Headache (General)

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PATHOPHYSIOLOGY

- headaches *may be activated by anxiety*, but emotional stress is not necessary for symptom to appear.
- ***genetic factors*** may augment this system (some people are susceptible to more frequent or more severe head pain).

Pain-sensitive cranial structures:
- sensitive to **mechanical stimulation**: scalp & aponeurosis, large dural arteries, large arteries at base of brain, proximal segments of large pial arteries, dural venous sinuses, dura mater at skull base & falx cerebri.
- insensitive to pain - ventricular ependyma, choroid plexus, pial veins, much of brain parenchyma, most of dura, meningeal surfaces.
- most of brain is insensitive to **electrical stimulation**, but particular *midbrain site* (near midbrain dorsal raphe) is locus for headache generation.

Sensory stimuli from head are conveyed to brain:
- structures above tentorium in anterior and middle fossae - by **CN5**.
- posterior fossa and infratentorial structures - by **CN9 & 10, first three cervical nerves**.

Headache can occur:
1) distention, traction, dilation of **arteries** (intracranial or extracranial).
2) traction, displacement of large intracranial **veins** or their dural envelope.
3) compression, traction, inflammation of **nerves** (cranial and spinal).
4) spasm, inflammation, trauma to **muscles** (cranial and cervical).
5) **meningeal** irritation.
6) perturbation of **intracerebral serotonergic projections**.

Previously, head pain was thought to originate from either ***contracted scalp & neck muscles*** or ***vascular dilatation***; neither of these mechanisms achieved scientific support; **central mechanisms** of head pain are of current interest!

INTERNATIONAL HEADACHE SOCIETY (IHS) CLASSIFICATION

PRIMARY HEADACHE DISORDERS - ***headache itself is illness*** and no other etiology is found; normal examination during asymptomatic intervals!

1. **Migraine**
   1) migraine with aura (classic migraine)
   2) migraine without aura (common migraine)
   3) ophthalmoplegic migraine

4) retinal migraine
5) childhood periodic syndromes that may be precursors to or associated with migraine
6) migrainous disorder not fulfilling above criteria

2. Tension-type headache
1) episodic tension-type headache
2) chronic tension-type headache

3. Cluster headache, chronic paroxysmal hemicrania
1) cluster headache
2) chronic paroxysmal hemicrania

4. Medication-overuse headache

5. Miscellaneous headaches unassociated with structural lesion
1) idiopathic stabbing (fleeting ice-pick) headache
2) external compression headache
3) cold stimulus headache
4) benign cough headache
5) benign exertional headache
6) headache associated with sexual activity

6. Head trauma
1) acute posttraumatic headache
2) chronic posttraumatic headache

SECONDARY HEADACHE DISORDERS - ***headache is symptom*** of identifiable abnormality (structural or metabolic):

7. Cranial vascular disorders
1) **carotidynia** (subtype of migraine?)
2) **acute ischemic cerebrovascular disorder** (< 30% patients with middle cerebral artery vascular accidents have any head pain; headache is result of involvement of larger vessels; involvement of smaller, deeper vessels produces no painful stimuli).
3) **intracranial hematoma** (intracerebral, epidural, and subdural)
4) **subarachnoid hemorrhage**
5) **unruptured vascular malformation** (AVM, aneurysm)
6) **temporal arteritis** (in elderly patients, palpation of superficial temporal arteries is essential!!!)
7) carotid or vertebral **artery dissection**
8) **venous thrombosis**
9) **acute arterial hypertension** (pheochromocytoma, malignant hypertension)
   N.B. arterial hypertension per se is uncommon cause of headache (diastolic pressures ≥ 130 mmHg are requisite for hypertension to cause headache)

8. Nonvascular intracranial disorders
1) intracranial pressure↑ (e.g. obstructive hydrocephalus, idiopathic intracranial hypertension, space-occupying intracranial lesions)
2) intracranial pressure↓ (e.g. post-lumbar puncture)
3) intracranial infection (acute meningitis, meningoencephalitis, brain abscess)
4) noninfectious inflammatory diseases (sarcoidosis, Tolosa-Hunt syndrome)
5) intrathecal injections
6) intracranial neoplasm

9. Substances or their withdrawal

1) substance use or exposure:
    a) acute (e.g. nitrites, CO)
    b) chronic
2) substance withdrawal:
    a) acute use
    b) chronic use (e.g. caffeine)

10. Noncephalic infections

Fever is extremely common cause of headache (potential for meningitis exists in all patients with febrile head pain!)

1) viral infection
2) bacterial infection

11. Metabolic disorders

1) hypoxia, altitude sickness, sleep apnea
2) hypercapnia (e.g. early morning headaches in chronic pulmonary failure with hypercapnia)
3) hypoglycemia
4) dialysis
5) systemic lupus erythematosus
6) Hashimoto thyroiditis

12. Disorders of facial / cranial structures

1) cranial bone
2) eyes, e.g. glaucoma (astigmatism, refractory errors, eye strain, squint are rarely responsible for headaches)
3) ears
4) nose and sinuses (e.g. sinusitis)
5) teeth, jaws, and related structures
6) temporomandibular joint disease
7) neck

13. Cranial neuralgias, **nerve trunk pain**, and **deafferentation pain**

1) persistent (in contrast to ticlike) pain of cranial nerve origin
2) trigeminal neuralgia
3) glossopharyngeal neuralgia
4) nervus intermedius neuralgia
5) superior laryngeal neuralgia
6) occipital neuralgia

14. Psychiatric conditions (depression, anxiety disorders, somatization and conversion disorders).

EPIDEMIOLOGY

- 40% persons experience severe headaches annually.

Only 1 in 250,000 patients with chief complaint of headache have ***secondary headache***.
Almost all patients have one of three*: **migraine**, **tension-type**, or **cluster** headache.

*all three are diagnosed clinically based on International Headache Society criteria

CLINICAL FEATURES

- most headaches are dull, aching, deeply located.
- superimposed jabbing, brief, sharp pain, often occurring multifocally (*ice pick*-like pain), is signature of benign disorder.
- throbbing quality and tight muscles about head, neck, and shoulder girdle are common nonspecific accompaniments (tightening in scalp and neck musculature is reaction to pain).
- pain **INTENSITY** seldom has diagnostic value; patients with *most severe headache of their lives* usually have *migraine* (alternatives - *meningitis*, *subarachnoid hemorrhage*, *cluster headache*).
  N.B. headache produced by *brain tumor* is not severe!
  More severe headache, more likely it is to be associated with ***nausea***, ***photophobia*** and ***hyperacusis***.
- **response to PLACEBO medication** has no diagnostic value (simply identifies "placebo responders" - group that includes ≈ 30% of population).
- headache **LOCATION** may occasionally be informative:
  - ***extracranial structure*** correspondence with pain site is fairly precise.
  - ***posterior fossa lesions*** cause occipitonuchal pain; ***supratentorial lesions*** - frontotemporal pain.
  - *MULTIFOCALITY* is strong indicator of benignity.
  - ***intracranial masses*** may cause pain by displacement of pain-sensitive blood vessels that are *distant from their location*; mass may cause bilateral headache if CSF flow is obstructed.
- **EXACERBATING phenomena** with high probability that headache syndrome is benign: provocation by red wine, sustained exertion, pungent odors, hunger, lack of sleep, weather change, menses.
- patient whose *headache pattern and neurologic status has been normal over period of years* is extremely unlikely to have life-threatening cause for headache!
- *hypertension*, *tachycardia* commonly accompany any severe headache.

DIAGNOSIS

Normal physical & neurologic examination + **history*** consistent with one of patterns of benign headache → no further diagnostic testing.

*invaluable technique is to ask patient to describe pattern of headaches *when they began* (often many years ago) rather than to focus on current, usually confusing, headache presentation.

- testing is reserved for patients who do not respond as expected to treatment.
- if benign diagnosis cannot be made (new-onset headache with nausea, vomiting, or abnormal signs) → **MRI**;
  - CT poorly visualizes posterior fossa tumors (far more likely than forebrain tumors to cause headache), Arnold-Chiari malformation.
- **ESR** for those > 50 yrs.
- **ophthalmoscopy** – for papilledema.
- **EEG** has no utility in diagnosis of headache.

TREATMENT

PERIPHERAL NERVE BLOCKS

Injection Sites (majority bilateral):

greater occipital nerve (GON)
supraorbital nerve (SON)
supratrochlear nerve (STN)
auriculotemporal nerve (ATN)

Solutions: BUPIVACAINE + LIDOCAINE + DEXAMETHASONE.

Average duration of relief - 2 weeks

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