Misdiagnosis of migraine

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Migraine as the wolf disguised in sheep's clothing

Robert G. Keniecki, MD

- Under / over diagnosis of migraine

  (1/2 USA) (3 times)

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  Inappropriate tx

  Ineffective tx

Underconsultation, underdiagnosis, undertreatment

Why ?
(factors contribute to misdiagnosis)

- Technique of history taking
- Migraine is not life-threatening disease.

  Non-specialty offices. Poor patient–physician communication
- Concomitant headache types and co-morbidities
- Pitfalls (symptoms lab. Tx)
- Self-awareness

NEUROLOGY 2002;58(Suppl 6):S3–S9

Outline

- Tension-type headache and migraine
- Migrainous headache
- Sinus headache and migraine
- Secondary headache

D/D TTH and migraine

Table 4
Distinguishing characteristics of tension-type headache and migraine

Tension-type headache	Migraine
No aura	Aura present in 15%–30% of patients
Constant pain, pressure, or feeling of tightness	Throbbing or pulsating pain
Pain is often bilateral	Unilateral and sometimes bilateral
Mild to moderate, not disabling pain	Moderate to severe pain that is disabling
Not aggravated by activity	Often aggravated by exertion or activity
Usually not associated with nausea, photophobia, or phonophobia	Often associated with nausea, and in approximately 25% of patients, vomiting may occur. Most migraine patients experience sensitivity to light and/or sound during an attack.

Common headache misdiagnoses
Robert E. Ryan, Prim Care Clin Office Pract
31 (2004) 395–405

Symptoms

- Many migraine attacks are accompanied by tension-headache-like symptoms, such as neck pain.
- Tension-type headaches are accompanied by migraine-like symptoms, such as photophobia or phonophobia and aggravation by activity.

Migraine and tension-type headache
An assessment of challenges in diagnosis
Robert G. KanieckiNEUROLOGY 2002;58(Suppl 6):S15–S20

Precipitatants

- **Clinical-based study**:

  Stress/tension, fatigue, lack of sleep, skipping meal
  (migraine = TTH)

  smoke, smell, light, menstruation, and weather
  (migraine > TTH)

- **Scharff et al study**:

  Stress, alcohol, weather changes, and menstruation
  (migraine = TTH)

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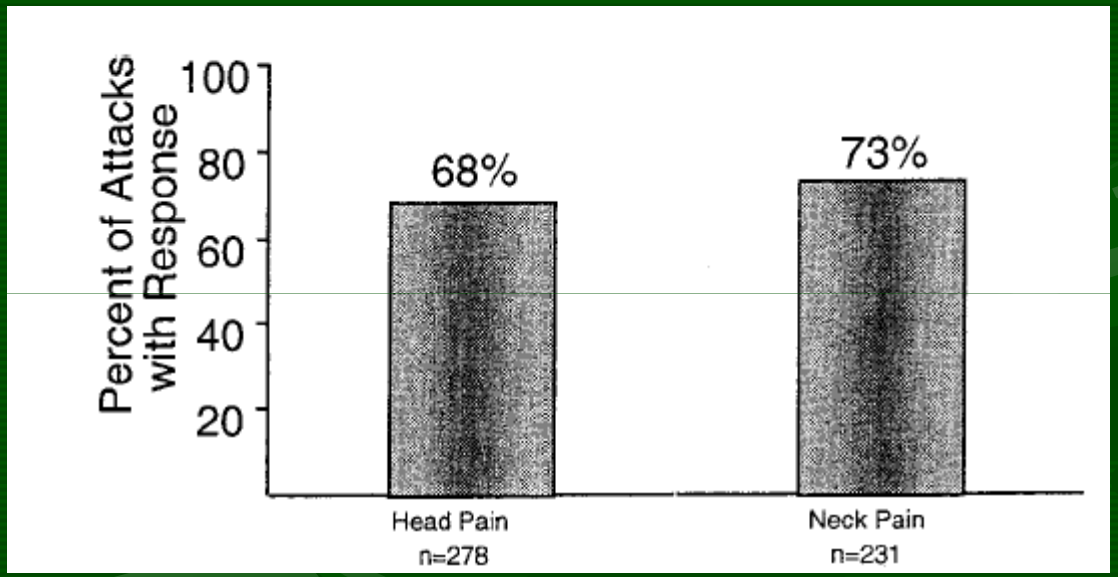
Pharmacologic response

head pain or neck pain responded after treatment of IHS-diagnosed migraineurs with a 5HT1B/1D agonist



Both headache types may respond to 5-HT1B/1D agonists (triptans)

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A common pathophysiology? (Migraine / TTH)

- The trigeminocervical nucleus, a region of the spinal cord in which descending sensory nerve fibers of the trigeminal nerve are co-localized with sensory fibers from the upper cervical roots
- Overlapping pathophysiology of migraine & TTH
- Referral of neck pain to areas of the face, this convergence of trigeminal and cervical fibers provides a substrate for cervically initiated

  neurogenic inflammation

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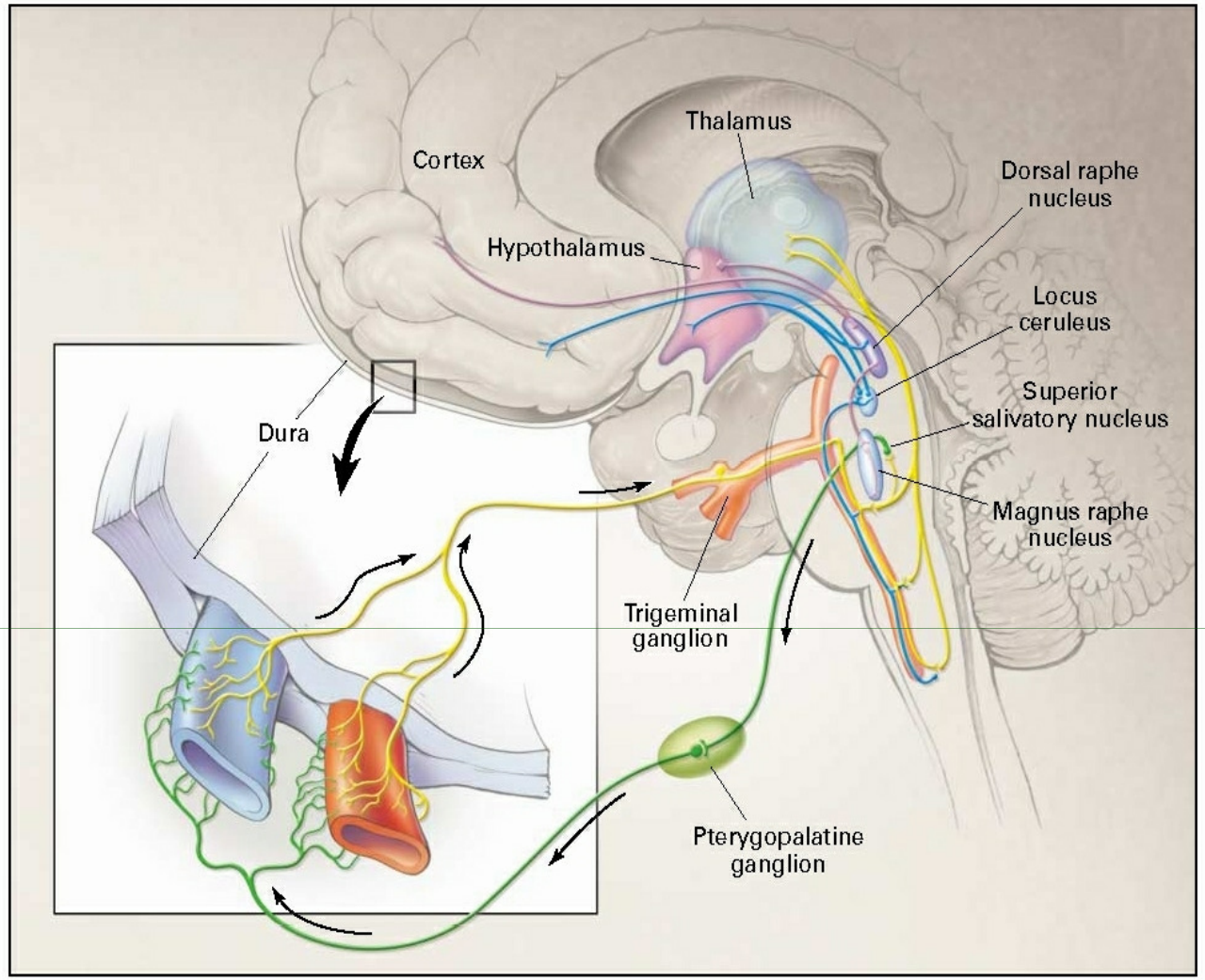

Figure 1. Pathophysiology of Migraine.

Migraine involves dysfunction of brain-stem pathways that normally modulate sensory input. The key pathways for the pain are the trigeminovascular input from the meningeal vessels, which passes through the trigeminal ganglion and synapses on second-order neurons in the trigeminocervical complex. These neurons, in turn, project through the quintothalamic tract, and after decussating in the brain stem, form synapses with neurons in the thalamus. There is a reflex connection between neurons in the pons in the superior salivatory nucleus, which results in a cranial parasympathetic outflow that is mediated through the pterygopalatine, otic, and carotid ganglia. This trigeminal–autonomic reflex is present in normal persons[34] and is expressed most strongly in patients with trigeminal–autonomic cephalgias, such as cluster headache and paroxysmal hemicrania; it may be active in migraine. Brain imaging studies suggest that important modulation of the trigeminovascular nociceptive input comes from the dorsal raphe nucleus, locus ceruleus, and nucleus raphe magnus.

TTH/migraine

One of the most distinguishing features between tension-type headache and migraine, however, is the severity of disability

(Lipton et al reported a study involving 432 subjects, 90% with disabling headache from a migraine-related disorder)

- distinct entities
- extremes of a continuum.

Migraine and tension-type headache
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What is migrainous headache?

- which is defined as a headache that meets several of the diagnostic criteria for migraine, but not all of them

- **Migraine**

1. heterogeneous
2. individuals and within individuals
3. from attack to attack.

(spectrum of headache presentation)

- **Migraineurs may experience**

1. including full-blown migraine with /without aura
2. migrainous headache
3. episodic tension-type headaches (ETTH)

- **phenotype/biotype**

Diagnostic lessons from the
Spectrum Study R.B. Lipton, MD
NEUROLOGY 2002;58(Suppl 6):S27⇋31

Sinus headache

Table 2
Classification of acute sinus headache [2,24]

A. Purulent discharge in the nasal passage either spontaneous or with suction
B. Pathologic findings with one or more of the following tests:
    1. Radiograph
    2. CT or MRI imaging
    3. Transillumination
C. Simultaneous onset of headache and sinusitis
D. Headache locations:
    1. Acute frontal sinusitis headache: pain directly over the sinus and may radiate to the vertex or behind the eyes
    2. Acute maxillary sinusitis headache: pain over the antral area and may radiate to the upper teeth or the forehead (pain often located in the cheek, gums, and teeth of upper jaw)
    3. Acute ethmoiditis headache: pain between the eyes and may radiate to the temporal area
    4. Acute sphenoiditis headache: pain in the occipital area, the vertex, the frontal region, or behind the eyes (only observed in approximately 3% of sinusitis cases)
E. Headache disappears following treatment of acute sinusitis

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Sinus headache

A simple definition includes:

- continuous headache associated with purulent discharge (except with sphenoid sinusitis, in which purulent discharge is not apparent)
- abnormal imaging findings
- simultaneous onset of pain and sinusitis

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D/D migraine and sinus headache

Table 3
Migraine and sinus headache distinguishing clinical characteristics

Migraine	Sinus
Acute recurrent episodic pain lasting 4–72 hours, throbbing in nature	Ongoing or continuous pain, which may not be throbbing
Responds to migraine-specific medications and analgesics	May not respond to acute migraine medications; responds poorly to opioids; may require antibiotics, treatment for reduction of ostial swelling, sinus draining, and maintenance of sinus ostia patency.
May be associated with rhinitis, which often is clear	May be associated with purulent discharge and rhinitis
Not associated with fever	May be associated with fever

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Diagnostic confusion of migraine/sinus headache

1. both can occur moderate or severe pain, intensity and exacerbation by activity
2. both also experience nasal symptoms including stuffiness and runny nose

Sinus headache or migraine? Roger K. Cady, MD; and Curtis P. Schreiber, MD
NEUROLOGY 2002;58(Suppl 6):S10–S14

Case 1: acute sinus headache in a patient with history of migraine

SR is a 24-year-old graduate student who has a history of migraine headaches. She usually has one approximately every 6 weeks and usually uses zolmitriptan 5 mg, which is effective. SR also has a history of allergic rhinitis that is treated with oral antihistamines. She now presents with a severe headache that has been present for 4 days and has not responded to the zolmitriptan like it normally does. She also has associated symptoms of decreased appetite, light sensitivity, nasal congestion, sore throat, and general malaise. She suggests that an allergy flare-up the previous week appeared to trigger this attack. She went to the emergency department where she was treated with meperidine, which provided partial temporary relief. Physical examination showed her temperature to be 99.4° F. She had slight bilateral conjunctival injection. Nasal examination showed an inflamed nasal mucosa with thick, whitish to yellow secretions. Coronal-view CT scan of the sinuses showed an air–fluid level in the right frontal sinus.

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Diagnosis: Acute sinus headache. SR also has coexisting migraine.

Teaching point: Although migraine was considered to be the initial diagnosis at the onset of the headache, this specific headache meets the IHS criteria for acute sinus headache: SR was mildly febrile, had purulent secretions in her nasal mucosa, and had an air–fluid level present on her sinus CT scan. This specific headache therefore is acute sinus headache and should be treated with appropriate antibiotics and decongestants.

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Case 2:

ST is a 28-year-old school teacher whose headaches began at age 13 years. She has 3–5 attacks per month. Pain is localized to the right or left frontal/maxillary region. She also has nasal congestion, conjunctival injection, and nausea with her headache attacks. The pain is throbbing and moderate or severe in intensity. She frequently has to go to bed during a headache attack. The headaches can be triggered by weather changes, alcohol, and foods (red wine, caffeine). Previous treatments included allergy shots, nasal steroids, and large doses of OTC analgesics. She had an MRI done that showed her to have mild mucosal thickening in both maxillary sinuses. An ENT consultant recommended sinus surgery to "clean out the sinuses." Examination showed her to be normotensive and afebrile. Her nasal examination was normal. Her neurologic examination was also normal.

Common headache misdiagnoses
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Diagnosis: Migraine without aura.

Teaching point: The symptoms consistent with migraine are one-sided pain, moderate to severe throbbing pain associated with nausea and often requiring bed rest. Nasal and ocular symptoms can occur in 45% of migraine patients [18]. Smith et al have shown many migraine patients associate their headaches with weather changes or erroneously believe their headaches to be sinus related [19].

Common headache misdiagnoses
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Possible mechanism of "sinus" symptoms in migraine.

- **Neurogenic switching** : Insult -- neural plexus (the cavernous sinus, consists of trigeminal, parasympathetic, and sympathetic fibers) --migraine/nasal symptoms (Megg's hypothesis)
- **Immunogenic switching**: allergens -- immune cascade -- histamine. Similar migraine mechanical or chemical stimulation, subs. P/ inflammatory peptides.
- **Crossover interaction**

  (migraine/allergy comorbid)

Sinus headache or migraine? Roger K. Cady, MD; and Curtis P. Schreiber, MD NEUROLOGY 2002;58(Suppl 6):S10–S14

Optimal treatments for sinus headache
differ from those for migraine headache

The antihistamines and intranasal corticosteroids for the sinus sufferers migraine --helped associated sinus and nasal symptoms -- not helpful for the headache itself.

Sinus headache or migraine? Roger K. Cady, MD; and Curtis P. Schreiber, MD
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What is the most common cause of secondary headache?

Common headache misdiagnoses
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Table 1
Critical headache diagnoses for the EP

Diagnosis	Critical Clinical Features	Critical Diagnostic Tests	Critical Interventions	Comments
SAH	Sudden onset Maximal at onset Different than previous headaches	CT head LP	Neurosurgical consultation Blood pressure control Nimodipine Ventriculostomy	CT head and other neuroimaging modalities are insufficient to rule out the diagnosis
Occult trauma	Signs of abuse or neglect Anticoagulation or coagulopathy	CT head	Neurosurgical consultation Admission	Patients in at-risk populations may not volunteer a history of trauma
Bacterial meningitis	Fever Meningeal irritation Immune compromise Head and neck infection or instrumentation	CT head LP	Antibiotics Corticosteroids Isolation	Treatment should be initiated before diagnostic confirmation by CSF analysis if clinical suspicion is high. Corticosteroids should be initiated before or with the first dose of antibiotics in clinically apparent cases
TA	Jaw claudication Superficial temporal artery tenderness or nodularity Visual symptoms	Temporal artery biopsy	Systemic corticosteroids	ESR is an adequately sensitive screening test in patients without these high-risk features. Empirical corticosteroids are indicated in patients with high-risk features and findings or a markedly increased ESR
CO toxicity	Symptomatic cohabitants Flulike illness that is worse each morning Potentially toxic environment (eg, home furnace in winter)	Arterial cooximetry	HBOT	HBOT is indicated for patients with neurologic and cardiovascular signs and above certain cutoff levels
Acute glaucoma	Red eye Midrange fixed pupil Cloudy cornea	Intraocular pressure	Topical ocular therapy Systemic osmotic agents Ophthalmologic consultation	A cursory examination before neuroimaging should prevent costly delays in consultation and therapy

Cervical artery dissection	SAH-like onset Facial (carotid), neck (vertebral) pain Cranial nerve abnormalities	Angiography	Neurologic/ neurosurgical consultation Anticoagulation	In the absence of brain hemorrhage, anticoagulation is initiated to reduce the risk of thrombus formation and embolization
Cerebral/dural VST	Hypercoagulable state (pregnancy and puerperum, oral contraceptives, malignancy) Head and neck infection Proptosis (cavernous sinus thrombosis)	MR head Venography	Neurosurgical consultation Systemic anticoagulation	A D-dimer may be falsely negative
Space-occupying lesion	Progressively worse over time New onset in patient >50 years old History of malignancy Worse in morning Worse in head-down position	CT head	Neurosurgical consultation ICP-lowering therapies Lesion-specific therapies	Emergent ICP-lowering therapies may include elevating the head of the bed, restriction of intravenous fluids, mannitol, and hyperventilation Lesion-specific therapies may include emergent surgery/ neuroradiological procedures, corticosteroids, and antimicrobial agents
Cerebellar infarction	Headache with dizziness Cerebellar signs Cranial nerve abnormalities	CT head	Neurologic/ neurosurgical consultation	Although CT head is insensitive for infarction, it is helpful initially to rule out hemorrhage and identify life-threatening edema and mass effect
Idiopathic intracranial hypertension	Obese, young female patient Cranial nerve 6 palsy (false localizing sign)	LP	CSF drainage Neurologic referral	After negative neuroimaging, an LP will reveal a markedly increased opening pressure and provide temporary headache relief
Pituitary apoplexy	Thunderclap headache Vomiting Visual acuity, field deficits Ocular palsies	CT head MR head	Neurosurgical consultation	Many pituitary infarctions and hemorrhages will not be easily visible on CT. MR is considered the diagnostic modality of choice
Preeclampsia	Postpartum (up to 4 weeks)	Complete blood count Chemistry panel with Liver function tests Coagulation studies	Intravenous magnesium Obstetric consultation	Up to half of all patients present in the postpartum period, the majority with a chief complaint of headache

Abbreviations: CSF, cerebrospinal fluid; CT, computed tomography; ESR, erythrocyte sedimentation rate; HBOT, hyperbaric oxygen therapy; ICP, intracranial pressure; LP, lumbar puncture; MR, magnetic resonance; TA, temporal arteritis; VST, venous sinus thrombosis.

Pitfalls in the Management of Headache in the Emergency Department
Stuart P. Swadron, MD, FRCP(C), FAAEM, FACEP Emerg Med Clin N Am 28 (2010) 127–147

PITFALLS

- Dangerous primary headache diagnoses—hemiplegic migraine, thunderclap HA mimic secondary HA such as stroke and SAH
- Occult trauma---children, the elderly
- Pituitary apoplexy —thunderclap headache, decreased acuity, reduction in visual fields, and ocular palsies.

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- Bacterial meningitis can present — initially resemble URI, often absence of Kernig and Brudzinski signs.
- CO poisoning: headache that is associated with a flulike illness.
- TA : include bitemporal pain and jaw claudication, visual field deficits, temporal tenderness.
- Carotid and vertebral artery dissections : mimic SAH, may be precipitated by seemingly minor trauma

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- Postpartum preeclampsia— the onset of headache with new features at any time up to 4 weeks following delivery.
- Acute angle-closure glaucoma---rule out SAH or meningitis.
- Cerebral and dural VST---D-dimer is also falsely negative
- Idiopathic intracranial hypertension (IIH), (pseudotumor cerebri.)--increased opening pressure during lumbar puncture (LP) that is accompanied by an immediate improvement in the patient's symptoms

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Laboratory Pitfalls

- LP was required after a negative CT scan to make the diagnosis of SAH
- CT is insensitive to detect VST.
- Cerebellar infarction, like cerebral infarction, may not become apparent on CT scan for several hours
- Pituitary apoplexy, by contrast, is frequently not visualized on CT

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- CO cooximetry values may be misleading. Low or undetectable levels may not rule out CO poisoning in the patient who presents many hours after exposure
- TA—the diagnostic evaluation should not end with a normal, or only mildly increased, ESR. definite diagnostic determination is made with temporal artery biopsy.
- D-dimer, Cerebral and dural VST--D-dimer is also falsely negative

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PITFALLS OF TREATMENT

Poor Analgesic Agent Choices

- Treatment Response - positive response to analgesics and antimigraine therapy has been reported for carotid artery dissection, carbon monoxide (CO) exposure, brain tumor, SAH, meningitis, and venous sinus thrombosis (VST).
- dopamine antagonists used alone or in combination- high effective in any given patient.

1. The dopamine antagonists are notable for prolonging the QT interval on the ECG
2. The other complication is akathisia

Epidemiology

1. 在急診，頭痛是第5常見的主訴，佔病人中 2%

   Self-awareness of migraine Richard B. Lipton, MDNEUROLOGY 2002;58(Suppl 6):S2-26

2. In a population ，54%不知自己是migraine

   Common headache misdiagnoses Robert E. Ryan, Prim Care Clin Office Pract 31 (2004) 395–405

3. 只有約 1/2Migraine病人會去看醫生

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4. 臨床醫師門診，平均頭痛佔1% ，其中90%是primary headache

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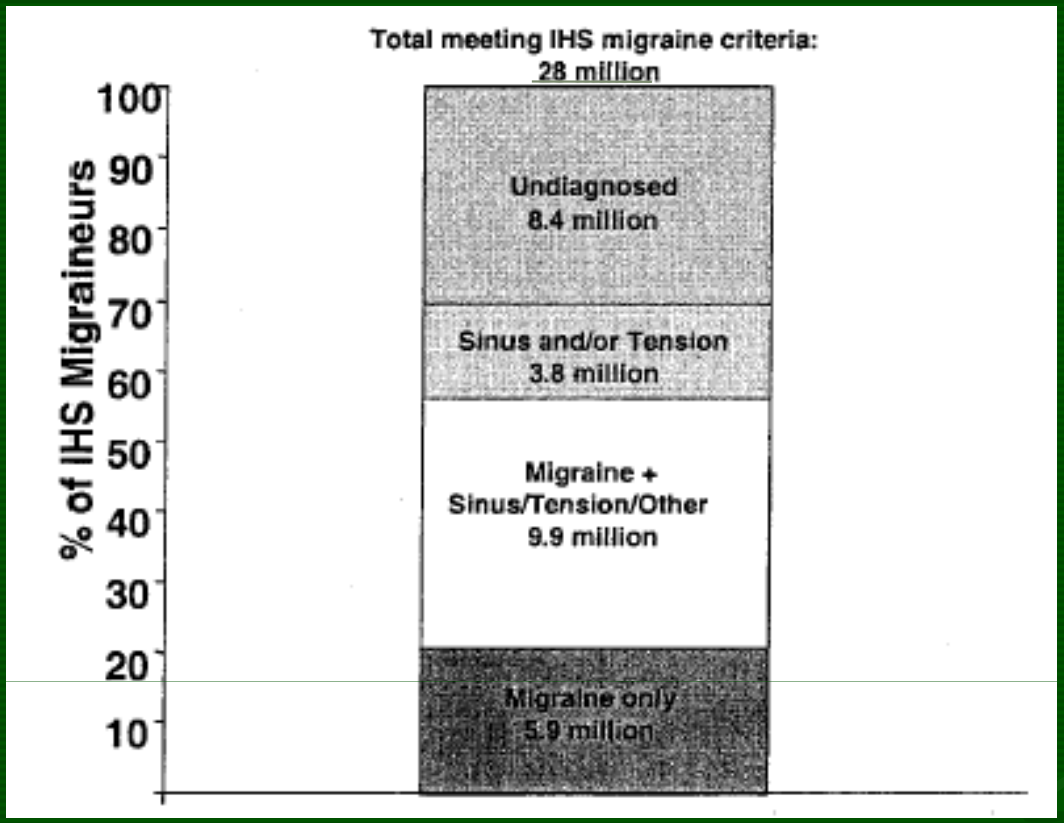
5. 大於1/2 migraineurs ，從未接受到migraine的診斷

   Self-awareness of migraine Richard B. Lipton, MDNEUROLOGY 2002;58(Suppl 6):S21–S26



- 8.4 million(30%) had not received a specific diagnosis,
  3.8million (14%)received a diagnosis of sinus or TTH
  9.9million(35%) migraine and sinus/ TTH/other headache types
  5.9million(21%)were diagnosed with migraine only.

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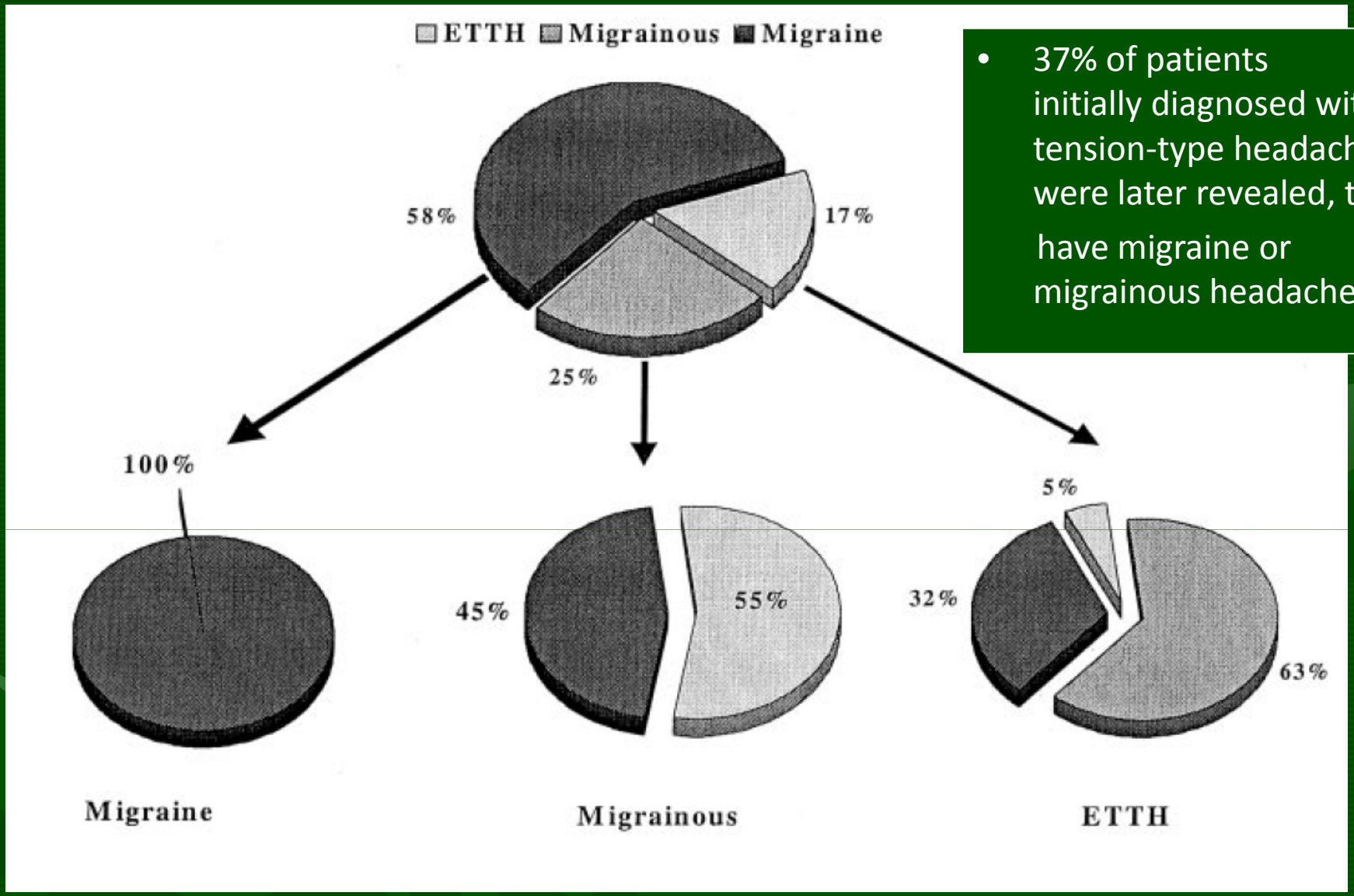

- 37% of patients initially diagnosed with tension-type headache were later revealed, to have migraine or migrainous headache

Figure 1. Initial clinical diagnosis compared with final headache diagnosis based on diary review.

Diagnostic lessons from the Spectrum Study R.B. Lipton, MD NEUROLOGY 2002;58(Suppl 6):S27⇋31

Take home message

- Philosophy: Being the patient—correct diagnosis—appropriate therapy.(disguised in sheep's clothing)
- One of the most distinguishing features between TTH and migraine-- the severity of disability.
- Migrainous headache- meets several of the diagnostic criteria for migraine, but not all of them.
- Sinus headache-- headache associated with purulent discharge, abnormal imaging findings, simultaneous onset of pain and sinusitis, not response only antihistamines and intranasal corticosteroids .
- Pitfalls of headache (table 1).

The End

Thanks for your attention

TTH

Box 1. IHS classification criteria for episodic tension-type headache

A. Patient must have at least 10 previous headache episodes fulfilling diagnostic criteria B–D listed below and classified by number of days with such headache <180 days/year (<15 days per month)
B. Headache lasts from 30 min to 7 days
C. At least two of the following pain characteristics are present:
   1. Pressing/tightening (non-pulsating) quality
   2. Mild or moderate intensity (may inhibit but does not prohibit activities)
   3. Bilateral location
   4. Not aggravated by walking stairs or similar routine physical activity
D. Both of the following are present:
   1. No nausea or vomiting (anorexia may occur)
   2. Photophobia or phonophobia are absent
E. No evidence of temporally related structural or metabolic disease

Common headache misdiagnoses Robert E. Ryan, Prim Care Clin Office Pract 31 (2004) 395–405

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