



HEADACHE: CLINICAL SYNDROMES, PATHOPHYSIOLOGY AND MANAGEMENT

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After this session, participants will be able to identify and treat various non-migraine headache syndromes, including:

- ❖ Medication Overuse
- ❖ Cluster
- ❖ Tension
- ❖ Ominous (PTC, Meningitis. SAH)

CLINICAL HEADACHE SYNDROMES

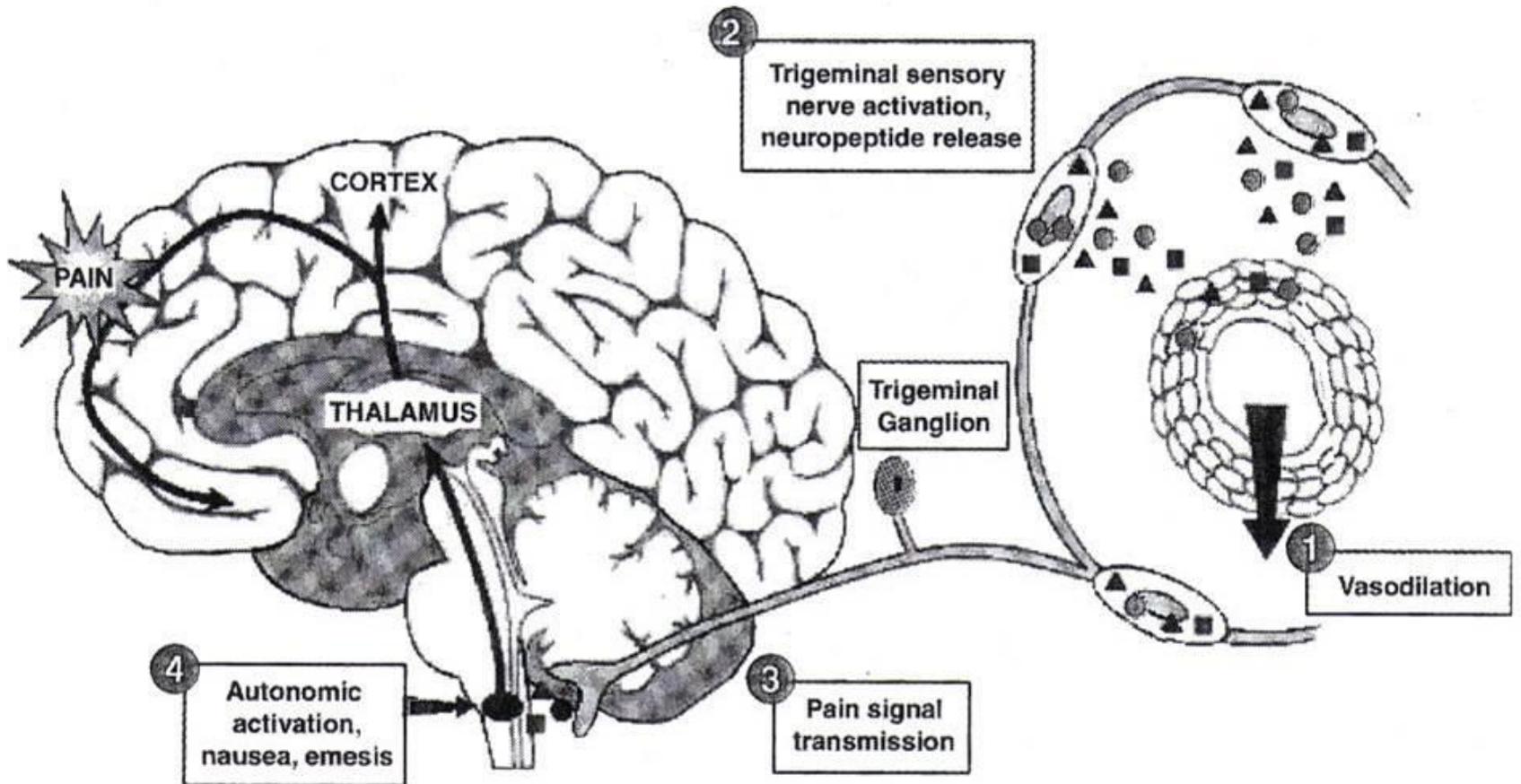
1. Migraine Headache
2. Cluster Headache
3. Tension-type Headache
4. Benign Intracranial Hypertension
5. Trigeminal Neuralgia
6. Cranial Arteritis
7. Subarachnoid Hemorrhage

MIGRAINE PATHOPHYSIOLOGY

Migraine Aura

- ❖ Spreading depression in the cortex
- ❖ Release of Potassium
- ❖ Release of glutamate

The Trigeminovascular Theory



MIGRAINE PATHOPHYSIOLOGY

- ❖ Pain Syndrome
- ❖ Trigeminal nucleus activated
- ❖ Calcitonin gene – related peptide (CGRP) released by trigeminal nerve
- ❖ CGRP release causes vasodilation
- ❖ Plasma protein extravasation causes sterile inflammation in the dura matter

MIGRAINE HEADACHE

COMMON

1. No aura
2. With nausea, vomiting, photophobia
3. Sleep alleviates symptoms
4. Familial history likely
5. Unilateral, throbbing quality of pain

MIGRAINE HEADACHE

CLASSICAL

1. With visual aura, such as scintillating scotoma or fortification spectra – thought to represent neuronal spreading depression within the occipital lobe
2. The remainder of clinical presentation is the same as with common migraine

MIGRAINE HEADACHE

COMPLICATED

1. Involves significant neurological deficits
2. Recovery may take hours to days or weeks
3. Rarely may represent a stroke
4. Treatment should NOT include ergotamines or “Triptans”

Pharmacological Migraine Treatment

ABORTIVE TREATMENT OF MIGRAINE

- a) 5-HT₁ receptor agonists (“Triptans”) Sumatriptan, Rizatriptan, Zolmitriptan, Naratriptan, Frovatriptan
- b) Ergot alkaloids Dihydroergotamin Ergotamine
- c) Opioid analgesics
- d) Butorphanol Fiorinal/Fioricet

Comparative Clinical end points from selected trials of triptans

Drug	Formulation (mg)	Headache response at 2 hours (%)	Therapeutic gain (%) (Active drug response minus placebo response)	Recurrence rate (%)
Sumatriptan	Subcutaneous 6	77	48	32 - 38
	Nasal Spray 20	64	34	32 - 38
	Oral 50	56 (51-61)	33 (20-36)	32 - 38
Rizatriptan	Oral 10	72 (67-77)	36 (23-40)	30 - 47
Zolmitriptan	Oral 2.5	64 (59-69)	34 (27-41)	30
Naratriptan	Oral 2.5	48 (45-61)	21 (18-24)	17 - 28
Almotriptan	Oral 6.25	56	21	18 - 30
	Oral 12.5	64	29	18 - 30

The Triptans: Stratification by patient needs

Condition	Medications
Regular migraine when rapid onset of action (within 1 hour) is required	Nasal sumatriptan Oral rizatriptan Oral sumatriptan Oral zolmitriptan
Migraine, when efficacy of oral tablets is the main consideration	Rizatriptan
Migraine, when consistency of response is desired	Almotriptan Rizatriptan Sumatriptan Zolmitriptan

The Triptans: Stratification by patient needs

Prolonged migraine

Menstrual

Naratriptan

(Sumatriptan, rizatriptan, and zolmitriptan have also been shown to be effective in menstrual migraine.)

Non-menstrual

Naratriptan

Transformed migraine

Naratriptan

When tolerability is a major consideration

Naratriptan

"Tension-type" headache in migraineurs

Naratriptan

Oral sumatriptan

Pharmacological Migraine Treatment

1. Prophylactic Treatment of Migraine

- a) Beta-adrenergic blockers
- b) Calcium-channel blockers
- c) Tricyclic antidepressants
- d) Anti-epileptic drugs
- e) Nonsteroidal anti-inflammatory drugs
- f) Methysergide

AED Effects on Migraine Prevention

(VPA* and TPM*)

	Valproate			Gabapentin			Topiramate		
	Treatment (n=69)	Placebo (n=36)	<i>P</i>	Treatment (n=99)	Placebo (n=46)	<i>P</i>	Treatment (n=19)	Placebo (n=21)	<i>P</i>
4-week migraine headache frequency	3.5 [†]	5.7 [†]	≤.001	2.7 [‡]	3.3 [‡]	.03	3.31 [†]	3.83 [†]	.002
50% Responder rate	48%	14%	<.001	36%	14%	.02	26.3%	9.5%	NS

*Data from Magnus-Miller et al; Storey et al.^{144,148}

[†]Mean 4-week headache frequency.

[‡]Median 4-week headache frequency.

STATUS MIGRAINOSIS

1. Duration of Migraine is greater than 48 hours.
2. Headache produces sufficient disability of debilitation to make presentation to the hospital warranted.

STATUS MIGRAINOSIS

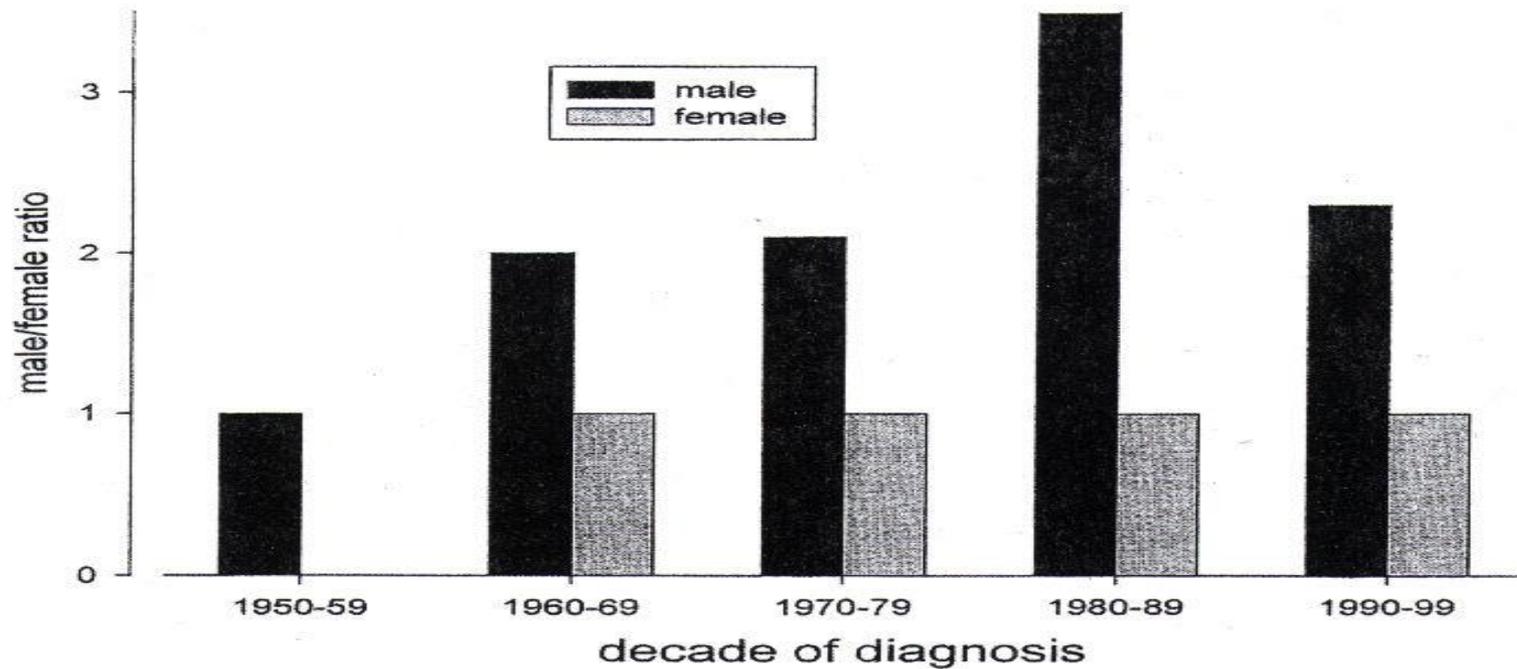
3. Treatment includes rehydration and 3 possible protocols:
 - a. Dihydroergotamine (DHE)
or
 - b. "Triptans"
or
 - c. Corticosteroids

CLUSTER HEADACHE

CLINICAL PRESENTATION

1. Occurs in males greater than females
2. Usually no family history
3. Headaches can occur up to 3 times a day over a several month period

Gender Distribution in Cluster Headache



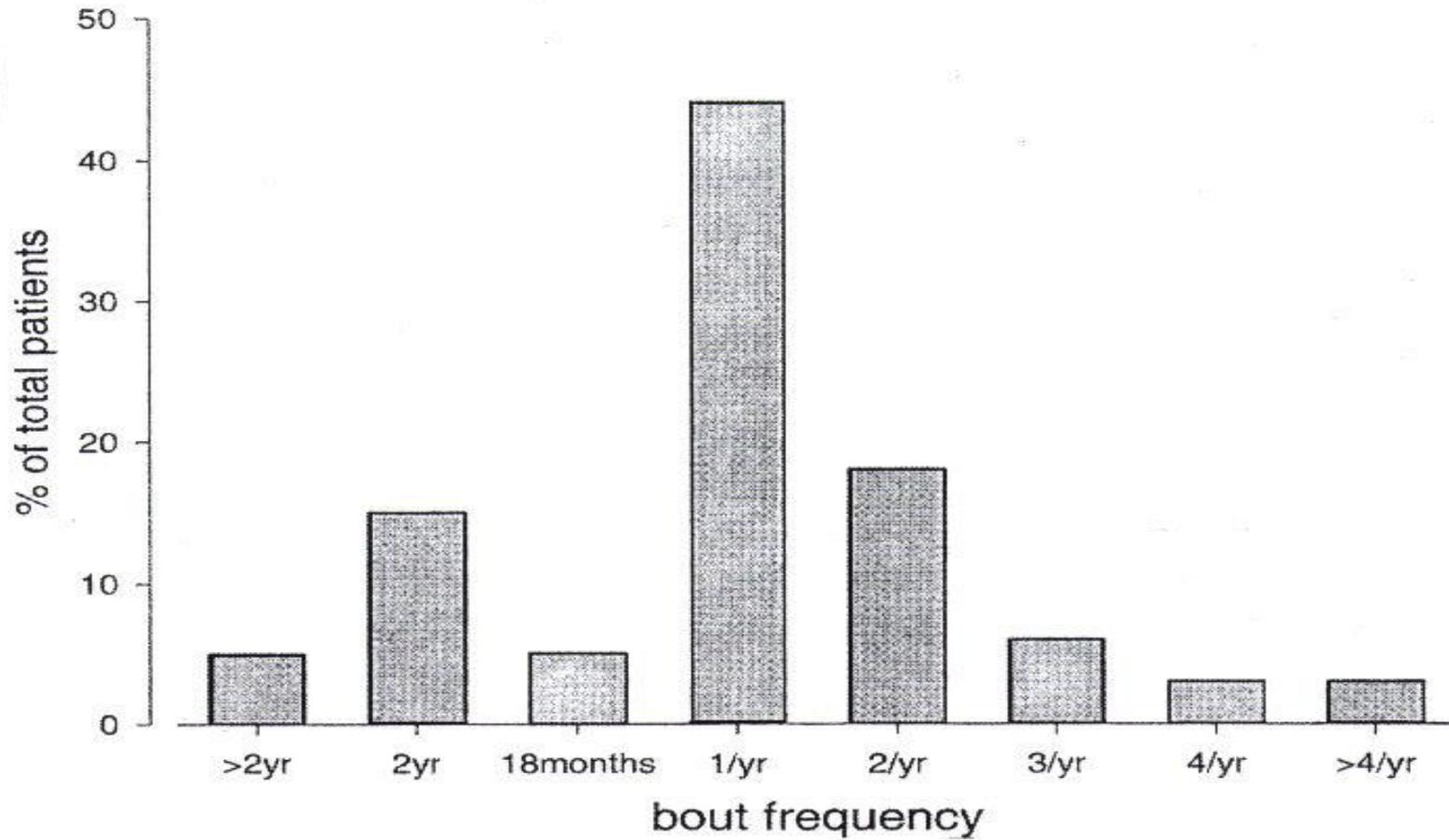
Bar chart showing male-to-female (M:F) prevalence ratio in our patients based on the time of onset of their cluster headache by decade (abscissae). The graph shows a steady ratio that is relatively low.

CLUSTER HEADACHE

CLINICAL PRESENTATION (continued)

4. Pain is abrupt in onset, unilateral and usually remains on the same side of the head from attack to attack
5. Attacks can last for 1-2 hours
6. Ipsilateral eye injected, nostril blocked
7. Partial Horner syndrome can occur

BOUT FREQUENCY



ASSOCIATED FEATURES

Features	Total	Men	Women	ECH	CCH
Nausea	50	47	57	51	46
Vomiting	23	21	29	25	17
Photophobia	56	57	55	58	50
Phonophobia	43	45	37	41	52
Osmophobia	26	25	29	23*	38*
Restlessness or no exacerbation with movement	93	94	92	93	94
Aura	14	13	18	14	15

Values are %.

* Indicates a difference for episodic cluster headache (ECH) vs chronic cluster headache (CCH) $p \leq 0.05$.

CLUSTER HEADACHE

Laterality and autonomic features	Total	Men	Women	ECH	CCH
Laterality					
Right-sided attacks	60	60	62	60	58
Left-sided attacks	38	38	37	37	42
Right and left equally	2	2	1	3	0
Side change within the bout	18	19	15	14*	33*
Side change between bouts	18	18	18	18	—
Side change within and between bouts	3	3	2	3	—
Side change within attack	1	<1	<1	1	0
Autonomic features					
Lacrimation	91	92	88	92	88
Conjunctival injection	77	79	69	71	79
Nasal congestion	75	74	77	74	77
Ptosis/eyelid swelling	74	72	78	73	79
Rhinorrhea	72	74	68	76*	56*

Values are %.

* Indicates a difference for episodic cluster headache (ECH) vs chronic cluster headache (CCH) $p \leq 0.05$.

PHARMACOLOGICAL CLUSTER TREATMENT

1. Preventive Treatment of Cluster Headache
 - a) Verapamil
 - b) Lithium
 - c) Methysergide
 - d) Valproate
 - e) Ergotamine
2. Abortive Treatment of Cluster Headache
 - a) Oxygen
 - b) Ergotamine
 - c) DHE-45
 - d) "Triptans"
 - e) Corticosteroids
 - f) 4% Lidocaine intranasally (ipsilateral to headache)

CHRONIC TENSION HEADACHE

- ❖ Occurs equally in women and men
- ❖ Usually related to musculoskeletal spasm of neck and shoulders
- ❖ Rebound headaches common from excessive symptomatic medications (ie. OTC preparations, opioid use, barbiturate combination therapies)
- ❖ Many patients have “mixed headaches”

TENSION HEADACHE

Location/radiation of pain	Bilateral or holocephalic
Quality, severity of pain	Pressing/bandlike; mild to moderate
Associated signs/symptoms	Slight loss of appetite; pericranial muscle tenderness
Duration	30 minutes to 7 days
Frequency	Intermittent (<15 days per month)
Time pattern	Anytime
Age at onset	Any age
Incidence	2 females to 1 male
Behavior during attack	Variable
Precipitating factors	Stress, depression, anxiety

CHRONIC TENSION HEADACHE

Successful treatment usually includes strong emphasis on non-pharmacologic management

- ❖ Physical therapy for neck
- ❖ Stretching
- ❖ Relaxation techniques
- ❖ Posture correction
- ❖ Heat to neck affected by muscle spasm

CHRONIC TENSION HEADACHE

Pharmacologic management includes:

- ❖ Muscle relaxants
- ❖ Tricyclic anti-depressants
- ❖ Non-steroidal anti-inflammatory medications

PSEUDOTUMOR CEREBRI

(BENIGN INTRACRANIAL HYPERTENSION)

CLINICAL PRESENTATION

1. Women more commonly affected than men
2. Generalized headache
3. Pressure-related CN VI palsy
4. Papilledema
5. Visual field deficits with enlarged blind spots

PSEUDOTUMOR CEREBRI

RISK FACTORS

1. Addison's disease
2. Pregnancy
3. Hypervitaminosis A
4. Obesity
5. Oral contraceptive use
6. Corticosteroid withdrawal
7. Tetracycline
8. Sulfa
9. Radical Neck Surgery
10. Venous hypertension (e.g. COPD, CHF)

PSEUDOTUMOR CEREBRI

MEDICAL TREATMENT

1. Acetazolamide
2. Low-dose corticosteroids

PSEUDOTUMOR CEREBRI

SURGICAL TREATMENTS

1. Frequent lumbar punctures
2. Lumbar drains
3. Optic nerve sheath fenestration

TRIGEMINAL NEURALGIA

(Tic Douloureux)

CLINICAL PRESENTATION

1. Paroxysmal pain in distribution of CNV
2. Pain often triggered by trivial sensory stimulus (light touch, wind)
3. Each attack is short-lived (seconds) but tends to occur repetitively, with lingering facial pain

ETIOLOGY OF TRIGEMINAL NEURALGIA

1. Primary Trigeminal Neuralgia
 - a) Idiopathic
2. Secondary Trigeminal Neuralgia
 - a) CP angle tumor
 - b) Meningioma (compressing Gasserian ganglia)
 - c) Cancer Infiltration of skull base
3. Bilateral Trigeminal Neuralgia
 - a) Multiple Sclerosis

TRIGEMINAL NEURALGIA

MEDICAL TREATMENT

1. Carbamazepine
2. Phenytoin
3. Clonazepam
4. Baclofen

TRIGEMINAL NEURALGIA

SURGICAL TREATMENT

Stereotactically controlled thermocoagulation of the trigeminal roots

CRANIAL ARTERITIS

“Temporal Arteritis”

CLINICAL PRESENTATION

1. Painful inflammation of the cranial arteries and general systemic symptoms.
2. Major vessels of the aorta, coronaries and limb arteries can be involved (periarteritis nodosa)
3. Headache not seen in all patients with cranial arteritis
4. Hyperalgesia of scalp
5. Frequently patients may suffer pain on mastication, pain in the ear, zygoma, nuchal regions and occiput

CRANIAL ARTERITIS

“Temporal Arteritis”

VISUAL COMPLICATION

1. Ocular symptoms may be the presenting complaint
2. More than one-third of patients are threatened with partial or complete loss of vision

SUBARACHNOID HEMORRHAGE

NATURAL HISTORY

1. 5-10% of all strokes
2. Leading cause of SAH is due to rupture of saccular aneurysm
3. The 30-day mortality of SAH is nearly 50%

SUBARACHNOID HEMORRHAGE

The most common sites are:

1. Anterior communicating artery
2. Posterior communicating artery and
3. Major bifurcation of middle cerebral artery
4. And, bifurcation of the ICA into MCA and ACA

DIAGNOSIS

1. 25% of cases of SAH are initially misdiagnosed
2. Laboratory tests
3. EKG abnormalities after SAH
4. Head CT 5-10% of patients with SAH will have normal scans
5. CSF Studies (especially when CT nl.)
6. Cerebral arteriography essentially after diagnosis made

MANAGEMENT OF SUBARACHNOID HEMORRHAGE

1. Intensive care unit
2. Seizure prophylaxis
3. Risk of cardiac arrhythmias and myocardial ischemia
4. Hypertension
5. Intracranial pressure monitoring
6. Hydrocephalus
7. Prevention of rebleeding



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The mission of **Project ECHO** (Extension for Community Healthcare Outcomes) has been to develop the capacity to safely and effectively treat chronic, common, and complex diseases in rural and underserved areas, and to monitor outcomes of this treatment.

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