National Board of Examination - Journal of Medical Sciences
Volume 1, Issues 9-10, Pages 591–600, September-October 2023
DOI 10.61770/NBEJMS.2023.v01.i09-10.004

REVIEW ARTICLE

Sinus Headache and Facial Pain: A Diagnostic Dilemma

Soumick Ranjan Sahoo[1,*] and Mandira Sarma[2]

[1]*Ent Department, Steel Authority of India Limited, IISCO Steel Plant, Burnpur Hospital, West Bengal, India*

[2]*Ent Department, Esic Model Hospital, Beltola, Guwahati, Assam, India*

Accepted: 26-August-2023 / Published Online: 29-September-2023

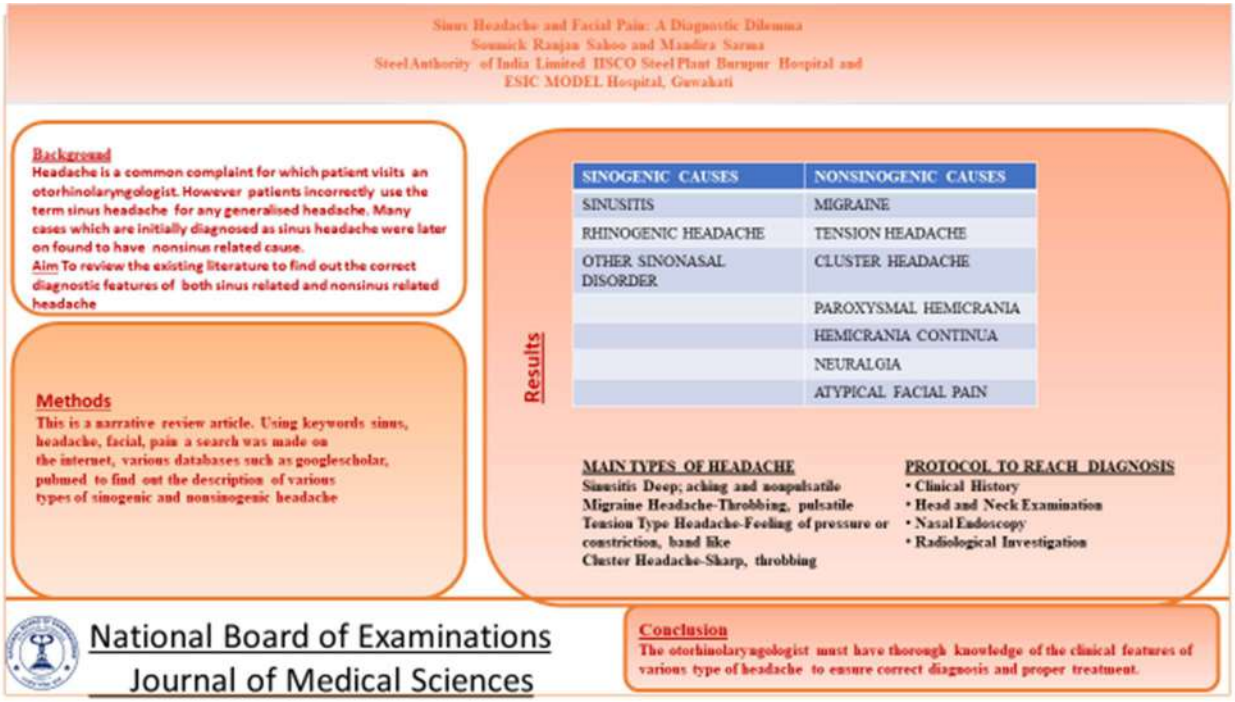
Abstract

Headache and facial pain are common complaints for which patient visits otorhinolaryngologist. Many patients have a misconception that all types of headache are sinus related and incorrectly refer it as sinus headache. It is the duty of an otorhinolaryngologist to correctly differentiate between sinogenic and nonsinogenic causes of headache/facial pain through proper history taking, diagnostic nasal endoscopy, radiological investigation to reach at an appropriate diagnosis. In this article various sinogenic and non sinogenic causes of headache are briefly discussed. A proper knowledge of diagnostic criteria of different types of headache will ensure correct and timely treatment of the patient and improve patient satisfaction.

Keywords: Sinus, Headache, Facial, Pain

*Corresponding Author: Soumick Ranjan Sahoo
Email: soumicksahoo@gmail.com

Graphical Abstract



Introduction

Headache is one of the chief complaints of patients attending otorhinolaryngology clinic,the patients inappropriately use the term sinus headache instead of headache [1,2].

This incorrect use of the term sinus headache for any generalized headache is also being done by few primary care physicians [1,3,4].

It is important for an otorhinolaryngologist to properly frame a definition for sinogenic and non sinogenic headache and differentiate between them. This will ensure correct treatment and referral of non sinogenic causes to appropriate specialist. In this brief narrative review we will discuss about the different sinogenic and nonsinogenic causes of headache.

Problem Statement

There are various studies which support the fact that a problem genuinely exists while evaluating patients of headache.In many cases initially incorrect diagnosis has led to wrong treatment.

From the literature data we got some studies where a proportion of the patients who were initially diagnosed as having sinus headache were later on discovered to have migraine [1,5–8].

Similarly in studies it has been found that a proportion of the patients initially diagnosed as migraine were later on discovered to have headache suggestive of sinogenic etiology after investigations [1,9].

There are also studies where both migraine and sinogenic causes may coexist as co morbidities [1,6,10].

Sinogenic Headache

This headache refers to any headache in which a rhinologic pathology is the causative factor [1,11]. The explanation of this headache is the activation of trigeminovascular system by the trigeminal afferent in nose and sinus.Immunological activation from allergy and infection act as peripheral trigger [1,12].

The various causes are as follows:

1. Sinusitis

Acute Rhinosinusitis is characterized by history of unilateral severe pain along with nasal obstruction.There is history of fever in 50% of the cases.

When there is facial pain along with dental pain it is suggestive of maxillary sinus infection [1,13].

Acute infection of the frontal sinus presents as frontal headache, fever, tiredness and may be accompanied by tenderness over the medial part of the infraorbital margin [14]. Nasal endoscopy findings include hyperemia of the sinonasal mucosa and purulent secretions.

Pain at the vertex is suggestive of acute sphenoid sinus infection which is very rare.

Chronic Rhinosinusitis is usually painless with pain occuring only during acute exacerbation [1,15]. The other clinical features include purulent nasal discharge and respiratory obstruction [1,5,16].

Features of headache or facial pain in sinusitis are [17-21]:

Clinical, nasal endoscopic and / or radiological evidence of acute or acute-on-chronic rhinosinusitis. There should be no other features of a primary headache which could present simultaneously.

Facial pain must develop simultaneously with the onset or acute exacerbation of rhinosinusitis.

Facial pain must resolve within seven days of remission or successful treatment of acute or acute-on-chronic rhinosinusitis.

Sinonasal pain is usually deep, aching and non-pulsatile.

Acute viral rhinosinusitis is treated with analgesics and antipyretics, saline irrigations,intranasal glucorticoids.In case of acute bacterial rhinosinusitis antibiotics are additionally prescribed along with symptomatic management which is same as for acute viral rhinosinusitis [22].

2. Rhinogenic Headache

This type of headache affects the face and is caused by impingement of the mucosal surface with each other within the nose and sinuses and there is absence of inflammation, hyperplasia of the mucosal surfaces, pus filled discharge, nasal or sinus polyposis, mass [1,23].

The common sites of rhinogenic headache includes the area around the orbit,canthus medially and superiorly, zygomaticotemporal region and pain is usually unilateral.

A variation of normal anatomy may lead to impingement such as pneumatised middle turbinate.

Sometimes middle turbinate may impinge on the septum or the lateral wall of the nose causing headache. This condition is

known as middle turbinate headache syndrome [1,24]. Therapeutic option include excision of a portion of the middle turbinate to relieve the headache [1,25].

It has been proposed by Greenfield that cutaneous branches of the nasal afferent of cranial nerve V synapse in the cerebral cortex leading to perception of nasal stimulation as pain [1,26]. Because of failure of the cortex to localize these afferent impulses the nasal stimulation is perceived as facial pain [1,27].

It has been suggested by Stammberger and Wolf that mucosal pooling occurs as a consequence of anatomical aberration with infection occurring and causing facial pain. [1,28]. They hypothesize that neurotransmitter peptide substance P released due to mucosal impingement had a role in pain transmission.

3. Other Sinonasal Disorder

Among the other miscellaneous sinogenic causes of headache include pain in case of mucocele and neoplasm.

Impingement on the osteous wall of sinus by a enlarging mucocele causes facial pain.The most prominent among the various mucocele is the frontoethmoidal mucocele which causes frontal headache and pain in the orbit.

The sites of pain in Sphenoethmoidal mucocele are occipital region,vertex and deep nasal region [1,29,30].

A worsening of facial pain along with the presence of neural signs should raise suspicion of neoplasm. But neoplasm rarely present as facial pain.Nasal blockage and unilateral serosanguinous pus filled nasal discharge are the common presentation of neoplasm. Advanced stage neoplasm present as facial pain.Radiological imaging required to confirm the diagnosis of neoplasm.

Nonsinogenic Headache/Facial Pain

The various causes are as follows:

1. Migraine

Worldwide 11% of the adult suffer from migraine [1,31]. Females are affected more compared to males,cause being attributed to hormonal change.The daily incidence in general population is 3000 in 1000000 [1,32].

Migraine headache is defined as headache lasting for 4 to 72 hours if untreated,along with features like pulsating pain on one side and affecting the face along with the head [1,33].

The orbit, cheek and nose are some of sites of migraine pain in few cases.

A small percentage of the patients also describe an aura affecting vision. The headache which follows aura may occur along with other symptoms such as photophobia, acoustic hyperesponsivity, nausea and vomiting.

The treatment of headache in migraine depends on whether it is an acute or chronic presentation and includes abortive or prophylactic therapy [17].

Abortive therapy comprises simple analgesics alone or in combination with other compounds which can provide relief for mild to moderately severe headaches. For severe headaches and facial pain, 5-HT1 agonists and / or opioid analgesics alone or

in combination with dopamine antagonists can be used.

Prophylactic therapy is used when there is chronic migraine or the symptomatic treatment are ineffective or contraindicated.Prophylactic therapy includes nortriptyline and propranolol which have been found to be very effective for chronic facial migraine. In recent years, botulinum toxin has also shown good results as a prophylactic therapy

2. Tension Headache

This headache has a prevalence of 1 to 3% [1,31]. The headache is perceived by the patient as a feeling of pressure or constriction. The headache is bilateral and keeps on recurring. The duration of headache is minutes to weeks. There is absence of nausea and vomiting. However excessive sensitivity to lights and sounds may be present [1,34]. Mostly no worsening or relieving factors are identified. The soft tissues become very sensitive to touch and certain points when touched may be painful.

Notably pressing on one point for long time can cause referred pain in other areas.

Tension type headache is precipitated by psychological pressure, disturbed sleep, inadequate eating habits.

Management of TTH consists of pharmacotherapy, physical therapy and psychophysiologic therapy [17].

Pharmacotherapy consists of abortive therapy and long-term preventive therapy. These headaches generally respond to simple over-the-counter (OTC) analgesics. Preventive drugs are the main therapy for Chronic TensionType Headache. Preventive medications may be considered if headaches are frequent (>2 attacks per week), of long duration (>3-4 h), severe enough to cause significant disability. Nortriptyline in low dosage (10-100 mg) is the most frequently used tricyclic antidepressant for prophylaxis. A few minimally invasive techniques may also provide pain relief such as “trigger point” injections, greater or lesser occipital nerve blocks and auriculotemporal nerve block.

Physical therapy techniques include hot or cold applications, positioning, stretching exercises, traction, massage, ultrasound therapy, transcutaneous electrical nerve stimulation (TENS) and manipulations. Psychophysiologic therapy includes reassurance, counselling, relaxation therapy, stress management programmes and biofeedback techniques.

3. Cluster Headache

It is a primary one sided recurring headache affecting patients sleep. Usually the same side is affected again and again and sometimes the pain is very severe.The site of pain include behind the orbit or the midorbit.Each episode lasts for 15 minutes to 3 hours.There are associated clinical symptoms and signs such as nasal discharge,tearing, inability to sweat,tiny pupils and ptosis.Attacks occur periodically and they are present for 8 to 10 weeks in a year.Around 15 to 20 % of chronic cluster headache don’t have asymptomatic interludes.These patients don’t experience prodormal symptoms or aura [1,35].

Males are affected more than females.The common age group affected is 20 to 40 years [1,36].

Treatment of an acute cluster headache is with oxygen (8 L/min or 100% by mask for 10 min), which may abort the headache if used early. Subcutaneous injections of sumatriptan (6 mg) can be effective, in large part due to the rapidity of onset of action [17].

4. Paroxysmal Hemicrania

The pain in this disorder is usually present on one side around the eyes and forehead. The duration of pain may vary from 2 to 45 minutes. The age of presentation of the first episode of such type of headache is usually within the fourth decade of life.

There may be a remission period of 3 months to 3 years. The disorder must include atleast one clinical feature which suggests autonomic dysfunction such as blocked nose, nasal discharge, tearing, bloodshot eyes, ptosis, swollen eyelid, altered cardiac rhythm, localized epiphora, saliva production and flushing of the face [1,37].

5. Hemicrania Continua

This headache has many features similar to paroxysmal hemicranias.The headache occurs on one side and shows good response to pharmacological management with drugs like indomethacin.The headache is of moderate severity, doesn't shift sides and the pain is unswerving. Although the intensity of the pain may vary and the intensity is maximum when there is autonomic dysfunction [1,38].

6. Neuralgia

Patients having Trigeminal Neuralgia describe electric shock like pain at the sites having trigeminal nerve innervations.They are unilateral with sudden onset and recurring in nature [33,39]. Talking,eating, shaving,washing the face, teeth brushing etc trigger the pain of trigeminal neuralgia [1,39].

Carbamazepine or other antiepileptic drugs are initially used for treatment. Surgical microvascular decompression and gamma knife radiation have been shown to treat cases caused by compression of the trigeminal nerve from pontine vessels. Other less invasive techniques include balloon dilatation of the trigeminal ganglion and glycerol ganglion lysis [17].

The pain of glossopharyngeal neuralgia occurs in flare ups.The common sites include the pharynx, lingual base,velum and tonsillar fossa [1,40]. The lower jaw angle or external acoustic meatus can also be potential sites of pain [1,40].

The most common site of pain in sluder neuralgia include the medial ocular angle.The other common site of the pain may be superciliary,orbital,nasal and mandibular areas.The characteristic signs and symptoms include tearing,bloodshot eyes,blocked nose,sternutation and frontal erythema [1,41,42].

7. Atypical Facial Pain

The pain usually affects one side,is unremitting and deeply felt [1].

The symptoms of the patient are unclear and keeps on changing.There are multiple sites of pain in the face, head and neck.

The patients give a history of previous sinus operation and dental

treatment who are unsatisfied with the outcome.

Many patients with this condition have psychological problems.

Learning Points

A protocol must be followed to reach at an appropriate cause of the headache after which correct treatment can be given to the patient. The protocol consists of the following points.

- **Clinical History -** onset, site, character of pain, duration, laterality, aggravating and relieving factors along with associated symptoms
- **Head and neck examination** - should be performed including testing of the cranial nerves, palpation for points of tenderness and trigger points [17].
- **Nasal endoscopy -** looking for purulence, oedema, inflammation if sinogenic cause is suspected.
- **Radiological Investigations -** CT scan of nose and paranasal sinuses if rhinosinusitis is suspected.MRI Brain may be done if intracranial pathology such as tumor is suspected.
- The main types of headache which are seen in the ENT clinic with the differentiating features are summarized in Table 1.

Table 1. Important Types of Headache Seen In ENT Clinic

	Sinusitis Headache	Migraine Headache	Tension type Headache	Cluster Headache
Type of pain	Deep; aching and nonpulsatile	Throbbing, pulsating pain	Feeling of pressure or constriction, band like.	Sharp, throbbing
Associated symptoms and signs	Fever, Nasal Obstruction, Rhinorrhoea	Nausea, Aura(+/-) and Photophobia	Absence of Nausea. Excessive Sensitivity to Lights or Sounds May be Present.	Nasal Discharge, Inability to Sweat, Tiny Pupils and Ptosis
Treatment	Analgesics and Antipyretics, Saline Irrigations, Intranasal Glucorticoids.	Abortive or Prophylactic Therapy	Pharmacotherapy, Physical Therapy and Psychophysiologic Therapy	Oxygen, Subcutaneous Injections of Sumatriptan

Conclusion

The otorhinolaryngologist must have a thorough knowledge of clinical features of various types of headache or facial pain so that proper diagnosis can be made and correct treatment is provided for the relief of the headache.

Conflicts of interest

The authors declares that they do not have conflict of interest.

Funding

No funding was received for conducting this study.

References

1. De Corso E, Kar M, Cantone E, et al. Facial pain: sinus or not?. Acta Otorhinolaryngol Ital. 2018;38(6):485–496.
2. Patel ZM, Setzen M, Poetker DM, DelGaudio JM. Evaluation and management of “sinus headache” in the otolaryngology practice.Otolaryngol Clin North Am. 2014; 47:269–287.
3. Novis SJ, Akkina SR, Lynn S, et al. A diagnostic dilemma: Chronic sinusitis diagnosed by non-otolaryngologists. Int Forum Allergy Rhinol.2016; 6:486–490.
4. Jayawardena ADL, Chandra R. Headaches and facial pain in rhinology. Am J Rhinol Allergy. 2018;32(1):12–15.
5. Schreiber CP, Hutchinson S, Webster CJ, et al. Prevalence of migraine in patients with a history of self-reported or physician-diagnosed “sinus” headache. Arch Intern Med 2004;164:1769-72.
6. Eross E, Dodick D, Eross M. The Sinus, Allergy and Migraine Study (SAMS). Headache 2007;47:213-24.
7. Mehle ME, Kremer PS. Sinus CT scan findings in “sinus headache” migraineurs. Headache 2008;48:67-71.
8. Perry BF, Login IS, KSE. Nonrhinologic headache in a tertiary rhinology practice. Otolaryngol Head Neck Surg 2004;130:449-52.
9. Lee JH. Underestimation of rhinogenic causes in patients presenting to the emergency department with acute headache.Acta Neurol Taiwan 2015;24:37-42.
10. Aaseth K, Grande RB, Kvaerner K, et al. Chronic rhinosinusitis gives a ninefold increased risk of chronic headache. The Akershusstudy of chronic headache. Cephalalgia 2010;30:152-60.
11. Farri A, Enrico A, Farri F. Headaches of otolaryngologicalinterest: current status while awaiting revision of classification. Practical considerations and expectations. Acta OtorhinolaryngolItal 2012;32:77-86.
12. Cady RK, Schreiber CP. Sinus headache: a clinical conundrum.Otolaryngol Clin North Am 2004;37:267-88.
13. Berg O, Carenfelt C. Analysis of symptoms and clinicalsigns in the maxillary sinus empyema. Acta Otolaryngol 1988;105:343-9.
14. Al Yaeesh I, AlOmairin A, Al Shakhs A, Almomen A, Almomen Z, AlBahr A, AlNaim A, Al Abdulgader A, Alawadh A. The serious complications of frontal sinusitis, a case series and literature review. J Surg Case Rep. 2020 Dec

31;2020(12):rjaa474. doi: 10.1093/jscr/rjaa474.
15. Mertens E. Modifying factors on perception and expression of pain. *Pflege Z* 2007;60:312.
16. Gamerra M, Cantone E, Sorrentino G, et al. Mathematical model for preoperative identification of obstructed nasal subsites. Acta Otorhinolaryngol Ital 2017;37:410-5.
17. Ram B, Maini S. Facial pain: the differential diagnosis in an ENT clinic. ENT & AUDIOLOGY NEWS. 2016;25(3).
18. The Headache Classification Committee of the International Headache Society. Classification and diagnostic criteria for headache disorders, cranial neuralgia and facial pain; 2nd edition. Cephalalgia 2004;24(S1):24-136.
19. Rebeiz EE, Rastani K. Sinonasal facial pain. Otolaryngol Clin North Am 2003;36(6):1119-26.
20. Fahy C, Jones NS. Nasal polyposis and facial pain. Clin Otolaryngol Allied Sci 2001;26(6):510-13.
21. Jones NS. Sinugenic facial pain: diagnosis and management. Otolaryngol Clin North Am 2005;38(6):1311-25.
22. Patel, Zara M., and Peter H. Hwang. "Uncomplicated acute sinusitis and rhinosinusitis in adults: Treatment." *Uptodate. Literature review current through: Jan* (2017).
23. Gelardi M, De Candia N, Quaranta N, et al. The relevance of counseling in patients with nasal polyps. Acta Otorhinolaryngol Ital 2016;36:326-7.
24. Morgenstein KM, Krieger MK. Experiences in middle turbinectomy. Laryngoscope 1980;90:1596-603.
25. Anselmo-Lima WT, de Oliveira JA. Middle turbinate headache syndrome. Headache 1997;37:102-6.
26. Greenfield DP. Diagnosis and clinical management of headaches.CNS Spectr 1999;4:32-47.
27. Cantone E, Castagna G, Ferranti I, et al. Concha bullosa related headache disability. Eur Rev Med Pharmacol Sci 2015;19:2327-30.
28. Stammberger H, Wolf G. Headaches and sinus disease:the endoscopic approach. Ann Otol Rhinol Laryngol 1988;134:3-23.
29. Cummings CW. Otolaryngology: head and neck surgery. 4th edition. Mosby; 2005.
30. Yüce S, Akal A, Doğan M, et al. Results of endoscopic endonasal dacryocystorhinostomy. J Craniofac Surg 2013;24:e11-2.
31. Stovner LJ, Hagen K, Jensen R, et al. The global burden of headache: a documentation of headache prevalence and disability worldwide. Cephalalgia 2007;27:197-210.
32. Steiner TJ, Scher AI, Stewart WF, et al. The prevalence and disability burden of adult migraine in England and their relationships to age, gender and ethnicity. Cephalalgia 2003;23:519-27.
33. Headache Classification Committee of the International Headache Society (IHS). The International Classification of Headache

Disorders. 3rd edition. Cephalalgia 2018;38:1-211.
34. Sahler K. Epidemiology and cultural differences in tension type headache. Curr Pain Headache Rep 2012;16:525-32.
35. Bernstein JA, Fox RW, Martin VT, et al. Headache and facial pain: differential diagnosis and treatment. J Allergy Clin Immunol Pract 2013;1:242-51.
36. Lanteri-Minet M. Epidemiology, clinical presentation, diagnosis,natural history and screening of cluster headache. Presse Med 2015;44:1176-9.
37. Prakash S, Patell R. Paroxysmal hemicrania: an update. Curr Pain Headache Rep 2014;18:407.
38. Viana M, Tassorelli C, Allena M, et al. Diagnostic and therapeutic errors in trigeminal autonomic cephalalgias and hemicrania continua: a systematic review. J Headache Pain 2013;14:14.
39. Araya EI, Claudino RF, Piovesan EJ, Chichorro JG. Trigeminal Neuralgia: Basic and Clinical Aspects. Curr Neuropharmacol. 2020;18(2):109-119. doi: 10.2174/1570159X17666191010094350. PMID: 31608834; PMCID: PMC7324879.
40. Reddy GD, Viswanathan A. Trigeminal and glossopharyngeal neuralgia. Neurol Clin 2014;32:539-52.
41. Oomen KP, Van Wijck AJ, Hordijk GJ, et al. Sluder's neuralgia:a trigeminal autonomic cephalalgia. Cephalalgia 2010;30:360-4.
42. Vinken PJ, Bruyn GW. Charlin's neuralgia. In: Rose FC, editor. Headache: handbook of clinical neurology. Amsterdam: Elsevier; 1986. p. 483-86.