Rhinogenic Headache

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Introduction

- Otolaryngologists frequently evaluate and treat patients complaining of headache

- it is important to know how to diagnose and treat headaches of sino-nasal origin as well as others

- rhinogenic headache is a specific entity that has received increased attention in the literature over the last 20 years. It is controversial topic that is currently being debated

- very little in textbooks- even those dedicated to rhinology
Objectives

- review diagnostic criteria for common headache syndromes
- define rhinogenic headache
- explain the history and proposed mechanism of rhinogenic headache
- examine the evidence for it
- review the literature against it
- discuss recommendations for practice management
Background:

Different types of Headaches
Migraines

- most common neurological illness in Europe and North America
- Its prevalence is about 12%, with women affected twice as frequently as men
- mechanism: exact mechanism unknown: vascular? neurogenic? Other?
- with a prodromal aura vs without
Migraine without Aura

Description:
- recurrent headache disorder that manifests as attacks
  - attacks: 4-72 hours
  - typical features: unilateral location, pulsating in quality, moderate/severe intensity, made worse by physical activity, associated with light/sound sensitivity
- More common: 80%
**Migraine without Aura**

*Diagnostic criteria:*

A. At least 5 attacks\(^1\) fulfilling criteria B-D
B. Headache attacks lasting 4-72 hours (untreated or unsuccessfully treated)\(^2;3;4\)
C. Headache has at least two of the following characteristics:
   1. unilateral location\(^5;6\)
   2. pulsating quality\(^7\)
   3. moderate or severe pain intensity
   4. aggravation by or causing avoidance of routine physical activity (e.g., walking or climbing stairs)
D. During headache at least one of the following:
   1. nausea and/or vomiting
   2. photophobia and phonophobia\(^8\)
E. Not attributed to another disorder\(^9\)

*The International Classification of Headache Disorders, 2nd edition, (Cephalalgia 2004; 24 suppl 1: 1-160)*
Migraine with Aura

- headache with separate classification
  - aura: focal neurological symptoms that occur before or accompany a migraine
    - gradual onset: 5-20 min period
    - duration: 60 min
    - migraine onset: 60 min after end of aura
  - less common: 20%
Migaine with Aura

A. At least 2 attacks fulfilling criteria B–D
B. Aura consisting of at least 1 of the following, but no motor weakness:
   1. Fully reversible visual symptoms, including positive features (eg, flickering lights, spots, or lines) and/or negative features (eg, loss of vision)
   2. Fully reversible sensory symptoms, including positive features (eg, pins and needles) and/or negative features (eg, numbness)
   3. Fully reversible dysphasic speech disturbance
C. Headache has at least 2 of the following characteristics:
   1. Homonymous visual symptoms and/or unilateral sensory symptoms
   2. At least 1 aura symptom develops gradually over $\geq 5$ min and/or different aura symptoms occur in succession over $\geq 5$ min
   3. Each symptom lasts $\geq 5$ and $\leq 60$ min
D. Headache fulfilling criteria B–D for migraine without aura begins during the aura or follows aura within 60 min
E. Not attributed to another disorder

The International Classification of Headache Disorders, 2nd edition
Tension Headache

- Most common type of headache
- Prevalance: 30-78%

-Mechanism: unknown

-Features:
  - Location: bilateral
  - Infrequent episodes
  - Duration: minutes-days
  - Quality/Intensity: pressure/squeezing and mild/moderate
  - Does NOT get worse with physical activity
  - Can have either light or sound sensitivity but not BOTH
  - Not associated with Nausea
Tension headache

Diagnostic criteria:

A. At least 10 episodes occurring on <1 day per month on average (<12 days per year) and fulfilling criteria B-D
B. Headache lasting from 30 minutes to 7 days
C. Headache has at least two of the following characteristics:
   1. bilateral location
   2. pressing/tightening (non-pulsating) quality
   3. mild or moderate intensity
   4. not aggravated by routine physical activity such as walking or climbing stairs
D. Both of the following:
   1. no nausea or vomiting (anorexia may occur)
   2. no more than one of photophobia or phonophobia
E. Not attributed to another disorder

The International Classification of Headache Disorders, 2nd edition, (Cephalalgia 2004; 24 suppl 1: 1-160)
Cluster Headaches

- acute headache attacks that occur in a series (cluster period)
- cluster periods: weeks-months with remission periods of months-years
  - headache triggers: alcohol, histamine, and nitroglycerin
  - features:
    - pain worst in the orbit, supraorbitally, or temporal area
    - pain occurs on the same side during a cluster period
    - pain tends to be excruciating
    - 3-4 X in men
  - associated with other symptoms:
Cluster Headaches

- associated with ipsilateral other symptoms:

  conjunctival injection, lacrimation, nasal congestion, rhinorrhea, forehead and facial sweating, miosis, ptosis, eyelid edema

-mechanism: activation of the posterior hypothalamic gray matter
Cluster headaches

Diagnostic criteria:

A. At least 5 attacks fulfilling criteria B-D
B. Severe or very severe unilateral orbital, supraorbital and/or temporal pain lasting 15-180 minutes if untreated
C. Headache is accompanied by at least one of the following:
   1. Ipsilateral conjunctival injection and/or lacrimation
   2. Ipsilateral nasal congestion and/or rhinorrhea
   3. Ipsilateral eyelid oedema
   4. Ipsilateral forehead and facial sweating
   5. Ipsilateral miosis and/or ptosis
   6. A sense of restlessness or agitation
D. Attacks have a frequency from one every other day to 8 per day
E. Not attributed to another disorder
Acute sinusitis headache

<table>
<thead>
<tr>
<th>Major factors</th>
<th>Minor factors</th>
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<tbody>
<tr>
<td>Purulence in nasal cavity</td>
<td>Headache</td>
</tr>
<tr>
<td>Facial pain, pressure, congestion, and fullness</td>
<td>Fever (all nonacute)</td>
</tr>
<tr>
<td>Nasal obstruction, blockage, discharge, and purulence</td>
<td>Halitosis</td>
</tr>
<tr>
<td>Fever (acute rhinosinusitis only)</td>
<td>Fatigue</td>
</tr>
<tr>
<td>Hyposmia and anosmia</td>
<td>Dental pain</td>
</tr>
<tr>
<td></td>
<td>Cough</td>
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<td></td>
<td>Ear pain and fullness</td>
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-2 major or 1 major/2 minor
Rhinogenic Headache Defined

- headache or facial pain secondary to mucosal contact points in the nasal cavity in the absence of inflammatory sinonasal disease, purulent discharge, nasal polyps, nasal mass, or hyperplastic mucosa

-synonyms: Rhinologic headache, rhinopathic, sinogenic, middle turbinate headache, nasal spur headache, four finger headache, sinus headache, contact point headache
The International Classification of Headache Disorders

-A11.5.1 Mucosal contact point headache

Diagnostic criteria:
A. Intermittent pain localised to the periorbital and medial canthal or temporozygomatic regions and fulfilling criteria C and D
B. Clinical, nasal endoscopic and/or CT imaging evidence of mucosal contact points without acute rhinosinusitis
C. Evidence that the pain can be attributed to mucosal contact based on at least one of the following:
   1. pain corresponds to gravitational variations in mucosal congestion as the patient moves between upright and recumbent postures
   2. abolition of pain within 5 minutes after diagnostic topical application of local anaesthesia to the middle turbinate using placebo- or other controls
D. Pain resolves within 7 days, and does not recur, after surgical removal of mucosal contact points

Note:
1. Abolition of pain means complete relief of pain, indicated by a score of zero on a visual analogue scale (VAS).

Comment:
A11.5.1 Mucosal contact point headache is a new entry to the classification for which evidence is limited.
Controlled trials are recommended to validate it, using the listed criteria for patient selection.
Historical Perspective

- mucosal contact point headaches: Described in 1888 by J.O. Roe

- Sluder- vacuum headache without inflammatory disease

-McAuliffe et al. 1943: Questioned the mechanisms of “sinus headache” in 1943 and theorized that it was not due to pathology of the para-nasal sinuses, but rather from structures in the nasal cavity, sino-nasal ducts, or sinus ostia
McAuliffe et al 1943

-the McAuliffe study involved 5 healthy people, and 10 patients with neurological lesions (cranial nerves sectioned for symptomatic relief)
-he stimulated areas with a prob, an electrical current, and a 1:1000 epinephrine solution
-the subject’s finger was dipped in soft red wax and they were asked to point to the site of pain

-sensitivity to stimulus:
  -tongue: 1+
  -septum: 1-2+
  -turbinates 4-6+
  -naso-frontoduct: 5-7+
  -sinus ostium: 6-9+
  -sinus lining: 1-2+
McAuliffe et al 1943

-different presentations of “sinus headache” corresponded with certain areas of the nasal cavity undergoing disease/inflammation 
-superior nasal structures: headaches in the front of head, top of head, and between the eyes (1113)
-middle/inferior nasal structures: zygoma, temples, teeth, jaw

-could not elicit pain to the back of the head
3 classifications of headaches:
- headaches that are clearly connected to a sinus problem: inflammation from acute sinusitis, tumor, etc
- headaches with clearly identifiable non-rhinosinus origin: migraine, neuralgia, C spine disorders, vascular disorders, TMJ,
- unidentifiable cause
Stammberger & Wolfe 1988-Mechanism of Rhinogenic Headache

-Substance P: vasoactive neuropeptide found in nasal tissue in unmyelinated C fibers that causes vasodilation, plasma extravasation, histamine release from mast cells, and other inflammatory events. These vascular phenomenon may be responsible for migraine-like headache symptoms.
Rhinogenic headache mechanism

substance P, a neuropeptide found in nasal mucosa with strong vaso-dilation properties, can be released by afferent C fibers by multiple etiologies (including pressure)
-V1 innervates the dura and intracranial blood vessels
-substance P released near blood vessels in the brain can cause vasodilation and inflammation, causing a headache (the final common pathway for a migraine)
Supporting Evidence for Rhinogenic Headache

Clerico DM. Pneumatized Superior Turbinate as a Cause of Referred Migraine Headache. Laryngoscope. 1996;106: 874-879
-3 patient case series- superior turbinate pneumatization- improved at 2 years

-36 patients. 100% improved, 52% “cured”
-follow up 1 yr

-34 pts underwent septoplasty/ITH
-75% improved after 1 year

Multiple studies published since the late 1980’s: case series describing successful treatment of headaches with surgery

-33 patients, 85% improvement

-37 patients. 91% reported a decrease in the intensity of headaches 85% reported decreased frequency in headaches

-30 patients followed up to 8-41 months (mean 23) after surgery
-results
-43% experienced complete relief
-47% had decreased intensity of headaches
-10% were unchanged

-12 patients- 92% improvement

-9/15 (60%) improved with surgery. 8/8 controls remained the same
Supporting Evidence for Rhinogenic Headache

**Similarities between studies**

- very high success rate
- sample size: small
- strict selection of a small subgroup of patients: all had long-standing, frequent, severe headaches
- no other sino-nasal disease
- diagnostic criteria
  - CT, nasal endoscopy
  - Topical blockage, infiltrative blockade

- had been evaluated by physicians of other specialties (neurology, ophtho, chiropractor, internist)
  - tried medical management first - but failed
Etiologies of Mucosal Contact Points

- septal deviation contacting nasal wall
- septum to middle turbinate
- septum to inferior turbinate
- concha bullosa
- superior turbinate pneumatization
- any other visualized mucosal contact point
Problems with Mechanism of Rhinogenic Headache

1. McAuliffe’s findings have not been reproduced: (despite persistent references)


- Repeated the mapping of the nasal cavity
- Jobson horn probe until mucosal blanching occurred for 10 seconds
- Repeated with cotton wool with 1:1000 epi
- Again with cotton wool with substance P (10nmol/mL for 5 of the volunteers and 80nmol/mL for the other 5)
- 4th stimulus: (placebo) cotton wool with sterile water

- Areas stimulated
  - Nasal floor
  - Septum
  - Lateral nasal wall
  - Inferior turbinate
  - Middle turbinate
Problems with Mechanism of Rhinogenic Headache


Results

- local nasal pain disappeared once the Jobson horn probe was removed
- substance P cause variable nasal itching and sneezing
- none of the stimuli caused referred pain to the face

Conclusion

- nasal mucosal contact points and headaches/facial pain are a coincidence
- neurological causes of facial pain should be given heavier consideration
- low dose amitriptyline for tension type headaches or midfacial segment pain for 6 weeks prior to surgery
Problems with Mechanism of Rhinogenic Headache

2. There is no clear evidence that substance P is produced locally by mucosal contact points even though it is localized in sensory C-fibers in the human nasal mucosa.
   - Nowhere else in the human body do mucosal contact points cause pain.

3. There is no clear evidence of a causal relationship.


- 973 patients who presented to clinic were evaluated for facial pain and contact points
  - 566 with, 407 without
  - The percentage of nasal mucosal contact points was the same in both groups - 4%
  - There was no difference in their response to the application of cocaine as opposed to sterile water
  - Concluded that facial contact points were coincidental
Problems with Mechanism of Rhinogenic Headache

4. Most studies supporting surgical management are un-controlled case series or uncontrolled chart reviews with short follow up periods

- placebo?
- cognitive dissonance
- alteration in sensory pathways


4 patients had surgery for contact points- all were improved 2-12 months after surgery. In ¾, the symptoms returned within 2 years

Exception:
- 9/15 surgery patients had improvement in symptoms
- 8/8 non-surgery patients continued to have headaches unchanged despite medical therapy

13/20 patients at 10 years still improved

A. intensity
B. Freq
C. duration
Problems with Diagnosis of Rhinogenic Headache

CT Criteria to Predict Improvement


<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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<tbody>
<tr>
<td>Lund-Mackay score (mean)*</td>
<td>2</td>
</tr>
<tr>
<td>Presence of a posterior septal spur w/lateral contact, n (%)</td>
<td>26 (78.8)</td>
</tr>
<tr>
<td>Presence of a concha bullosa &lt;5 mm, n (%)</td>
<td>5 (15.2)</td>
</tr>
<tr>
<td>Presence of a concha bullosa ≥5 mm, n (%)</td>
<td>9 (27.3)</td>
</tr>
<tr>
<td>Length of vertical contact (mean)</td>
<td>56 mm</td>
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* Lund-Mackay scores: 0 = no opacification, 1 = partial opacification, and 2 = complete opacification.

-85% of pt reported improvement

COULD NOT FIND AN ASSOCIATION BETWEEN SURFACE AREA OF CONTACT POINTS AND SURGICAL OUTCOMES
Research needs

-since the number of patients treated are low, a multi-center prospective, controlled trial will probably be needed to try to establish diagnostic criteria
Practice Considerations

1. Very controversial: Rhinogenic headache remains a diagnosis of exclusion.

2. Before surgery is considered- patient should be evaluated by other relevant specialists and treated medically for a sufficient period of time.

3. To diagnose contact point headache:
   - CT, nasal endoscopy, positive block test

4. Disclose the controversial role of surgery for headaches with patients wanting an operation.
The End
References


Clerico DM. Pneumatized Superior Turbinate as a Cause of Referred Migraine Headache. Laryngoscope. 1996;106: 874-879


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