HEADACHE ATTRIBUTED TO DISORDERS OF HOMEOSTASIS

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Headache attributed to disorder of homeostasis

If a headache occur for the first time in close temporal relation to a disorder of homeostasis, it is coded as a secondary headache attributed to that disorder.

(The International Classification of HeadacheDisorders:ICHD-3 beta version)

Headache due to disorder of homeostasis mainly consists disorders of followings

I. O_2, CO_2 and Altitude

II. Blood pressure changes ,dialysis and cardiac ischaemia

III.Autonomic dysreflexia

IV.Metabolism (Fasting, Hypothyroidism)

I.Headache attributed to hypoxia or hypercapnia

- Headache begins within 24 hrs after acute onset of hypoxia with PaO2 <70mmHg or

- Chronically hypoxic patients with PaO2 persistently at or below these levels.(Asthma, COPD,CCF, Haematological disorders with significant anaemia, sleep apnoea)

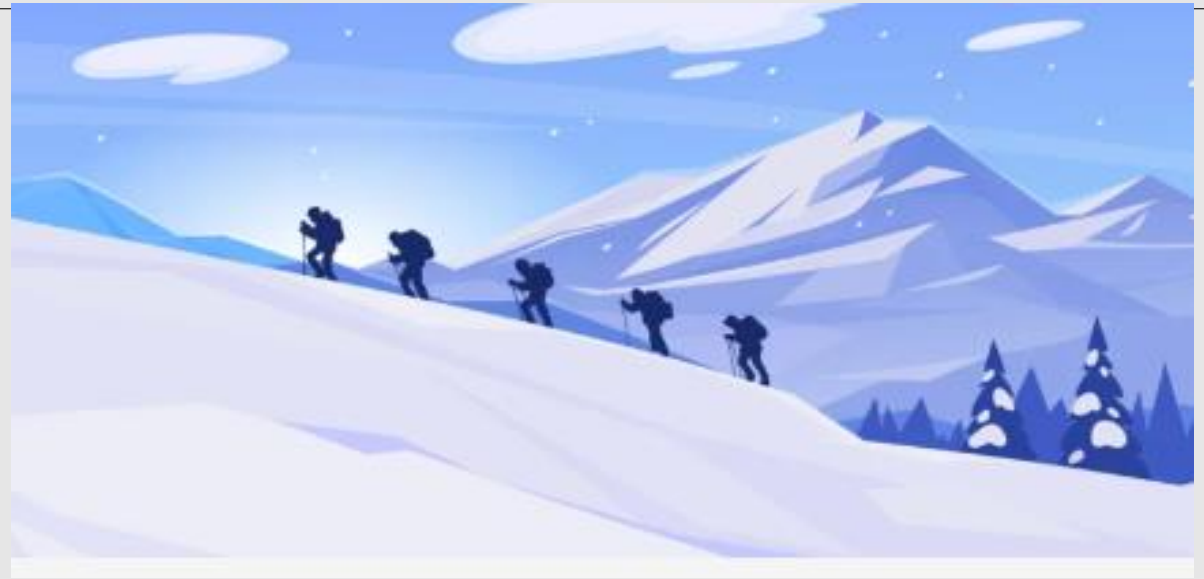
Why?

- O2 constrict cerebral blood vessels that dilate under condition of hypoxia

- CO2 is the most efficient cerebral vasodilator

(turtle headache)

High-Altitude Headache



- Incidence-73%-86%
- Headache develops in temporal relation to an ascent above 2500 m that worsens during continued ascent and/or resolves within 24 hrs after descent to below 2500m.
- more often bilateral, nausea, photophobia, vertigo, poor concentration, impaired judgement.

- Hypoxia elicit neurohumoral & hemodynamic responses that result in overperfusion of microvascular beds, capillary leakage and vasogenic edema & mild increase in brain volume.
- **Management**:
- analgesic, antiemetic,

acetazolamide 125-250 mg bd ,which can cause a metabolic acidosis, which increases the respiratory exchange of O2.

steroid (Dexamethasone) can used to reduce cerebral edema.

Prevention-

-Aspirin 320mg tds, starting1 hour before ascent

-Ibuprofen 600mg tds starting few hours before ascent

-Liberal fluid intake, slow ascent, avoidance of alcohol

-2 days of acclimatization prior to engaging in strenuous exercises

Headache due to airplane travel

- Stereotypical nature of the attack, clear relationship with take-off and landing phase, male preponderance.
- Character- lasting less than 30 minutes,often severe , usually unilateral & periocular ,without autonomic symptoms & no other accompanying symptoms.
- Is thought to be squeeze effect on the frontal sinus wall, when air trapped inside it contracts, producing negative pressure leading to mucosal edema,transudation and intense pain,(or) sinus barotrauma.

- The most important mechanism of injury is the speed of ascent or the speed of depressurization.

- Prophylaxis: analgesic, NSAID, antihistamine, nasal decongestants 30 mins to 1 hr prior to travel

Diving Headache(attributed to hypercapnia: arterial Pco2 >50 mmHg)

- Occur during dive and diving below 10 m, intensified on surfacing and occurs in the absence of decompression sickness.
- Hypercapnia in the absence of hypoxia is associated with headache.
- It remits quickly with O2 or , if this is not given, spontaneously remits within 3 days after the dive.

- Although headache in diver is uncommon, serious consequences such as arterial gas embolism, decompression sickness, otic and paranasal sinus barotrauma can occur .

- Symptoms depend on duration, depth ,and speed of ascent.

Sleep Apnea Headache

- Is a recurrent morning headache, usually bilateral and less than 4 hr duration, diagnosed using polysomanography with apnea-hypopnea index(AHI)> or equal to 5.
- AHI is calculated by dividing the number of apneic events by the number of hours of sleep.
- Several possible mechanisms include oxygen desaturation,hypercapnia, shorter REM sleep, increase ICP.

II. Headache due to Haemodynamic changes

Headache due to Hypertensive Crisis

- Usually bilateral &pulsating ,caused by a paroxysmal rise of arterial hypertension(systolic BP_>180 mmHg and /or diastolic _>120 mmHg).
- Remits after normalization of blood pressure.
- Paroxysmal hypertension may occur in association with failure of baroreceptor reflexes(after carotid endarterectomy or subsequent to irridiation of the neck) or in patients with enterochromaffin cell tumors.

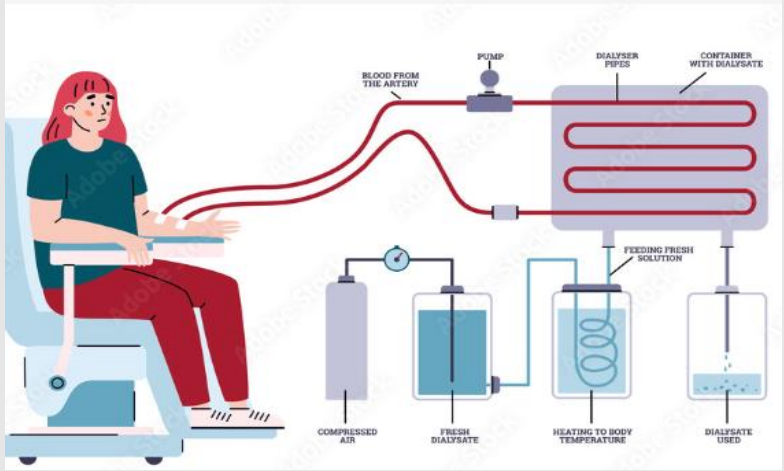
- Headache due to pheochromocytoma-usually paroxysmal,severe and short duration less than 15 mins to 1 hour, often severe, pulsating or constant in character, frontal or occipital in location & associated with apprehension and/or anxiety, often with a sense of impending death.

- The variable duration and intensity of the headache correlates with the pressor and cranial vasoconstrictor effects of the secreted amines.

Headache due to Hypertensive Encephalopathy

- Bilateral &pulsating ,caused by a persistent blood pressure elevation to 180 /120 mmHg or above and accompanied by symptoms of encephalopathy(confusion, lethargy, visual disturbances, or seizures).
- It is thought to occur when compensatory cerebrovascular vasoconstriction can no longer prevent cerebral hyperperfusion as blood pressure rises.
- Cerebral oedema is often most prominent in the parieto-occipital white matter in MRI.

Dialysis Headache



- It has been recognized for years as a known emerging symptoms of hemodialysis treatment (30%-70%),mainly occur in second half of dialysis.
- Commonly occur in association with hypotension and disequilibrium syndrome: this syndrome may begin as headache and then progress to obtundation and coma, with or without seizures.
- Dialysis headache may be prevented by changing dialysis parameters.

- Treatment-symptomatic
- Analgesic & NSAIDs are often used during dialysis sessions.

Cardiac Cephalalgia

Treatable form of exertional headache

- Migraine-like but not always aggrevated by exercise, occurring during an episode of myocardial ischaemia that is relieved by nitroglycerine
- Headache were correlated with ECG changes indicative of myocardial ischaemia
- Diagnosis must include careful documentation of headache and simultaneous cardiac ischaemia during treadmill or nuclear cardiac stress testing

- To recognize and correctly diagnose cardiac cephalalgia is important and distinguishing this disorder from migraine is of crucial importance, particularly because vasoconstrictor medications (triptans and ergots) are indicated in the treatment of migraine but contraindicated in patients with ischaemic heart disease
- The mechanism of cardiac cephalgia is unclear but possibly related to neural convergence, including somatic and sympathetic supply that converge in the posterior horn of spinal cord, mixing neural supply to cervical area and cranial vessels

III. Headache due to Autonomic Dysreflexia

- Presence of spinal cord injury(SCI) and autonomic dysreflexia documented by a paroxysmal rise above baseline in systolic pressure of = or > 30 mm Hg and/or diastolic pressure = or >20 mmHg.
- Headache of sudden onset in temporal relation to the rise in blood pressure.
- Severe pounding and throbbing/pulsating quality.
- Accompanied by diaphoresis cranial to the level of the SCI.
- Triggered by noxious or non-noxious stimuli,usually of visceral origin , occasionally somatic
- The time of onset of autonomic dysreflexia after SCI is variable (4 days to15 years)

Treatment of headache due to autonomic dysreflexia includes

- Close monitoring of blood pressure and heart rate
- Place in a sitting position
- Removal or loosening of clothing or constrictive devices
- Scrutinizing for potential triggers (bladder distension & bowel impaction)
- Rapid onset & short acting antihypertensive drugs(nifidipine, nitrates) if systolic blood pressure>150 mmHg

IV. Headache due to metabolic disorders

Headache due to fasting

- Headache that begins during a fast of at least 8 hours and relieved after eating
- Diffuse , non-pulsating and mild to moderate in intensity
- One of the most commonly reported migraine triggers is hypoglycemia

Headache due to hypothyroidism

- Approximately 30% of patients with hypothyroidism suffer from headache
- The headache begins within 2 months after the onset of hypothyroidism and lasts less than 3 months after its effective treatment
- Usually bilateral and nonpulsatile
- In migraineurs with subcinical hypothyroidism, treatment of borderline hypothyroidism is sometimes followed by dramatic improvement of headache

Case scenario

- 72yr old gentleman present with a 3-week history of headache.
- Intermittent, 2-3 days per week, lasted less than an hour
- Bilateral,Pulsating in quality, moderate to severe intensity
- No association, No symptom of trigerminal autonomic cephalgia
- No symptom suggestive of polymyalgia rheumatic and jaw claudication
- No prior h/o headache, No eventful past medical history

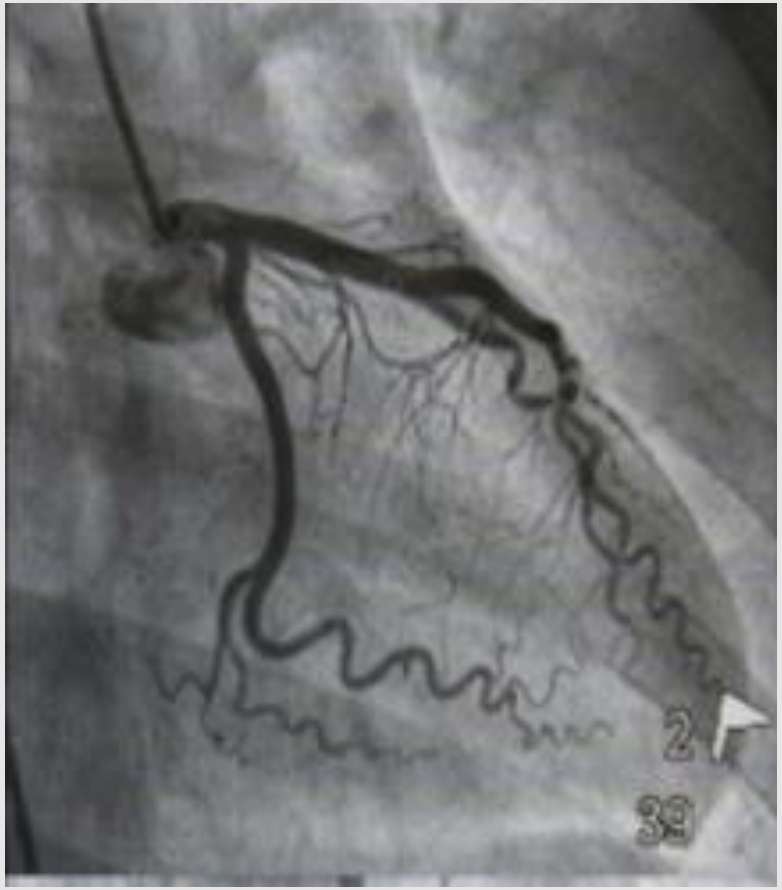
Aetiology of headache?

- On further probing - when direct questioning regarding potential triggers
- The headache typically occur while gardening
- At times, he aware heaviness in the chest simultaneously with headache , sometime heaviness/ache and pain of left arm ,he think it is due to lifting heavy things.

- Given the new onset of exertion-related headache and chest discomfort in a 72 yr old man , order to do ECG and show no obvious abnormality except sinus tachycardia. So proceed to do stress test.

- During the treadmill stress test, he develops typical pulsating headache and ischaemic changes in ECG tracing.

- Coronary angiogram revealed three vessel disease and myocardial revascularization procedures were followed by complete resolution of headache.



- Several case reports documented that this type of headache may be the sole manifestation of myocardial ischaemia.

Learning points

- A thorough history are needed to determine the level of suspicion for a secondary etiology for headache.
- To much extent headache is a headache, and that is that.
- The task become more difficult when we are dealing with symptoms but no physical signs. No help is usually come from specialized investigations and imaging.
- There are some patients whose headache blur traditional boundaries and defy rigid classifications.

Learning points

- The history at least sets the clinical thinking. It may not provide the whole answer, but it may provides the clues from which the answer can finally be derived.

THANK YOU