endocrine : hypothyroidism

musculoskeletal : sleep apnea or hypopnea

Rheumatoloigcal : SLE (malar rash)

Renal : hypertension

Blood : sickle cell

Psychiatric : depression , anxiety

DRUG HISTORY

Table 5. Medications Associated With Headaches

Angiotensin-converting enzyme inhibitors
α- and β-adrenergic agonists and blockers
Amphetamines
Antiarrhythmics
Calcium channel blockers
Methylxanthines
Nitrates
Phosphodiesterase inhibitors
Sympathomimetics
Caffeine
Ergotamine
Estrogen
Opioids
Acid blockers: including famotidine and ranitidine
Antimicrobials: amoxicillin, metronidazole, sulfamethoxazole, trimethoprim, ciprofloxacin, gentamicin, nitrofurantoin, ofloxacin, tetracyclines
Immunoglobulin
Amiodarone
Corticosteroids
Oral contraceptives
Thyroid hormone replacement
Vitamin A and retinoic acid

Adapted with permission from Ferrari A, Spaccapelo L, Gallesi D, Sternieri E. Focus on headache as an adverse reaction to drugs. *J Headache Pain.* 2009;10(4):235–239.

FAMILY HISTORY
SOCIAL HISTORY

History of migraine in other family members

Social history : conflicts at home , school , bullying , abuse ….etc

After taking the detailed history from the mother and from Laila

What are the points in the history that suggests a serious underlying brain pathology as the cause of headache

Table 4. Red Flags for Secondary Headache

- Progressive pattern of the headache: becoming more severe and/or more frequent
- Increased headache with straining, coughing, or sneezing
- Explosive or sudden onset of severe headache (<6 mo duration)
- Systemic symptoms: fever, weight loss, rash, and joint pain
- Secondary risk factors: immunosuppression, hypercoagulable state, neurocutaneous disorder, cancer, genetic disorder, and rheumatologic disorder
- Neurologic symptoms or signs: altered mental status, papilledema, abnormal eye movements, or other abnormalities or asymmetries on neurologic examination
- New or different severe headache, change in attack frequency, severity, or clinical features
- Sleep-related headache, headache waking the patient from sleep, or headache always present in the morning

Table 1. Causes of Pediatric Headache

- Acute headache
  - Migraine
  - Viral respiratory infection, streptococcal pharyngitis
  - Meningitis/encephalitis
  - Intracranial hemorrhage
  - Tumor
  - Toxic exposures: alcohol, toxins, illicit drugs, medications
  - Trauma
  - Stroke
  - Malignant hypertension
  - Vasculitis
- Episodic recurrent headaches
  - Tension-type headache
  - Migraine with or without aura
  - Fasting/eating disorders
  - Recurrent toxic exposures: alcohol, toxins, illicit drugs, medications
  - Recurrent sinus disease
  - Seizure-associated headache
  - Mitochondrial disease
  - Trigeminal autonomic cephalalgias
- Chronic progressive headaches
  - Elevated intracranial pressure
  - Tumor
  - Vascular malformations
  - Infection
  - Sinus venous thrombosis
  - Idiopathic intracranial hypertension
  - Endocrine disease: thyroid or parathyroid disease
  - Chiari malformation
  - Vasculitis
- Chronic nonprogressive headaches
  - Chronic tension-type headaches
  - Chronic or transformed migraine
  - New daily persistent headache
  - Chronic sinus disease
  - Dental disease
  - Sleep apnea
  - Idiopathic intracranial hypertension
  - Thyroid disease
  - Chiari malformation
  - Fasting/eating disorders
  - Chronic posttraumatic headache
  - Chronic trigeminal autonomic cephalalgias

Table 3. Conditions Associated With Intracranial Hypertension

- Cerebral venous sinus thrombosis
- Medications
  - Thyroid replacement
  - Corticosteroids (particularly withdrawal)
  - Growth hormone
  - Levothyroxine
  - Cytarabine, cyclosporine
  - Lithium
  - Levonorgestrel
  - Sulfa antimicrobials
  - Tetracycline antibiotics (minocycline, doxycycline)
  - Vitamin A
  - Cis-retinoic acid
- Lyme disease
- Anemia
- Antiphospholipid antibody syndrome
- Occult craniosynostosis
- Sarcoidosis
- Sleep apnea
- Systemic lupus erythematosus

Laila does not have any of the red flags

She has recurrent headache for the last 7 months , throbbing , associated with photophobia ,lasting 2 hours and resolves by sleep, once per month , no school absence

Her general and neurological exams are normal

What could be the differential diagnosis for her headache

PRIMARY HEADACHE

Episodic recurrent headaches
- Tension-type headache
- Migraine with or without aura
- Fasting/eating disorders
- Recurrent toxic exposures: alcohol, toxins, illicit drugs, medications
- Recurrent sinus disease
- Seizure-associated headache
- Mitochondrial disease
- Trigeminal autonomic cephalalgias

- How do you differentiate between the different primary types

- Migraine : with or without aura
- Tension headache : band like
- Chronic headache : >15 days /month
- Trigeminal autonomic cephalgia : accompanied by autonomic symptoms

- Does Laila need neuroimaging

NO

What medications will you give Laila

Does she need prophylactic treatment

What advices will you give for her

Table 6. SMART Headache Management

Sleep	Regular and sufficient sleep
Meals	Regular and sufficient meals, including breakfast and good hydration
Activity	Regular (but not excessive) aerobic exercise
Relaxation	Relaxation, stress reduction, and management
Trigger avoidance	Avoid triggers such as stress, sleep deprivation, or other identified triggers

Table 7. Acute Treatment for Childhood Migraine

Drug	Dose
Acetaminophen	10–12.5 mg/kg q 4–6 h Adult: 650–1,000 mg q 6 h Maximum: <4,000 mg/d
Ibuprofen	10 mg/kg q 4–6 h prn Adult: 400–800 mg q 6 h Maximum: 3,000 mg/d
Naproxen sodium	5–7 mg/kg q 8–12 h prn Adult: 250–500 mg q 8 h Maximum: 1,250 mg/d
5-HT_1 agonists, triptans	
Rizatriptan[a]	Adult: 5–10 mg may repeat once in 2 h ODT or tablets Maximum: 15 mg/d
Zolmitriptan[b]	Oral (tablet or ODT) or nasal Adult 2.5–5 mg per dose; may repeat once in 2 h Maximum: 10 mg/d
Sumatriptan[b]	Oral: 25–100 mg, maximum 200 mg/d Nasal: • 4–6 y: 5 mg • 7–11 y: 10 mg • >12 y: 20 mg[c] • Adult maximum: 40 mg/d SC: 0.06 mg/kg, >12 y: 6 mg SC, Adult maximum: 12 mg/d SC
Almotriptan[d]	6.25–12.5 mg; may repeat dose once in 2 h Maximum: 25 mg/d

Maximum=maximum dose; ODT=oral disintegrating tablet; prn=as needed; qXh=every X hours; SC=subcutaneous.
[a]Approved for treatment of migraine in children 6- to 17-years-old.
[b]Not approved for pediatric use.
[c]Strong supporting efficacy and safety data in adolescents.
[d]Approved for use in children age 12 to 17 years.

Table 9. **Selected Preventive Medications for Pediatric Migraine**

Drug	Dose	Toxicity
Cyproheptadine	0.25–1.5 mg/kg per day Adult: 4 20 mg/d tid	Sedation, dry mouth Weight gain
Tricyclic antidepressants		
Amitriptyline	10–50 mg qhs 0.1–1 mg/kg per day Maximum: 50–100 mg for headache	Sedation Weight gain May exacerbate cardiac conduction defects (consider baseline electrocardiogram)
Nortriptyline	10–75 mg qhs	Suicidal thinking, mood changes
Antiepileptics		
Topiramate	1–2 mg/kg per day for headache Typical adult dose: 50 mg bid Maximum: 800 mg bid for seizures	Sedation, paresthesias, appetite suppression/ weight loss, glaucoma, kidney stones cognitive changes, word finding difficulty, mood changes, depression
Valproic acid	20–40 mg/kg per day; adult: 500–1,000 mg/d	Weight gain, bruising, hair loss, hepatotoxicity, ovarian cysts, teratogenic, thrombocytopenia, leukopenia, mood changes, depression
Gabapentin	10–40 mg/kg per day Adult: 1,800–2,400 mg/d Maximum: 3,600 mg/d	Fatigue, ataxia, tinnitus, gastrointestinal complaints, mood changes, depression
Antihypertensives		
Propranolol[a]	2–4 mg/kg per day Adult: 160–240 mg/d	Hypotension Sleep disorder Decreased stamina Depression
Verapamil	4–10 mg/kg per day divided tid <12 y: ≤120 mg 13–18 y: 240 mg	Hypotension, nausea, atrioventricular block Weight gain
Selected supplements used for headache prevention		
Riboflavin/vitamin B_2	50–400 mg	Yellow urine (25 mg may be effective; studies done using 400 mg/d)
Melatonin	1–6 mg before bed	Vivid or disturbing dreams
Magnesium oxide	9 mg/kg per day tid	Diarrhea Modify dose with renal dysfunction
Coenzyme Q10	100 mg/d	Rash, irritability Gastrointestinal symptoms
Migralief or Children's Migralief (B_2/magnesium/ feverfew)	1 capsule 1–2 times/d	Yellow urine, diarrhea

IF ≥ 4 EPISODES OF DISABLING HEADACHE PER MONTH