# HEADACHES, MIGRAINES AND MIMICS

Dr Julian Smith University of Pretoria Department of Paediatrics

### WHY HEADACHE IS IMPORTANT

- > Up to 51 % of 7 year olds
- $\succ$  Up to 82 % of 15 year olds
- Migraines: 4 % children under 5yr
- > Migraines: 10 % children 5-15 yr
- > Boys>Girls when young.
- > Girls>>Boys by teens



Image Credit: Africa Studio / Shutterstock

# WHERE HEADACHE COMES FROM: INTRACRANIAL

- Cerebral and dural arteries
- > Dura Mater at base of brain
- Large veins and venous sinuses
- > No pain-brain parenchyma,
- > ependymal linings, meninges, dura



Normal Anatomy of the cerebral venous system

# WHERE HEADACHE COMES FROM: INTRACRANIAL CONT

- Cerebral and dural arteries: vasodilation, inflammation, traction displacement
- Raised Intracranial pressure cause traction displacement of arteries
- > Supratentorial Blood vessels: Trigeminal Nerve
- Infratentorial Vessels: 1st 3 Cervical Nerves
- Superficial Dura Mater: Opthalmic division Trigeminal nerve-refers to eye and forehead
- Middle Meningeal artery: Second and Third divisions of trigeminal nerve-refers to temple
- > All post fossa refers to occiput and neck

# RAISED INTRACRANIAL PRESSURE CAUSING BLOOD VESSEL TRACTION DISPLACEMENT

ROYTOWSKI, David; FIGAJI, Anthony. Raised intracranial pressure: What it is and how to recognise it. **Continuing Medical Education**, [S.I.], v. 31, n. 3, p. 85-90, mar. 2013. ISSN 2078-5143.



# WHERE HEADACHE COMES FROM: EXTRACRANIAL

- Cervical Roots
- Cranial Nerves
- Extracranial arteries around eyes, forehead, temple-dilate and stretch
- Muscles attached to skull: neck extensors, masseter, temporalis, frontalis
- Periosteum esp near teeth and sinuses
- > Sinuses

# WHERE HEADACHE COMES FROM: EXTRACRANIAL CONT

- Impaired vision-blurring, not pain
- Convergance Disorder : Muscle tension-orbit and forehead pain
- Cervical root and cranial nerve pain usually due to mechanincal traction from injury or malformation
- Cervical Roots: Neck and back of head up to vertex
- Cranial Nerves : Refer to face

# HISTORY: HOW OFTEN HOW BAD?



Time

<b>A. Acute recurrent</b> Migraine (common, classical, complicated)		
B. Chronic non-progressive		
Iension Apriety		
Depression		
Somatisation		
C. Chronic progressive		
Tumour		
Benign intracranial hypertension		
Brain abscess		
Hydrocephalus		

#### D. Acute on chronic non-progressive

Tension headache with co-existent migraine

### HISTORY

> Identify Position of Pain and Pattern

- > Acute Generalized
- > Acute localised
- > Acute recurrent
- > Chronic Progressive
- > Chronic Non Progressive

# USEFUL QUESTIONS

- Is the headache chronic but not disabling or occasionally and preventing normal activity
- > What is longest time headache free
- How many different kinds of headache
- > What analgesics and how often

# ACUTE GENERALISED HEADACHE

- Systemic/generalised Infection
- > Exertional
- > CSF Leak
- Post Seizure
- > CNS Bleeds
- > Hypertension
- > Metabolic-low glucose, high CO2, Low O2



# ACUTE LOCALISED HEADACHE

- > Sinusitus
- > Ot Med
- > Temperomandibular Joint
- > Ocular Disease
- > Neuralgia-trigeminal, glossopharyngeal, occipital
- > Trauma
- > Dental Disease

# ACUTE RECURRENT HEADACHE

- > Migraine
- > Cluster
- > Paroxysmal Hemicrania
- > Episodic Tension Headache
- > Ice Pick
- > Exertional
- Cough
- > Intercourse

# CHRONIC PROGRESSIVE HEADACHE

- CNS Neoplasm
- Pseudotumor cerebri
- Brain Abscess
- Subdural Haematoma
- ► Hydrocephalus

# PRIMARY HEADACHE DISORDERS

#### A) MIGRAINE

- 1. Status Migrainosus
- 2. Familial Hemiplegic Migraine
- 3. Basilar Type Migraine
- 4. Benign Paroxysmal Vertigo of Childhood
- 5. Acute Confusional Migraine
- 6. Migraine Associated Cyclic Vomiting Syndrome
- 7. Abdominal Migraine
- 8. Paroxysmal Torticollis of Infancy
- 9. Acephalgic Migraine of Childhood
- 10. Opthalmoplegic Migraine

## PRIMARY HEADACHE DISORDERS

- > B) Chronic Daily Headache Disorder
- > C) Paroxysmal Hemicrania
- > D)Tension Type Headache
- > E) Trigeminal Autonomic Cephalalgias
- > F) Cluster Headache
- > G) SUNCT Syndrome
- > H) Icepick Headache

# SECONDARY HEADACHE DISORDERS

- > A) Cerebral Venous Sinus Thrombosis
- > B) Pseudotumour Cerebri-Idiopathic Intracranial Hypertension
- > C) Headache in Chiari Malformations
- D) Trauma Related Headaches: Epidural and Subdural Hematomas
- > E) Headache and Meningitis: Bacterial Meningitis Viral Meningitis
- > F) Headache and Brain Tumours
- > G) Headache and Vascular Malformations
- > H) Headache and Brain Abscess
- > I) Headache and Hydrocephalus

Preschool	School	Adolescents	
Looks ill	Bilat	Unilat	
Pale	Frontal	Bilat	
Abd pain	Temporal	Temporal	
Vomit	Retroorbital	Aura	
Sleep	Nausea anorexia	Location and intensity changes between episodes	
Dark room	Abd cramps		
Irritable	Vomit		
crying	Photophobia		
	Phonophobia		
	Sleep		
	Aura		
	Confusion		
	Memory loss		

### MIGRAINE



- > 10-20% of over 8 yr have Aura
- Precedes headache< 60 mins</p>
- Lasts 5-20 mins
- > NONVISUAL AURAS
- > Attention loss, confusion, amnesia, agitation
- > Aphasia, ataxia, dizzinyness, vertigo
- > Paresthesia, hemiparesis

#### MIGRAINE AURA



- > VISUAL AURAS
- Blurred vision, scotoma
- Scintillations, black dots
- Fortification Spectra, Kaleidoscopic Colour patterns
- Micropsia, Macropsia, Metamorphopsia (Alice in Wonderland)
- Moving or Changing Shapes
- Headache then 1 hr to 48 hr, usually < 4 hrs, young 10-20 mins

#### MIGRAINE AURA



#### MIGRAINE COMORBIDITIES



- > Epilepsy
- > Motion sickness
- Sleep Disturbances
- Ice cream Headache
- > Psychiatric:
- > Depression
- Panic Episodes
- > Anxiety
- > Phobias

# PEDMIDAS

#### TABLE 1

#### Pediatric Migraine Disability Assessment (PedMIDAS)

#### In the past three months:

How many full days of school did you miss because of headaches?

How many partial days of school did you miss because of headaches?

How many days did you go to school but functioned at less than one-half of your ability because of a headache?

How many days were you not able to do things at home because of a headache?

How many days were you not able to participate in other activities because of a headache?

How many days did you participate in other activities but functioned at less than one-half of your ability because of headaches?

#### Total the answers of all questions to get the PedMIDAS score.

#### PedMIDAS disability grades

	Score	Grade	Disability	
	0 to 10	1	Little to none	
	11 to 30	2	Mild	
	31 to 50	3	Moderate	
	> 50	4	Severe	

Information from references 1 and 2.

### MIGRAINE: DIAGNOSTIC CRITERIA

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

Dooley JM, Gordon KE. Ophthalmoscopy: A 7-step program. *Can J Neurol Sci.* 2008;35:237–42.

# PRIMARY HEADACHE DISORDERS

#### A) MIGRAINE

- 1. Status Migrainosus
- 2. Familial Hemiplegic Migraine
- 3. Basilar Type Migraine
- 4. Benign Paroxysmal Vertigo of Childhood
- 5. Acute Confusional Migraine
- 6. Migraine Associated Cyclic Vomiting Syndrome
- 7. Abdominal Migraine
- 8. Paroxysmal Torticollis of Infancy
- 9. Acephalgic Migraine of Childhood
- 10. Opthalmoplegic Migraine

# MIGRAINE: STATUS MIGRAINOSUS

- > Severe
- > >72 hrs
- > Preexisting Migraine History
- > Rx: IV Fluids, antiemetics, DHE-Dihydroergotamine

### MIGRAINE: FAMILIAL HEMIPLEGIC MIGRAINE

- Familial Hemiplegic Migraine
- > Autosomal Dominant with Aura
- CACNA1A, ATP1A2, SCN1A, PRRTZ genes + fam Hx and <16yrs</p>
- Prolonged Hemiplegia with numbness, aphasia and confusion
- Hemiplegia before, during or after headache
- Hours to days

- Hemiplegia contralateral to pain
- > Some with cerebellar ataxia
- Rx Acetazolamide or Calcium Channel Blockers
- Diff Dx: structural lesions,vasculitis,cerebral hemmorhage,brain tumour, mitochondrial myopathy,encephalopathy
- Alternating hemiplegia, Lactic acidosis

# MIGRAINE: BASILAR TYPE MIGRAINE

- > Occipital Migraine with Aura
- Aura at least 2 of Dysarthria, vertigo,tinnitus,hyperaccusia,diplopia,bifield visual symptoms,ataxia, decreased level of consciousness, bilateral paresthesias
- > Hx of migraine in family
- > Intermingled with typical migraine
- > Disturbance in brainstem function, occipital cortex, cerebellum



#### MIGRAINE: BENIGN PAROXYSMAL VERTIGO OF CHILDHOOD

- Benign Paroxysmal Vertigo of Childhood
- ≻ 2-6 yr
- > Brief episodes vertigo, disequilibrium, nausea
- > Nystagmus within but not between episodes
- > A few minutes
- > Often migraine as older
- > MRI post fossa pathology if neuro abnormal between episodes

# MIGRAINE: ACUTE CONFUSIONAL MIGRAINE

- Acute confusion before/after
- > Agitation
- > Lethargy
- Dysphasia, expressive/receptive aphasia
- Often precipitated by minor head trauma
- > May be recurrent
- > Typical Migraine when older
- Exclude hypoglycaemia, intox,encephalitis,structural lesions, seizures
- Transient amnesia

# MIGRAINE: CYCLIC VOMITING SYNDROME

- Recurrent regular/cyclic episodes intense vomit with symptom free intervals
- Rapid onset night/early morning
- > 6-48 hrs
- > Abd pain, Nausea ,anorexia
- Pallor lethargy
- > Photo and phonophobia
- ➤ Headache
- Girls>boys Resolves in adolescence
- > Fam Hx Migraine
- Fluid electrolyte disturbance
- Exclude Malrotation, neoplasm, urinary tract, metab, endocrine, mitochondrial



# MIGRAINE: ABDOMINAL MIGRAINE

- Recurrent abdominal pain with nausea and vomiting
- > Often no headache
- Sleep relieves
- > Can alternate with typical migraine
- Develops adult migraine
- > Rx Migraine prophylaxis



# MIGRAINE: PAROXYSMAL TORTICOLLIS OF INFANCY

#### > Uncommon

- Repeated episodes of headtilt
- > With nausea vomiting and headache
- > Infants
- Minutes to days
- DDX: Post Fossa
- > CACNA1A Gene



Case 1. Figure 1 – Left torticollis at first presentation. Figure 2 – Three weeks later, after a normal interval, she presented with right torticollis.

Published in The Journal of bone and joint surgery. British volume 1992 Benign paroxysmal torticollis of infancy.H. Bratt, M. Menelaus

### MIGRAINE: ACEPHALGIC MIGRAINE OF CHILDHOOD

- > Migraine aura without headache
- > Usually visual auras
- > Girls>boys
- > Migraine family hx

### MIGRAINE: AURA



- > 1/3 of adult and adolescent pts
- Retinal migraine-uncommon
- > Monocular visual disturbance with migraine headache

Art inspired by migraine auras CREDIT: British Migraine Association

### MIGRAINE: OPTHALMOPLEGIC MIGRAINE

- > Inflammatory
- > Opthalmoplegia- N III palsy unilat with headache
- > MRI inflammation of N III
- Can last days
- > Can be recurrent



Published in Cephalalgia : an international journal of headache 2012 Ophthalmoplegic migraine : Migraine or oculomotor neuropathy?L. Margari, A. R. Legrottaglie, F. Craig, M. Petruzzelli, U. Procoli, F. Dicuonzo

### MIGRAINE: EVALUATION AND DIAGNOSIS

- > No specific test
- > History
- Physical exam: Normal incl CNS
- Clinical Judgement
- Imaging: seizures, head trauma, change in headache,focal neuro deficit,papiloedema
- EEG: not useful except atypical aura, episodic loss of consciousness, seizures
- > LP: meningitis, encephalitis, high/low pressure problem

### MIGRAINE: MANAGEMENT AND PROGNOSIS

- Identify trigger-doesn't eliminate headache
- > Pain control: analgesics
- > Rest
- ➢ Reassure
- > Regular meals and bedtime
- > Time management
- Psych triggeres: stress, anxiety, worry, depression, bereavement
- > Physiological triggers: fever, illness, skipped meals, faitigue, sleep deprivation
- > Environmental triggers: light-fluorescent, bright, flickers
- Barometric pressure changes, strong odour, computer screen, temp changes, complex visual patterns
- Physical exertion
- > Minor head trauma
- Travel and motion

### MIGRAINE: MANAGEMENT AND PROGNOSIS

- > Sleep: cool dark quiet
- > Ice or pressure: temporary relief
- > Paracetamol
- > NSAIM: Ibuprofen early-migraine gives gastric stasis
- > Oral 25-100 mg po/ Nasal 5-20 mg in one nostril Sumatriptan
- > Non Pharmacological: self relaxation, biofeedback, self hypnosis
- > IV Fluid
- > Antiementics: Metoclopramide/Prochlorperazine (better)
- Consider ergotamine/dihydroergotamine-vasoconstrictiveconsider angio MRI before prescribing IV,nasal,oral
- > >6 years: almotriptan,zolmitriptan,rizatriptan

#### MIGRAINE: MANAGEMENT AND PROGNOSIS

Phase III trials: Calcitonin Gene-Related Peptide (CGRP)-Receptor antagonist- BIBN 4096 BS

- > CGRP is a 37 amino acid neuropeptide
- > A potent vasodilator in perivascular trigeminal nerve fibre supplying the pial, meningeal and extracranial cephalic arteries
- > Ubrogepant and Rimegepant registered for adult use

### MIGRAINE: PROPHYLAXIS

- > Use daily to decrease frequency and severity
- > 50% decrease in frequency considered good response
- Consider >2x per week/or prolonged and disabling
- > Topiramate: best evidence
- Propranolol heart rate and orthostatic pressure monitor 3 monthly, beware asthmatics, DM, Depresion
- > Cyproheptadine
- > Amitriptyline
- > Gabapentin
- > Valproate
- > Flunarizine
- > Ca channel blockers: Verapamil , Cinnarizine, Flunarizine
- ➢ Riboflavin
- > Onabotulinumtoxin A: approved in adults

### MIGRAINE: PROPHYLAXIS IN ADULTS

- Gepants (Calcitonin gene-related peptide (CGRP) receptor antagonists
- > Ditans (5HT1F receptor antagonists)
- Anti –CGRP monoclonal antibodies
- > Nerivio-wearable neuromodulation devic
- Cefaly headband



### MIGRAINE: PROGNOSIS

- > Change in frequency as older
- > 60 % still have headache as older
- > 52 % have a child with migraine

### MIGRAINE PLACEBO

- CHAMP trial: Childhood and adolescent Migraine prevention Trial: Amytriptyline, Topiramate and Placebo compared. Over 6 months placebo worked as well as meds.
- Suggestion that early diagnosis and pain control modulates brain's pain response and gives improved outcome later.
- Cognitive Behaviour Therapy very promising

# CHRONIC DAILY HEADACHE DISORDER

- Headache>15 days per month over 3 consecutive months
- With no underlying organic pathology
- >> >4 hrs per day
- > Adolescents and adults
- > 4% women/ 2 %men
- > May have past Hx of migraine,  $\frac{1}{4}$  no headache Hx

# CHRONIC DAILY HEADACHE DISORDER: 4 TYPES

- Transformed/Chronic Migraine (over hours to months)
- Chronic Tension Type Headache
- New Daily Persistent Headache
- > Hemicrania Continua

# CHRONIC DAILY HEADACHE DISORDER:

- > 2 types of Headache
- 1. Prominent severe throbbing migraine like pancephalic/frontal
- 2. Persistent headache when awake wax and wane 24/7,less intense, band, crushing
- Sleep improves headache
- > Weak Dizzy, unsteady
- > Blurry, loss of vision
- Syncopy/nearsyncopy after standing several minutes
- > No vertigo except severe headache episodes
- > Diff in BP standing and seated



# CHRONIC DAILY HEADACHE DISORDER:

- Mood and Anxiety
- Non-specific abd pain, back,neck,muscle,joint-no etiology
- Seasonal variability
- > MRI usually normal
- Consider MRVenography-pseudotumor cerebri, sinus thrombosis
- > Consider TFT, ESR, ANA, EBV, West Nile, Viral, Bacterial

#### CHRONIC DAILY HEADACHE DISORDER: RX AND PROGNOSIS

- Difficult to control
- ➤ Education
- > Trigger factors
- > Preventative meds
- ➢ Biofeedback
- Physical Therapy
- Complete resolution rare
- Goal: severe intermittent headaches less frequent and alltime headache less intense

#### CHRONIC DAILY HEADACHE DISORDER: RX AND PROGNOSIS

#### > Rx:

- SSRI-good effect on mood too
- > Tricyclic antidepressants; Amitriptyline, Nortriptyline, Protriptyline
- > Anticonvulsants: Valproate, Topiramate, Gabapentin
- ➢ Botox

#### CHRONIC DAILY HEADACHE DISORDER: RX AND PROGNOSIS



BOTOX (OnabotulinumtoxinA) FOR CHRONIC MIGRAINE; EFFECTIVE PATTERN, TECHNIQUE, AND WHAT YOU NEED TO KNOW. NOT ALL BÓTOX TREATMENTS ARE CREATED EQUAL. Dr. Eric Baron November 24, 2020, The headache Specialist

#### HEMICRANIA CONTINUA

- ≻ Rare
- > 1% of chronic daily headache patients
- Persistent unilat headache
- > Stabbing
- > Autonomic changes
- > Rx: Indomethacin
- Pain control difficult: analgesics for acute migraine not effective for chronic migraine
- Analgesics overuse and rebound headaches
- > Try same meds as for Migraine
- > Steroids
- Relaxation Therapy
- ➢ Biofeedback
- Reconditioning exercise program

#### TENSION TYPE HEADACHE



- > Most common headache in children: Migraine and Tension-73%
- > 5-12 yrs onset
- > Girls>Boys
- > Not familial Hx
- Pathophysiology may involve trigeminal activation

#### TENSION TYPE HEADACHE: CHARACTERISTICS

- > Variable Intensity
- $\succ$  Bilateral
- > Dull
- Pressure pain
- > Phonophobia +-
- > Minutes to days
- 1) Episodic: < 1 x per month
- 2) Frequent: 1-14/7 per month
- 3) Chronic:>15/7 per month

#### **TENSION TYPE HEADACHE: MANAGEMENT**

- ➢ Reassure
- > Stress reduction
- > Psych and Cognitive behaviour therapies
- > Analgesics: NSAIMS
- Prophylactics: Antidepressants

#### TRIGEMINAL AUTONOMIC CEPHALAGIAS

- > Repetitive,brief
- > Severe
- > Unilat
- > Neuralgiform pain with ipsilateral autonomic features
- > Rhinorrhea, nasal congestion
- > Lacrimation
- Conjunctival injection
- > Types
- 1. SUNCT
- 2. Cluster headaches
- 3. Paroxysmal Hemicrania



#### TRIGEMINAL AUTONOMIC CEPHALAGIAS: SUNCT

SUNCT: Shortlasting Unilateral Neuralgiform Conjunctival injection and Tearing, up to 100x per day, triggers touch face, chewing

#### TRIGEMINAL AUTONOMIC CEPHALAGIAS: CLUSTER HEADACHES

- > Boys>girls
- > <1% adults
- > >5yr onset
- Pathophysiology theory: hypothalamic activation with neurogenic inflammation
- Several bouts per day lasting weeks
- > Circadian Rhythmicity
- > Severe unilat orbital, supraorbital, temporal pain
- > 15 mins-3 hrs with autonomic features
- Familial predisposition
- > CT/MRI should be done to exclude brain lesion



Cluster headaches may involve pain around one eye, along with drooping of the lid, tearing and congestion on the same side as the pain

#### TRIGEMINAL AUTONOMIC CEPHALAGIAS: CLUSTER HEADACHES

- > Rx:
- > Verapamil
- > Oxygen
- > Triptans
- > Steroids
- > Triggers:smoke alcohol

#### TRIGEMINAL AUTONOMIC CEPHALAGIAS: PAROXYSMAL HEMICRANIA

#### > Rare

- > Short episodes-minutes
- > More frequent but less severe than cluster headache
- Indomethacin

#### ICE PICK HEADACHE

- > Benign Primary Headache Disorder
- Sudden Icepick-like pain
- Seconds to minutes
- > Different parts of head
- > Migraine pt often
- > Infrequent and mostly no Rx needed-Indomethacin



## BIBLIOGRAPHY

- Managing childhood migraine, Sixsmith and Starr, Australian Family Physician, volume 44, Issue 6, June 2015
- Migraines in Children, Recommendations for acute and Preventive treatment, Hoover, American Family Physician, May 1 2020
- Drawing Down the Pain, Johns Hopkins Publications, Dome march 2015
- ▶ Dooley JM, Gordon KE. Ophthalmoscopy: A 7-step program. Can J Neurol Sci. 2008;35:237-42.
- Dooley J. The evaluation and management of paediatric headaches. Paediatr Child Health. 2009 Jan;14(1):24-30. doi: 10.1093/pch/14.1.24. PMID: 19436460; PMCID: PMC2661331.
- Orr, S.L., Kabbouche, M.A., O'Brien, H.L. et al. Paediatric migraine: evidence-based management and future directions. Nat Rev Neurol 14, 515–527 (2018).
- ► Teleanu RI, Vladacenco O, Teleanu DM, Epure DA. Treatment of Pediatric Migraine: a Review. Maedica (Bucur). 2016 Jun;11(2):136-143. PMID: 28461833; PMCID: PMC5394581.
- ▶ The Unique Demands of childhood migraine, Emily Sohn, Nature 586, S19-S21 (2020)
- doi: <u>https://doi.org/10.1038/d41586-020-02869-2</u>
- Pallewatte, Aruna & Liyanage, N.. (2015). Normal Variations and Artifacts in MR Venography that may cause Pitfalls in the Diagnosis of Cerebral Venous Sinus Thrombosis. 10.1594/ranzcr2015/R-0005.
- ROYTOWSKI, David; FIGAJI, Anthony. Raised intracranial pressure: What it is and how to recognise it. Continuing Medical Education, [S.I.], v. 31, n. 3, p. 85-90, mar. 2013. ISSN 2078-5143. Available at: <<u>http://www.cmej.org.za/index.php/cmej/article/view/2698/2840</u>>. Date accessed: 09 Aug. 2022.
- > Skip to the beginning of the images gallery
- ► AICARDI'S DISEASES OF THE NERVOUS SYSTEM IN CHILDHOOD, 4<sup>TH</sup> EDITION
- ► Fenichel's Clinical Pediatric Neurology, 8th Edition

When I get a headache. I take 2 aspirins and keep away from children just like it says on the bottle!

THANK YOU

