Why the Confusion About Sinus Headache?

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KEYWORDS

• Sinus • Headache • Migraine • Treatment • MarketScan commercial database

KEY POINTS

- Symptoms of migraine headache and sinus headache can be similar.
- Both can occur with nasal congestion and facial pain, and can worsen during weather change.
- Sinus headache and the associated treatments can be found extensively in references on the Internet.

"Doctor, I have a sinus headache!" These words are heard frequently by physicians, especially otolaryngologists, headache specialists, neurologists, primary care physicians, pediatricians, and emergency room physicians. Although patients frequently believe they have a sinus problem, sinus headaches are not as common as individuals might think.

Some studies suggest that up to 90% of sinus headaches are actually migraines.[1,2] The confusion occurs partly because migraine headache involves activation of the trigeminal nerves that innervate both the sinus region and the meninges surrounding the brain. As a result, the site from which the pain originates is difficult to accurately determine. Additionally, nasal congestion can be a common feature of migraine headaches because of the autonomic nerve stimulation that can also cause tearing (lacrimation) and a runny nose (rhinorrhea). A study found that patients with sinus headaches responded to triptan migraine medications, but stated dissatisfaction with their

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treatment when they were treated with decongestants or antibiotics.[3] Treating these common symptoms without having the correct diagnosis can create overuse and misuse of resources, unnecessary surgeries, and unhappy patients. This issue addresses the differences and subtleties of sinus headaches.

To better understand the overall frequency of diagnosis, treatment pathways, and procedures and costs associated with sinus headaches, the Truven MarketScan (formerly Thomson Reuters) Commercial Claims and Encounters Database (Version 183), the largest United States–based claims database, was queried. MarketScan includes inpatient, outpatient, and prescription histories for all patients. For 2012 alone, MarketScan contains information on more than 50 million lives, with medical data available over multiple continuous years. This database is therefore extremely valuable, in that it can be used to track large patient cohorts longitudinally over time.

Because no specific *International Classification of Diseases, Ninth Revision* (ICD-9) diagnostic code exists for sinus headache, ICD-9 code 784.0 for headache (without further mention of cause or type) was used. This code is not specific to sinus headaches, but it provided the best match of all currently available diagnostic codes because it includes all headaches that are neither migraine/tension headache nor other forms of definable headache. Using this preliminary diagnosis code, a series of queries were built (**Fig. 1**) to understand how many of these headache diagnoses truly end up being caused by sinus disease. Specifically, all patients with a 784.0 diagnosis in the outpatient setting in January 2011 were identified. Of those, patients who also had a concurrent head computed tomography (CT) scan within ±30 days of the 784.0 diagnosis were further queried (**Table 1** provides a list of current procedural terminology used to identify head CTs), because these patients possibly underwent CT scan for sinus disease. The percentage of those patients with a 784.0 headache diagnosis and a sinus CT who were actually diagnosed with acute sinusitis, chronic sinusitis, or polyposis within 3 months of their CT was then analyzed. To do so, this subset of patients with an ICD-9 diagnosis code of 461.X (acute sinusitis), 473.X (chronic sinusitis), or 471.X (polyposis) were queried (the "X" means that all ICD-9 with the first 3 digits as shown here and any possible 4th digit were included).

A total cohort of 83,868 cases was identified (100%). Of those, 13,752 underwent a sinus CT. Within these 13,752 patients, only 3214 had a subsequent diagnosis of either sinusitis or polyposis (23.4% of patients with CT or 3.8% of the entire headache cohort).

This analysis, although not perfect because the headache diagnosis was not specific to sinus headache, does confirm anecdotal reports of overuse of "sinus headache." In addition, the findings suggest that, when migraine and all other causes of headaches are dismissed, only a small fraction of patients actually experience sinus headache (≈3.8%). This percentage correlates with other reports. A total of 100 patients who self-reported sinus headache were found after evaluation to have a variety of headaches (migraine, 63%; probable migraine, 23%; unclassifiable, 9%; hemicranias continua, 1%; cluster, 1%; and sinus headache, 3%).[4]

The MarketScan Outpatient View analysis provided some understanding of the overall costs associated with this broad headache diagnosis (ICD-9 784.0), and although most cases may not be sinus headaches per se, these diagnoses represent a significant burden for patients, providers, and payers. Specifically, in 2012, there were 13.5 million patient visits during which a patient was diagnosed with a 784.0 code. Nearly 20% of these were assigned in the emergency room and 66% were assigned in the physician's office. Of all diagnoses, 70% were given to female patients. The total expenses paid for these episodes were estimated at