

Headache

Headache is the most common medical complaint encountered in clinical practice .Patients with Refractory headaches unresponsive to drug treatment are often referred to a Pain Clinic . It is broadly classified into chronic and episodic types. Headache presenting for more than 15 days per month and lasting more than 4 hours per day is classified as chronic daily headache .About 5% of the general population is affected by chronic daily headache.and the incidence is significantly higher in women."

Mechanisms of Head pain

The mechanisms of head pain include:

1. Traction on intracranial structures: i.e., intracranial mass, post lumbar puncture headache.
2. Dilatation of cranial arteries (today it is felt that both tension type and migraine or vascular headaches have a central brainstem pacemaker which affects structures in the trigeminal nerve selectively).
 - a. Intracranial, i.e., cluster headaches, anoxia, CO₂ intoxication, pheochromocytoma.
 - b. Extracranial, i.e., migraine or cluster.
3. Inflammation
 - a. Intracranial, i.e., meningitis,
 - b. Ex:tracranial, i.e., temporal arteritis
4. Contraction of the striated muscles of the head or neck (this concept has been called into question by the recent discovery of central type pacemaker on PET scans), i.e., contraction headache.
5. Cranial neuralgias.
6. Diseases of the eyes, nose, sinus, ears, or teeth.

The major categories of headache disorders are given in [Table 1](#)

Table 1 CLASSIFICATION OF HEADACHES

Primary headache disorders

1. Migraine

Migraine with aura

Migraine without aura

2 Tension-type headache

Episodic tension-type headache

Chronic tension-type headache

Cluster headache and chronic paroxysmal hemicrania

3. Cluster Headache

Episodic cluster headache

Chronic cluster headache

4 Miscellaneous headaches unassociated with structural lesion

Idiopathic stabbing headache

External compression headache

Cold stimulus headache

Benign cough headache

Secondary headache disorders

5 Headache associated with head trauma

Acute posttraumatic headache

Chronic posttraumatic headache

6 Headache associated with vascular disorders

Acute ischemic cerebrovascular disease

Intracranial hematoma

Subarachnoid hemorrhage

Venous thrombosis

Arterial hypertension

7 Headache associated with non-vascular intracranial disorder

High/Low cerebrospinal fluid pressure

Intracranial infection

Headache related to intrathecal injections

Intracranial neoplasm

8 Headache associated with substances of their withdrawal

9 Headache associated with non-cephalic infections

10 Headache associated with metabolic disorders

11 Headache or focal pain associated with disorder of cranium, neck, eyes, nose, sinuses, \teeth, mouth or other facial or other cranial structures

12 Cranial neuralgias, nerve trunk pain and deafferentation pain

Headache evaluation : History

The headache evaluation consists of a detailed history, pertinent information from the physical examination and pertinent diagnostic laboratory studies. Of these far and away, the most important element is the headache history. "If you have thirty minutes to see a patient, spend twenty-nine on history, one on the examination. Evaluation of a patient with headache requires the following:

- A. Detailed history
- B. Pertinent information from the physical examination
- C. Pertinent diagnostic laboratory, neurophysiologic, and radiographic studies

In the headache evaluation, factors that cause concern are:

1. Headaches associated with neurologic dysfunction,
2. Exertional headache,
3. Headaches which peak rapidly,
4. Nocturnal headaches,
5. Headaches associated with systemic symptoms,
6. Focal headaches,
7. Recent headaches, and
8. A recent change in headache.

Before evaluating in details a simple questionnaire (MIDAS Questionnaire) is administered to grade the disability level of such patients with chronic intractable headache

(Table 2)

Table 2 : MIDAS HEADACHE QUESTIONNAIRE

Instructions: *Please answer the following questions about all your headaches you have had over the last 3 months. Write your answer in the box next to each question. Write zero if you did not do the activity in the last 3 months.*

1. On how many days in the last 3 months did you miss work or school because of your headaches? days
2. How many days in the last 3 months did you miss work or school because of your headaches? days
3. On how many days in the last 3 months did you not do household work because of your headaches? days
4. How many days in the last 3 months was your productivity in household work reduced by half or more because of your headaches? (Do not include days you counted in question 3 where you did not do household work) days
5. On how many days in the last 3 months did you miss family, social or leisure activities because of your headaches? days
 - A. On how many days in the last 3 months did you have a headache? (If a headache lasted more than 1 day, count each day) days
 - B. On a scale of 0-10, on average how painful were these headaches? (Where 0 = no pain at all, and 10 = pain as bad as it can be)

Grading system for the MIDAS Questionnaire:

Grade	Definition
I	Minimal or infrequent disability
II	Mild or infrequent disability
III	Moderate disability

Following are important questions which should always be asked to a patient with Headache

1. What is the character and location?
2. What is the onset to peak time?
3. What is the usual time of day it occurs and the total duration?
4. Are there any associated and/or residual neurological phenomena or sequelae?
5. Is there an aura?
6. What makes the headache worse?
7. What makes the headache better?
8. Is there a family history?
9. Were there headaches in childhood?
10. Was there motion sickness, cyclical vomiting, dizziness, or unexplained fever in childhood?
11. Were there any prior diagnostic tests?
12. What were the results of prior medication?
13. Are there any other medical illnesses?
14. Are there any psychiatric illnesses, history of alcohol or substance abuse, and what is the quality of the individual's life?

EVALUATING A PATIENT WITH HEADACHE :

Examination

The headache patient will commonly show no abnormalities on examination if he has a chronic benign type of headache. Incidental abnormalities may be encountered which are not germane to the patient's situation. However in all patients, a careful general physical and neurological examination should be carried out. In addition to the general examination, the skull and spine should be examined. The patient should have a complete examination of the head, eyes, ears, nose and throat for sinus disease, temporomandibular joint disease and even dental disease. Oftentimes pain referred to the head will come from the tooth.

In the general examination attention should be paid to the possible existence of café au lait spots or other stigmata of the phakomatoses. Examination of the range of motion of the neck should be carried out as well as a complete neurovascular examination. In the elderly with any suspicion of temporal arteritis, examination of the joints of the body plus the temporal arteries is mandatory.

The general configuration of the body especially a short neck or a low hair line may suggest congenital anomalies which may lead to headaches. The presence of obesity should be considered as a risk factor for the development of pseudotumor cerebri.

The steps to examination of a patient with headache are:

1. Check the patient's gait, noting his arm swing. Check tandem walking and walking on heels or toes. Remove any high heeled shoes.

It gives a general idea as to whether or not there is any hemiparesis, any limp, any postural abnormalities, and will quickly reveal any extrapyramidal or cerebellar signs.

2: Check the patient's posture with his feet together then have him close his eyes (Romberg test).

3: Have the patient step up and down alternatively with either leg onto a stool. This is a gross test of the strength of the lower extremity plus the patient's balance.

4: Test the motor power of the patient, his fine finger movements and alternating hand movements. This is a test for both upper and lower motor neuron disease.

5: Check the reflexes starting with the jaw jerk and for the presence of a snout reflex. Check the biceps, triceps, brachioradialis reflexes, knee and ankle jerk and check the foot for possible Babinski. Also check the abdominal reflexes.

6: Check sensation starting with the face, first with a wisp of cotton, then with a pin. Use a cotton pledget to test corneal reflexes. . Check vibration and position sense in both upper and lower extremities as well as the pin prick sensation in both upper and lower extremities.

7: **Cranial nerves:** The first cranial nerve can be checked with common substances such as coffee, perfume, etc. The second cranial nerve should be checked by the pupillary light response, optic fundus and field by confrontation. The eye movements in all directions check the third, fourth and sixth cranial nerves. The sensory part of the fifth nerve has already been checked under sensation, so the strength of the temporalis and masseter muscles should be checked as well as that the jaw is protruded in the mid line.

The seventh cranial nerve is conveniently checked by having the patient close his eyes tightly and bare his teeth. He can also elevate his eyebrows and flare his nostrils. At this point, tongue movements can be checked including whether or not the tongue is protruded in the mid line. The tongue then should push the examiner's finger away in

each cheek. The eighth cranial nerve should be checked already when the vibration is checked during the sensory exam. The ninth and tenth cranial nerves should be checked by observing the palate, the palatal movements and touching the back of the throat on either side with a cotton swab. The eleventh cranial nerve is checked by resistance of the patient to attempts to turn his deviated head from right to left, and left to right. At this point, the strength of anterior flexion and extension of the neck should be checked. Finally shoulder shrugging should be checked.

This entire scheme of the neurological exam should not take more than five to seven minutes in a healthy, normal adult..

HEADACHE: FACTORS THAT CAUSE CONCERN

Clues to headaches which are life threatening and which cause concern come from the history, the physical examination and the diagnostic tests which are ordered. Four key factors distinguishing physiological (primary) from secondary (organic) headache are:

1. Abruptness on onset.
2. Progression of the headache pattern.
3. The presence of abnormal neurological or physical findings.
4. The nature of the provoking and alleviating factors.

DANGER SIGNS in Headache

A list of "danger signs" in headache pain patients that suggest the need for immediate attention are

1. Headache is a new symptom for the individual in the past three months, or the nature of the headache has changed markedly in the past three months.
2. The presence of any sensory or motor deficits preceding or accompanying the headache other than the typical visual prodromata of migraine with aura. Examples include hands or feet, aphasia or slurred speech.
3. Headache is one-sided and has always been on the same side of the head.
4. Headache is due to trauma, especially if it follows a period of unconsciousness

(even if only momentary).

5. Headache is constant and unremitting.
6. For a patient reporting tension type headache-like symptoms:
 - A. Pain intensity has been steadily increasing over a period of weeks to months with little or no relief.
 - B. Headache is worse in the morning and becomes less severe during the day.
 - C. Headache is accompanied by vomiting.
7. Patient has been treated for any kind of cancer and now has a complaint of headache (to this may be added any patient who is immunosuppressed).
8. Patient or significant other reports a noticeable change in personality or behavior, or a notable decrease in memory or other intellectual functioning.
9. The patient is over 60 years of age, and the headache is a relatively new complaint.
10. Pain onset is sudden and occurs during conditions of exertion (such as lifting objects, sexual intercourse or "heated" interpersonal situation).
11. Patient's family has a history of cerebral aneurysm, other vascular anomalies or polycystic kidneys.

DIAGNOSTIC TESTING IN A PATIENT WITH HEADACHE

Laboratory Testing : Complete Blood count ,ESR,Blood Sugar,Renal Functions,Thyroid functions

Radiographic testing: Plain Skull Radiograph

CT Head

MRI Head/Cervical spine

EEG and Somatosensory Evoked Potential testing

Arteriography/DSA

MANAGEMENT OF HEADACHES

Primary headaches (migraine, tension type headache, cluster headache, chronic daily headache) can be very debilitating for the individual sufferer. Unfortunately there is no “magic bullet” to treat these conditions and as a pain clinician it will be a challenging task to provide optimal relief to the sufferer. While a cure for headaches is not currently possible, adequate control can be achieved for the majority of sufferers. The management strategies are primarily pharmacological although few patients do require non-pharmacological therapies including interventional management. Overuse of drugs should be avoided and analgesic intake should be restricted.

Migraine:

Clinical presentation:

Episodic attacks characterized by pulsating and throbbing headache in association with nausea, photophobia and phonophobia.

Treatment of Acute attacks:

Acute attack of Migraine is generally aborted by drugs such as aspirin, paracetamol (650mg) NSAID's such as oral or parenteral diclofenac 75 mg, opioids such as tramadol 50-100mg IM or butorphanol 1-2mg IM. Specific antimigraine drugs such as ergotamine, dilydroergotamine and the triptans are also effective in aborting the acute attack. Anti-emetics such as Metoclopramide may also be useful. All the oral triptans appear to be equally effective. Sumatriptan by nasal spray or in subcutaneous injection may be faster acting. DHE appears to be less effective. Tramadol while frequently used is not particularly effective. Combinations such as acetaminophen, aspirin, and caffeine may be useful in mild cases. Opiate analgesics including nasal Butorphanol, appear to be more effective than oral opiates. Corticosteroids IV, plus anti-emetics are reasonably effective

Doses

- 1) Dihydroergotamine (DHE) 1 mg I/M to be repeated after every 1 hour (maximum upto 3 mg) Nasal spray of DHE Maximum upto 2 mg.
- 2) Triptans: Drugs of choice due to their safety profile.
Sumatripan is available as injection , tablets and nasal sprays (50-100 mg orally)
zolmitriptan nasal spray (2.5-5 mg).

Preventive treatment of Migraine:

Prophylactic drugs are indicated when patients have three or more severe migraine attacks a month and symptomatic medication use alone is not satisfactory. Preventive treatment is taken on daily basis, whether or not the patient is having a migraine attack. The response to preventive treatment is unpredictable. Non pharmacological treatments such as Acupuncture, relaxation training and bio feedback have also been found to be effective in select group of patients with migraine. The 6 main classes of drugs that may be used as prophylactics are as shown in table 3.

Tension Type Headache:

It is characterized by pain that is mild to moderate in severity, bilateral in distribution, pressing or tightening in quality and not accompanied with any neurological signs. There is an evidence of sustained contraction of pericranial muscles in majority of patients with tension type headaches. Treatment strategies are aimed at treating an acute episode as well as for the prophylaxis of chronic headache (Table 4)

Cluster Headache

Cluster headache is a well defined neurovascular entity occurring in both episodic and chronic varieties. The attacks are extremely intense and of short duration, occur unilaterally

and are accompanied by signs of autonomic dysfunction.

The medical treatment includes both acute therapy and prophylactic therapy (Table 5)

Chronic daily headache

Many of these patients are rebound type patients. When treated with Amitriptyline there is a 30% improvement, but the with the withdrawal of analgesics, 72% improvement. When not treated with Amitriptyline and analgesics were continued there was an 18% improvement with analgesics withdrawn at 43% improvement.

Table 3

**Comparison of effect, adverse events and contraindications for different classes
Of drugs used in the preventive treatment of migraine**

Class/Substance	Adverse events
<i>Beta-Adrenoceptor Antagonists</i>	
Propranolol: 80-160 mg per day	Bradycardia
Metoprolol: 100-200 mg per day	Hypotension
Atenolol: 50-100 mg per day	Sleep disturbance
<i>Calcium Channel Antagonists</i>	
Flunarizine: 5-10 mg per day	Sedation
	Weight gain
	Bradycardia

5-HT₂ Antagonists

Cyproheptadine: 4 mg tablet x 2-4 per day

Methysergide: 1-2 mg x 1-3 per day

Nausea
Sleep disturbance
Peripheral
Vasoconstriction

Anti-Epileptics

Sodium valproate: 300- 600 mg x 1-3 per day

Nausea, vomiting
Tremor
Weight gain/loss
Hepatotoxicity
Thrombocytopenia

Divalproex Sodium

Tricyclics

Amitriptyline: 10-100 mg per day (bedtime)

Sedation
Dry mouth
Constipation
Urinary retention
Postural hypotension

NSAIDs

Naproxen: 250-500 mg x 1-2 per day

Abdominal pain
Nausea
Headache
Tinnitus

Table 4
Acute and preventive treatment alternatives
In tension-type headache

Attack Treatment: First line Alternatives

Analgesics

Aspirin: Effervescent tablet 500-1000 mg x 1-4

Acetaminophen: Effervescent tablet/supp. 500-1000 mg x 1-4

NSAIDs

Naproxen: Tablet/supp. 250-750 mg x 1-2

Diclofenac-K: Tablet/supp. 50-100 mg x 1-2

Ibuprofen: Tablet 400-800 x 1-2

Combinations

Acetaminophen + Codeine: Tablet/supp. 500-1000 mg + 30-60 mg x 1-4

Aspirin + Caffeine: Tablet 500-1000 mg + 50-100 mg x 1-4

Preventive therapy: First-line Alternative

Amitriptyline: Tablet 10-75 mg x 1

Table 5

Attack and preventive treatment alternatives in cluster headache

Attack Treatment

I. First-line alternatives

Sumatriptan: Injection 6 mg

Oxygen (100% O₂) inhalation through a facemask, 6-8 L/min for 10-15 min

II. Second-line alternatives (optional for convenience but less effective)

Sumatriptan: Nasal spray 20 mg x 1-3 alt.

Zolmitriptan: Tablet 5-10 mg x 1-3; or Nasal spray 5 mg x 1-3 alt.

Lidocaine: Spray 10 mg/dose alt.

Ergotamine: Tablet 1-2 mg x 1-2

(Ipsilateral application of nasal spray!)

Preventive Therapy

I. First-line alternative

Verapamil: Tablet 360-720 mg per day

Short-term prophylaxis

Prednisolone: Tablet 45-60 (-80) mg per day during 3 days, gradually tapered by 10-20 mg per week.

Ergotamine: Tablet 3-4 mg/day

Long-term prophylaxis

Lithium sulfate: Tablet 42 mg x 2-3

Lithium carbonate: Tablet 800-900 mg per day

(Therapeutic plasma concentration 0.3-0.8 mmol/L)

II. Second-line alternatives (optional)

Methysergide: Tablet 3-6 mg per day alt..

Sodium valproate: Tablet 500-1500 mg per day alt.

Melatonin: Tablet 6-12 mg at bedtime.

Botulinum Toxin in Headaches :

Recently, Botulinum Toxin has been under intensive clinical investigation for the treatment of migraine and other types of headaches. Pain relief conferred by Botulinum toxin is probably due to actions beyond those on neuromuscular transmission, which may help to explain its effectiveness in headache.

Dose : 25-30 Units of Botulinum Toxin are injected at multiple fixed symmetrical pericranial sites (frontalis, temporalis, corrugator and procerus muscles) (Fig). The headache severity, headache frequency and acute medication usage is significantly reduced within 2 weeks of injecting the toxin. Botulinum toxin has an extremely favourable toxicity and safety profile.

Table: Selection of patients for Botulinum Toxin Type A Therapy for Headache

- Patients with disabling primary headaches
 - Patients who have failed to respond adequately to conventional treatments
 - Patients with unacceptable side effects (from existing treatment)
 - Patients in whom standard preventive treatments are contraindicated
 - Patients in special populations or situations (the elderly, those at risk of unacceptable side effects from trial drugs or traditional treatments, airplane pilots, students studying and preparing for examinations)
 - Patients misusing or abusing or overusing medications
 - Patients with coexistent jaw, head or neck muscle spasm
 - Patients with disabling primary headaches
 - Patients who have failed to respond adequately to conventional treatments
-