Frontiers in Health Informatics
ISSN-Online: 2676-7104
www.healthinformaticsjournal.com
2026; Vol 15: Issue 1
Open Access

# Preventing Misdiagnosed of Headache in Chronic Rhinosinusitis: Diagnostic Challenges and Referral Implications : A Case Report and Literature Review

**Iwan Setiawan Adji[1], Zahira Husna Aflaha Khansa Siswaya[2], Namira Aisya Devi[2], Eillena Noxie Azzahra[2], Hanif Nur Khairuddin[2], Sultan Bayu Fahmi[2]**

[1]Department of Otorhinolaryngology–Head and Neck Surgery, RSUD Kartini Karanganyar, Central Java, Indonesia

[2]Faculty of Medicine, Universitas Muhammadiyah Surakarta (UMS), Jalan Ahmad Yani, Sukoharjo 57169, Central Java, Indonesia

**Corresponding Author**

Email ID : iwansetiawanadji@gmail.com.

Cite this paper as: Iwan Setiawan Adji, Zahira Husna Aflaha Khansa Siswaya, Namira Aisya Devi, Eillena Noxie Azzahra, Hanif Nur Khairuddin, Sultan Bayu Fahmi (2026) Preventing Misdiagnosed of Headache in Chronic Rhinosinusitis: Diagnostic Challenges and Referral Implications : A Case Report and Literature Review. *Frontiers in Health Informatics*, *Vol.15, No.1*, 138-146

**ABSTRACT**

Background: Headache is often associated with chronic rhinosinusitis (CRS); however, it is non-specific and frequently overlaps with primary headaches, leading to potential misdiagnosed. Case Illustration: A 48-year-old male presented with chronic headache for two months accompanied by long-standing nasal obstruction. The headache worsened with bending forward and physical activity. Rhinoscopic examination revealed hyperemic mucosa and bilateral nasal discharge. Head CT scan showed no intracranial abnormalities but demonstrated a lesion in the left maxillary sinus consistent with chronic rhinosinusitis. Discussion: Literature indicates that most cases labeled as "sinus headache" are actually primary headaches. Headache due to rhinosinusitis is typically characterized by facial pressure, worsening when bending forward, accompanied by nasal symptoms, and should be confirmed by objective findings such as endoscopy or CT scan. Conclusion: Headache cannot be used as a sole diagnostic criterion for chronic rhinosinusitis. A comprehensive approach is essential to prevent misdiagnosed and improve referral accuracy

**Keywords**: Headache, Chronic Rhinosinusitis, Sinus Headache, CT Scan, Misdiagnosed..

## INTRODUCTION

Headache is one of the most common neurological complaints worldwide, with a global prevalence reaching approximately 50% among adults within the past year (Stovner et al., 2022). The majority of cases are classified as primary headaches, such as migraine and tension-type headache, which account for more than 90% of cases encountered in primary healthcare settings (Ashina et al., 2021). Nevertheless, it is essential to identify secondary causes, including chronic rhinosinusitis (CRS), due to their distinct management and prognostic implications. Chronic rhinosinusitis is an inflammatory condition of the nasal mucosa and paranasal sinuses lasting ≥12 weeks, with an estimated prevalence of 5–12% in the general population (Fokkens et al., 2020). The main symptoms include nasal obstruction, rhinorrhea, and olfactory dysfunction, whereas facial pain or headache is not a dominant symptom in most cases (Fokkens et al., 2020; Ceriani & Silberstein, 2021). This often poses a diagnostic challenge, particularly due to the overlap of symptoms with primary headache disorders

The phenomenon of "sinus headache" overdiagnosis represents a significant clinical issue. Studies have shown that approximately 50–80% of patients diagnosed with sinus-related headache actually suffer from migraine or other primary headache disorders (Bernichi et al., 2021). Conversely, underdiagnosis of CRS may also occur, particularly in cases involving specific sinuses such as the sphenoid sinus, which may present as headache without prominent nasal symptoms (Ceriani & Silberstein, 2021). Accurate diagnosis is therefore crucial, as misinterpretation of headache etiology may lead to inadequate treatment and prolonged patient morbidity. Accordingly, a thorough understanding of the clinical characteristics of each condition is essential, especially at the primary healthcare level..

In this context, a multidisciplinary approach plays an important role in improving diagnostic accuracy. Comprehensive evaluation includes targeted history taking, nasal endoscopic examination, and imaging modalities such as paranasal sinus computed tomography (CT scan). Collaboration among general practitioners, neurologists, and otorhinolaryngology specialists has been shown to facilitate more accurate differentiation between primary and secondary headaches (Fokkens et al., 2020; Orlandi et al., 2016). Based on this background, this literature review aims to analyze the differences in headache characteristics between neurological conditions and chronic rhinosinusitis, while emphasizing the importance of diagnostic precision to prevent misdiagnosed, particularly in primary healthcare settings.

This case report presents a 48-year-old male with a two-month history of chronic headache accompanied by longstanding nasal obstruction. Rhinoscopic examination revealed hyperemic mucosa, bilateral nasal secretions, and hypertrophy of the left turbinate. CT imaging showed no intracranial abnormalities; however, a lesion was identified in the left maxillary sinus. Histopathological examination confirmed chronic sinusitis. The diagnosis was established as left-sided chronic rhinosinusitis.

This case highlights the importance of improving diagnostic capabilities for headache at the primary care level. It aims to enhance clinicians' understanding—particularly general practitioners, primary care physicians, and neurologists—in recognizing headache characteristics associated with otorhinolaryngological disorders, especially chronic rhinosinusitis. A better understanding of the distinction between neurologically driven headaches and secondary headaches due to sinonasal pathology is expected to reduce diagnostic errors and inappropriate referrals. Furthermore, this paper provides an overview of the typical clinical features of headache in chronic rhinosinusitis as a reference for determining appropriate diagnostic and management strategies. By integrating case analysis and literature review, this report is expected to serve as a practical reference in improving diagnostic accuracy and clinical decision-making in daily practice.

## CASE PRESENTATION

A 48-year-old male presented to the otorhinolaryngology clinic at Karanganyar Regional General Hospital following a referral from the neurology clinic, with a chief complaint of headache persisting for the past two months. The headache was described as continuous throughout the day. Initially, the patient reported a spinning sensation accompanied by balance disturbances. Over time, the character of the headache evolved, resembling both migraine-like pain and a tightening, band-like sensation localized to the frontal and occipital regions. The headache was alleviated by rest, particularly in the supine position, and following medication use, but was exacerbated by bending forward, prolonged walking, and wearing head coverings such as hats.

In addition, the patient reported chronic nasal obstruction since 2020. The obstruction occurred alternately between the right and left nostrils, with symptoms more pronounced on the left side. This was accompanied by intermittent nasal discharge from both nostrils, contributing to a persistent sensation of nasal blockage. The symptoms were fluctuating in nature, improving during sleep and after medication use, but worsening following the consumption of cold beverages. The patient denied any associated otologic symptoms, including tinnitus, otorrhea, or ear pain, even during episodes of nasal obstruction. There was no history of odynophagia. Nausea and vomiting were also denied. Regarding past medical history, the patient had been diagnosed with hypertension in February 2026 and had been on regular antihypertensive treatment. Additionally, the patient had a history of smoking.

## DIAGNOSTIC

To establish the diagnosis, a comprehensive otorhinolaryngological examination was performed, including nasal evaluation through anterior rhinoscopy. The examination revealed hyperemic nasal mucosa on both sides (+/+), with the presence of bilateral nasal secretions (+/+). Hypertrophy of the turbinate was noted on the left side (-/+), without any evidence of nasal septal deviation (-/-). On palpation, there was no tenderness over the nasal region (-) or the maxillary sinus area (-).

Further evaluation was carried out using a head computed tomography (CT) scan. The imaging findings demonstrated that the gyri, sulci, and Sylvian fissures were not prominent. The gray–white matter differentiation was preserved, with no evidence of pathological lesions, including hypodense, isodense, or hyperdense abnormalities. The ventricular system and cisterns were within normal limits, with no signs of dilatation or compression. The midline structures were centrally located, with no deviation observed. There was no evidence of cranial bone discontinuity.

However, an isodense lesion with a density of approximately 26–34 Hounsfield units (HU) was identified in the left maxillary sinus. Based on these findings, there was no evidence of cerebral edema, intracranial hemorrhage, or skull fracture on CT imaging. Nevertheless, the imaging features were consistent with left maxillary sinusitis. Based on the patient's history, physical examination, and supporting investigations, the diagnosis was established as left-sided chronic rhinosinusitis.

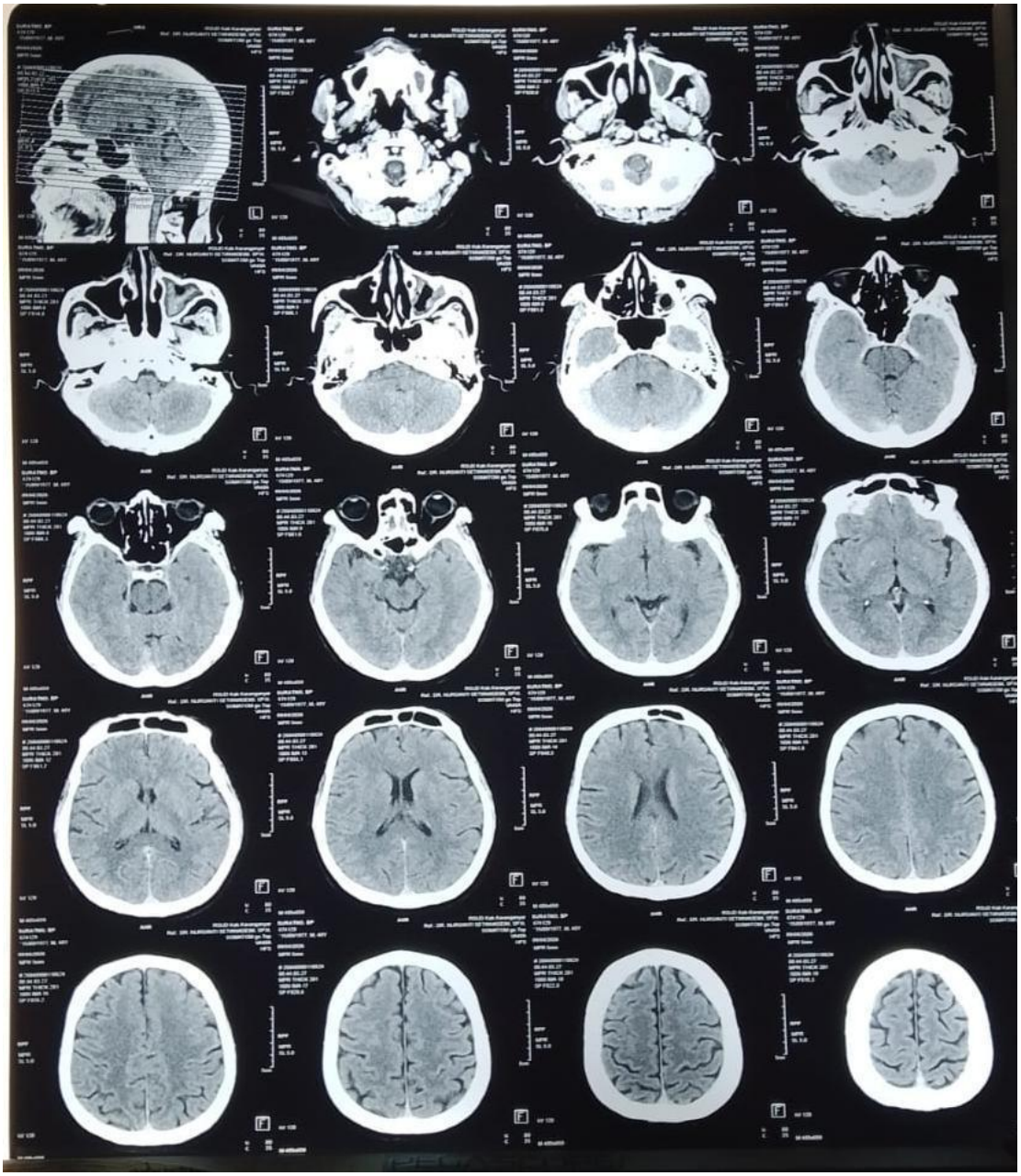

**Figure 1. CT Scan Findings**

## DISCUSSION

This study employed a narrative literature review method with a systematic approach in the process of article searching and selection. The literature search was conducted electronically across several major databases, including PubMed, Google Scholar, Springer, and Wiley Online Library. The search strategy utilized combinations of keywords with Boolean operators (AND, OR), including ("chronic rhinosinusitis" OR "sinusitis") AND ("headache" OR "facial pain") AND ("secondary headache") AND ("differential diagnosis" OR "misdiagnosed"); ("sinus headache" OR "secondary headache") AND ("migraine" OR "tension-type headache") AND ("differential diagnosis"); and ("rhinosinusitis" OR "sinusitis") AND ("headache" OR "facial pain") AND ("clinical features" OR "diagnostic criteria").

The selected articles were limited to publications from the last 10 years (2015–2025), available in full text, written in English or Indonesian, and involving human subjects. The inclusion criteria comprised studies discussing headache or facial pain in chronic rhinosinusitis, the role of headache in diagnostic evaluation, and those describing pain characteristics or diagnostic modalities such as clinical examination, endoscopy, or computed tomography (CT) scan. Accepted article types included original research, clinical trials, reviews, and systematic reviews. The exclusion criteria included studies focusing solely on primary neurological headaches without

sinonasal evaluation, studies emphasizing treatment without addressing diagnosis, articles where headache was not a primary variable, studies involving non-representative special populations, incomplete clinical data, low methodological quality (such as case reports without adequate analysis), duplicate publications, and animal studies.

The article selection process was conducted in several stages, including identification, screening based on titles and abstracts, full-text assessment, and eligibility determination according to the inclusion and exclusion criteria. The entire selection process was summarized using a PRISMA flow diagram. Based on this process, a total of 15 articles met the criteria and were included in the final analysis.

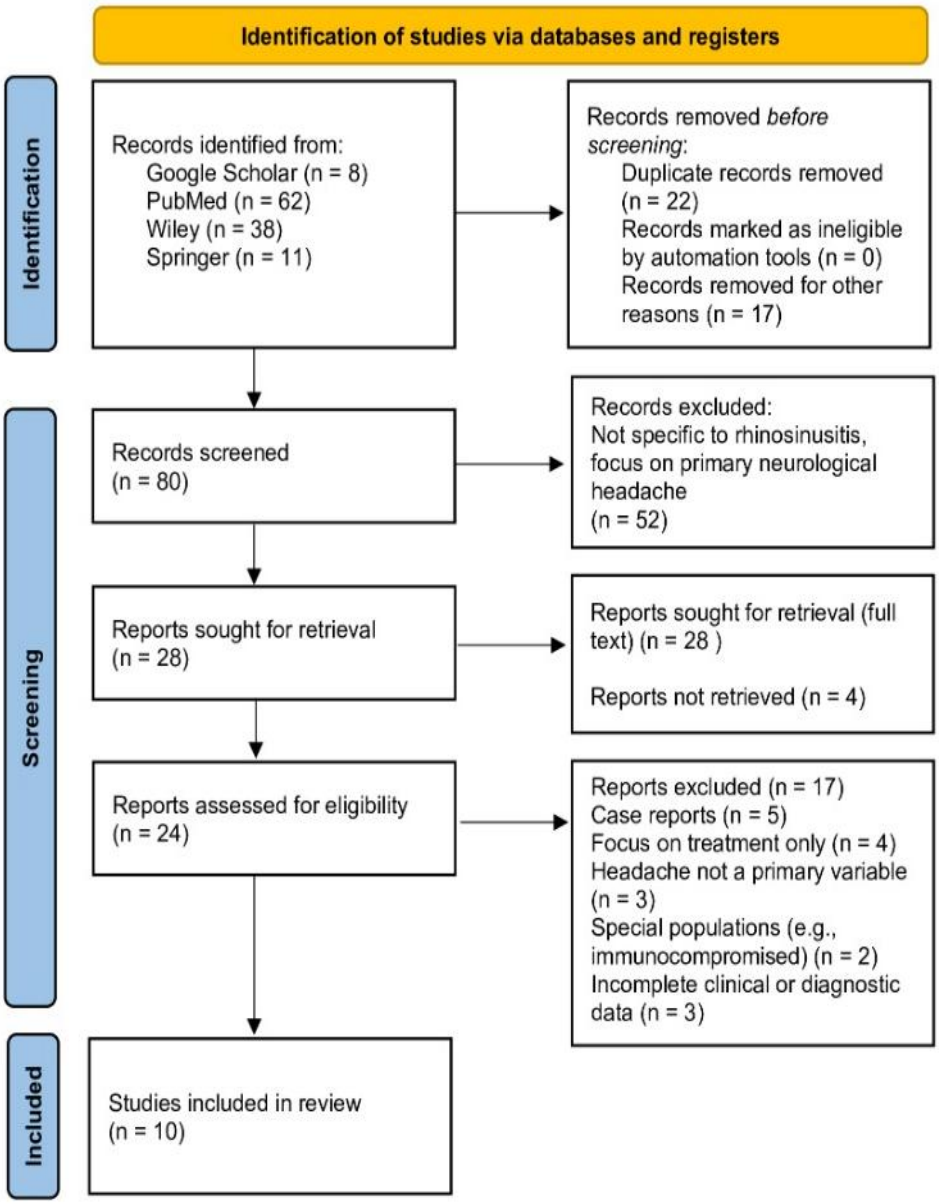


**Figure 2.** PRISMA Diagram

**Table 1. Literature Review Findings**

| No | Journal Title | Author/Year / Country | Type of Study | Study Objective | Method | Results | Clinical Implications of Headache in Chronic Rhinosinusitis |
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| 1 | Sinus Headache: Differential Diagnosis and an Evidence-Based Approach | Kim & Patel / 2020 / USA | Review | To describe the diagnosis and differential diagnosis of headache associated with rhinosinusitis. | To review the literature based on the ICHD-3 (International Classification of Headache Disorders, 3rd edition) guidelines. | Most cases labeled as "sinus headache" represent misdiagnosed and are actually primary headaches (migraine or tension-type headache). | The diagnosis of headache attributed to rhinosinusitis should fulfill ICHD-3 criteria and be supported by objective evidence of sinus inflammation (nasal endoscopy or CT scan). |
| 2 | Headache and Rhinosinusitis: A Review | Ceriani & Silberstein / 2021 / USA | Review | Explaining the relationship between rhinosinusitis and headaches, as well as the challenges of diagnosis | Literature Review | Sinus headaches are often overdiagnosed, whereas migraines are more frequently the actual cause | Headaches associated with rhinosinusitis should be evaluated with consideration of differential diagnoses to avoid overdiagnosis |
| 3 | Etiology of "Sinus Headache" – A Systematic Review | Straburzyński et al. / 2021 / Poland | Systematic Review | Assessing the etiology of sinus headaches and the prevalence of their causes | *Systematic review* (PRISMA) | Most sinus headaches are caused by primary headaches (migraines or tension-type headaches) and not by sinusitis | It is important to distinguish between sinogenic and non-sinogenic headaches due to the overlap in clinical symptoms |
| 4 | Endoscopic surgical treatment for rhinogenic contact point headache | Maniaci et al. / 2021 / Italia | Systematic review & meta-analysis | Assessing the effectiveness of endoscopic surgery in treating rhinogenic contact point headache | A PRISMA-compliant systematic review of 18 studies (978 patients), with a meta-analysis of 11 studies using the VAS and MIDAS scales | There was a significant reduction in postoperative headache pain (VAS score from 7.3 to 2.7); surgical outcomes were more effective than medical therapy in certain patients | This indicates that, in certain cases, headaches are associated with sinonasal anatomical factors. In RSK, this underscores the need for structural evaluation and potential surgical intervention when conservative therapy fails |

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| 5 | Rhinosinusitis: Evidence and Experience – 2024 | Romano et al. / 2025 / Brazil | Consensus / Review | Reviewing the latest evidence-based diagnosis and management of rhinosinusitis | Evidence-based consensus | CRS is characterized by symptoms lasting ≥12 weeks, including facial pain or pressure, with evidence of inflammation | Headache or facial pain is an important symptom but must be confirmed by objective findings for a diagnosis of CRS |
| 6 | Diagnosis and Management of Chronic Rhinosinusitis | Chin eL: et al. / 2025 / Canada | Review | Explaining the Diagnosis and Management of CRS | PubMed Literature Review | The diagnosis of CRS requires clinical symptoms and objective evidence (endoscopy/CT) | Headache alone cannot serve as the basis for a diagnosis without objective confirmation |
| 7 | Clinical Practice Guideline: Adult Sinusitis Update | Payne et al. / 2025 / USA | Guideline | Improving the accuracy of diagnosis and management of rhinosinusitis | Systematic review, guidelines based on randomized controlled trials | The diagnosis of rhinosinusitis is based on a combination of symptoms, clinical examination, and imaging | Headache is a supporting symptom, but it is nonspecific and therefore requires a comprehensive evaluation |
| 8 | Comprehensive study on hea2dache in otorhinolaryngology | Oğuz et al., / 2025 / Turki | Review | Examine the spectrum of headaches in the field of ENT and its relationship with various conditions, including rhinosinusitis | A review of the literature on headaches, including their classification, pathophysiology, and diagnostic approaches in otolaryngology practice | Headaches in otolaryngology are a combination of primary and secondary headaches; rhinosinusitis is a secondary cause that must be distinguished from migraine and tension-type headache | Emphasizing the importance of a comprehensive diagnostic approach for patients with headaches. In RSK, pain should not be the sole basis for diagnosis without evidence of sinonasal inflammation |

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| 9 | Facial/Sinus Pain or Pressure and Migraine: Exploratory Findings from the HEADS Registry | Kuruvilla et al. / 2025 / USA | Original Research | To analyze the relationship between facial/paranasal pain (FPP), migraine, and rhinosinusitis, and to differentiate their clinical characteristics. | Observational registry-based study (HEADS) with a comparative analysis of FPP and migraine. | Facial/paranasal pain is strongly associated with migraine and demonstrates significant symptom overlap with rhinosinusitis; furthermore, the frequent lack of response to antibiotic therapy suggests a high rate of misdiagnosed. | Facial/paranasal pain is strongly associated with migraine and demonstrates significant symptom overlap with rhinosinusitis; furthermore, the frequent lack of response to antibiotic therapy suggests a high rate of misdiagnosed. |
| 10 | Development of the Sinus Headache Screener to identify patients with non-rhinogenic facial pain compared with chronic rhinosinusitis in rhinology clinics | Coles et al. / 2025 / USA | Research Original | Developing screening tools to distinguish NRFP from CRS | Semi-structured interviews on 26 English-speaking adults, with the concept of elicitation and cognitive interviewing; content analysis was carried out gradually during 3 rounds of interview. | Produced 89 potential SHS items in 8 parts, including symptoms, episode characteristics, triggers, and therapies. | Emphasis that the diagnosis of "sinus" headache needs a more specific screening tool so that CRS patients are not confused with migraine/NRFP patients, so that the therapy becomes more appropriate and not excessive. |

This clinical case involving a 48-year-old male patient describes complaints of chronic headache accompanied by nasal congestion and intermittent rhinorrhea, suggesting involvement of the nasal cavity and paranasal sinuses. The continuous headache, with variations in character such as migraine and tension-type pain, as well as worsening when bending forward, during physical activity, and when wearing a head covering, indicates a rhinogenic component associated with impaired sinus ventilation and drainage. This is supported by a history of chronic, intermittent nasal congestion since 2020, accompanied by mucus secretion, indicating persistent inflammation of the nasal mucosa.

Pathophysiologically, this condition can be explained by impaired mucociliary function and ostiomeatal complex obstruction, leading to mucus accumulation in the paranasal sinuses, which in turn causes intra-sinus pressure that triggers headaches. The literature notes that chronic rhinosinusitis is often associated with headaches that may resemble migraines or tension-type headaches, leading to frequent misdiagnosed as primary headaches.

Sinus headache is a term used to describe headaches associated with inflammatory processes in the paranasal sinuses, usually accompanied by symptoms such as nasal congestion, rhinorrhea, facial pain or pressure, and may worsen when bending forward (Kim & Patel, 2020).However, in clinical practice, this term is often misused because not all headaches localized to the facial or sinus regions are actually caused by rhinosinusitis; therefore, caution is required when making a diagnosis (Ceriani & Silberstein, 2021).

Based on the results of the literature review in Table 1, Kim & Patel (2020) and Ceriani & Silberstein (2021) demonstrate consistent findings that the term “sinus headache” is often used inappropriately in daily clinical practice, as many cases of headache initially suspected to originate from the sinuses are found to have other

etiologies, particularly primary headaches such as migraine and tension-type headache. Other literature indicates that the rate of misdiagnosed can reach 50–80%, suggesting that sinus headache is a diagnosis that is frequently overestimated in clinical practice (Bernichi et al., 2021). This is supported by studies showing that the proportion of patients initially diagnosed with sinus headache who are later reclassified as having migraine is quite high, highlighting a tendency toward overdiagnosis of rhinosinusitis in patients presenting with headache complaints (Straburzyński et al., 2021)

To establish a diagnosis of headache associated with rhinosinusitis, criteria consistent with the International Classification of Headache Disorders (ICHD-3) must be met, which emphasize a temporal relationship between the headache and the inflammatory sinus process, as well as objective evidence such as endoscopic findings or CT scan imaging (Kim & Patel, 2020). Therefore, a diagnosis cannot be made based solely on subjective symptoms such as headache and nasal congestion, as this carries the risk of clinical misinterpretation (Chin et al., 2025).

Misdiagnosed of rhinosinusitis: Various studies indicate that the majority of cases labeled as sinus headaches are actually caused by migraines or tension-type headaches. Straburzyński *et al.* (2021) found that most patients with such complaints showed no evidence of sinusitis but instead fell into the category of primary headaches. Similar findings were also reported by Ceriani & Silberstein (2021), who stated that migraine is the most common cause of facial or head pain misinterpreted as sinusitis. In fact, recent observational studies indicate that facial/sinus pain has a strong association with migraine and often does not respond to antibiotics, further confirming the presence of misdiagnosed (Kuruvilla *et al*., 2025).

Sinus headache, or headache caused by rhinosinusitis, is typically characterized by a sensation of pressure or fullness in the face (facial pressure), localized to the affected sinus, and may worsen with changes in head position, such as bending forward (Kim & Patel, 2020). Additionally, sinus-related pain is almost always accompanied by characteristic symptoms such as nasal congestion, rhinorrhea, and olfactory dysfunction, and must be supported by objective findings such as inflammation on endoscopy or imaging (Chin *et al.*, 2025). Furthermore, pain in rhinosinusitis often worsens when the patient bends forward or in the morning due to changes in sinus pressure and secretion accumulation (Ceriani & Silberstein, 2021). Conversely, non-sinus-related pain in the table is described as pain that does not originate from the sinuses, although clinically it often resembles a sinus headache (Ceriani & Silberstein, 2021). The most common cause is a primary headache such as migraine, which has distinct characteristics such as throbbing pain, may be unilateral, and may be accompanied by other symptoms such as nausea or sensitivity to light and sound (Ceriani & Silberstein, 2021)

In the context of chronic rhinosinusitis (CRS), headache or facial pain is indeed one of the primary symptoms, but it is not a specific symptom. The latest consensus states that CRS must be characterized by symptoms lasting ≥12 weeks accompanied by objective evidence of inflammation; therefore, the presence of pain alone is insufficient to establish a diagnosis (Romano et al., 2025). This is also emphasized in the latest clinical guidelines, which classify headache merely as a supporting symptom that must be interpreted in conjunction with other symptoms such as nasal obstruction, rhinorrhea, as well as physical examination and imaging findings (Payne et al., 2025).

A comprehensive diagnostic approach is key to distinguishing between sinogenic and non-sinogenic headaches. In practice, headaches should be evaluated as a spectrum encompassing primary and secondary headaches, with rhinosinusitis as one of the secondary causes that must be carefully distinguished (Oğuz et al., 2025). Overlapping symptoms such as facial pain, sinus pressure, and nasal congestion often complicate diagnosis, necessitating a combination of a thorough medical history, physical examination, and objective confirmation.

## CONCLUSION

Based on the literature review and case analysis, headache associated with chronic rhinosinusitis is non-specific and cannot be used as a sole basis for diagnosis. A substantial proportion of cases labeled as “sinus headache” are primary headaches, such as migraine or tension-type headache, thereby increasing the risk of misdiagnosed. Headache related to rhinosinusitis is typically characterized by facial pressure corresponding to the affected sinus, worsening with forward bending, and accompanied by nasal symptoms along with objective evidence of inflammation, particularly on nasal endoscopy and paranasal sinus CT imaging.

In contrast, neurologically mediated headaches exhibit distinct clinical characteristics and are not necessarily associated with sinonasal symptoms. Therefore, establishing an accurate diagnosis requires a comprehensive approach, including detailed history taking, thorough clinical examination, and objective confirmation through appropriate investigations, such as CT scanning. This approach is essential to minimize diagnostic errors and to improve the appropriateness of referrals, particularly in primary healthcare settings.

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