

Sinus Headache: Revisiting the Diagnosis



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Robin's Case

Robin is a 17-year-old, otherwise healthy female, who is referred with recurrent acute sinusitis. Every four to eight weeks, she presents with headache, left facial pain, congestion, purulent discharge, dental pain, and periorbital swelling. In the past eight months, she has been treated with nasal steroids, naproxen, azithromycin, clarithromycin (twice), moxifloxacin, and clindamycin. Her symptoms come on over hours to days and completely resolve within three days of starting her antibiotics.

The sinus headache has plagued both patients and physicians alike. Although it represents a frequent complaint to the primary care practitioner, a true headache, secondary to sinus disease, is quite rare, and this presentation all too frequently leads to misdiagnosis and inappropriate prescribing of antibiotics. This article will provide an evidence-based approach to the sinus headache, which will allow primary practitioners to reach a more accurate diagnosis and to achieve more effective treatment strategies.

The paranasal sinuses are innervated by the first (frontal and ethmoid) and second (ethmoid, maxillary, and sphenoid) divisions of the trigeminal nerve. The trigeminal nerve also serves as a conduit for both sympathetic and parasympathetic innervation of the nasal cavity and the lacrimal

gland. Pain stimulation along the first and second divisions of the trigeminal nerve can lead to autonomic symptoms, including nasal congestion, rhinorrhea, lacrimation, and conjunctival injection through several proposed mechanisms that contribute to misdiagnosis.

It can be difficult to differentiate symptoms of sinusitis from neurological disease, primarily migraine disorder. Sinusitis is one of the most common misdiagnoses in the migraine patient, and, hopefully, this article will help prevent you from falling into that trap.

Table 1

Tips on How to Spot the Migraine

- Recurrent symptoms
- Pain and pressure without other nasal symptoms
- Trajectory: onset and resolution too fast
 - Antibiotics work too well
- Pain is moderate to severe: too severe
- Allodynia: facial pain with minimal stimulation (cool air, humidity)
- GI symptoms: nausea and vomiting are rare in sinusitis
- Photophobia and/or phonophobia
- Visual or neurological symptoms
- Can the patient predict when he or she will get one? (prodrome)
- Triggers (dietary, hormonal, stress, sleeplessness)

How often is sinus headache a misdiagnosis?

In 2001, the Migraine Consumer Segmentation Study, which was funded and reported by GlaxoSmithKline, surveyed 810 patients with sinus headache and found that 78% of patients fulfilled the International Classification of Headache Disorders (ICHD) criteria for the diagnosis of migraine headache.¹ In the same year, Lipton, *et al.*, published the results of The American Migraine Study. This was a survey of 20,000 households in the United States, and it found that half of the patients meeting ICHD criteria for migraine disorder had been previously diagnosed with sinusitis.²

In 2004, the Sinus, Allergy, and Migraine Study (SAM) was published by Eross, *et al.*, This was a prospective study where recruitment took place through a newspaper article offering

The most common reasons patients felt their migraines were due to sinus disease were:

- Symptoms triggered by weather, season change, or allergies
- The pain was centred over the sinuses (V2)
- There were autonomic symptoms, including rhinorrhea, nasal congestion, eyelid edema, conjunctival injection, and lacrimation³

How common are sinus symptoms in migraine disorder?

Migraine-related parasympathetic activation has been described for years. In 2001, Edvinsson suggested that migraine can lead to parasympathetic activation of the superior salivatory nucleus, causing lacrimation, rhinorrhea, and congestion.⁴ The incidence of this, however, was still not known.

In 2010, Yoon, *et al.*, surveyed 517 patients with migraine disorder and found 9% also had facial pain. Almost half of the patients who had associated facial pain also had associated rhinorrhea and nasal congestion, compared with 8% of

Table 2

Tips on How to Spot Acute Sinusitis

- Pain is dull and pressure-like
- Pain is worse in the morning and improves throughout the day
 - Also seen in medication overuse headache
- Periorbital or maxillary dental pain
- Fever and purulent discharge
- Associated with and preceded by days of congestion, rhinorrhea, post nasal drip
- Lasts for days with gradual resolution most of the time without antibiotics

assessment by ENT, allergy, and neurology specialists for patients who have recurrent sinus headaches. One hundred consecutive patients were included, and, through this study, 86% of patients were diagnosed with either “migraine” or “probable migraine” (ICHD criteria); only 3% of patients were found to have sinus disease.³

Table 3

Other than Migraine, What Should Be Considered?

- Midfacial segment pain
- Dental disease (abscess, load bearing, overuse)
- Trigeminal neuropathy
- Secondary headaches
- Trigeminal autonomic cephalgias (TACs):
 - Cluster headache
 - Paroxysmal hemicrania
 - Short-lasting unilateral neuralgiform headache with cranial autonomic features or conjunctival injection and tearing
- Hemicrania continua
- Trigeminal neuralgia

patients who did not have facial pain. Isolated facial pain without headache was seen but was uncommon.⁵

Allodynia

One of the most common reasons both patients and practitioners assume facial pain and headache are due to sinus disease is that the pain is centred over the sinus. Pain in the frontal area, eyes, nasal bridge, and maxillary area is assumed to arise from the underlying sinuses. In 2009, Kalita, *et al.*, showed that over half of all patients with migraine headache have allodynia.⁶


Pain can be seen over the sinus area in acute rhinosinusitis, but it is uncommon and signals marked obstruction with pressure. If this is recurrent, one must strongly question the diagnosis of recurrent sinusitis. Pain is not normally seen in chronic sinusitis. Although the study was poorly powered, Benoliel, *et al.*, were able to show a slight drop in pain thresholds overlying the affected sinus in acute disease. This same study showed an increase in the pain thresholds in chronic sinus disease.⁷ It is safe to assume that chronic facial pain is unlikely to be secondary to sinus disease.

Imaging

Occasionally, plain films can be ordered during a flare up of symptoms to help differentiate recurrent acute sinusitis from migraine. An air/fluid level or complete opacification of the involved sinus would suggest acute sinusitis as opposed to migraine. Mucosal inflammation on plain films is neither sensitive nor specific for sinus disease, and the use of plain films should not be routine.

Jones studied the role of the CT scan in acute sinus disease. He reported that 30% of asymptomatic patients will have sinus inflammation on a CT scan. During a viral upper respiratory tract infection, this increases to 90%.⁸ The CT sinus is the image of choice if there is a suspected complication of an acute infection, but it should not be used to help differentiate sinus disease from migraine.

Conclusion

Sinusitis must be considered as a potential cause for headache and facial pain, but it should not be so high on our differential. Ask patients with recurrent or fluctuating disease to keep a diary. They can rate and localize pain, keep track of associated symptoms, and document how well different medical trials work. 

References

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