

Analyzing Google Search Trends for Migraine Surgery and Nurtec in Response to Public Announcements

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Background: Nurtec, a versatile migraine medication, has gained popularity. However, the awareness of migraine surgery remains uncertain.

Methods: Following a descriptive approach, this cross-sectional study used Google Trends data as of December 1, 2023, to analyze internet search patterns. Approval from Vanderbilt University's institutional review board and adherence to Strengthening the Reporting of Observational Studies in Epidemiology guidelines were confirmed. Monthly relative search volume (RSV) data for "migraine surgery," "Nurtec," and "Rimegepant" were collected from January 1, 2004, to November 11, 2023, within the United States. Statistical analysis involved determining mean monthly RSV values and percentage changes for critical periods.

Results: For "Nurtec," a significant surge in RSV occurred from March 2020 to April 2020 (344%). Additional peaks were observed from June 2020 to July 2020 (66%), October 2020 to December 2020 (169%), May 2021 to June 2021 (33%), and May 2023 to June 2023 (14%). "Migraine surgery" exhibited a notable 400% increase in RSV, from March 2005 to May 2005. However, post-2006, RSV for "migraine surgery" consistently remained low without noticeable peaks.

Conclusions: The analysis of RSV trends for "Nurtec" and "migraine surgery" from 2004 to 2023 reveals the impact of pivotal events and marketing strategies on public interest. The distinct peaks in "Nurtec" RSV align with Food & Drug Administration approvals and marketing campaigns, highlighting the medication's accessibility. Conversely, the consistently low RSV for "migraine surgery" indicates limited awareness, emphasizing the need for enhanced promotion and education regarding surgical interventions. (*Plast Reconstr Surg Glob Open* 2024; 12:e5996; doi: 10.1097/GOX.0000000000005996; Published online 18 July 2024.)

INTRODUCTION

Migraines, intricate and often debilitating neurological conditions, have spurred relentless exploration into

diverse treatment modalities.¹ Recently, Pfizer purchased Nurtec,² a promising medication that has gained traction in the migraine treatment landscape.³ Nurtec, also known as Rimegepant, belongs to the class of calcitonin gene-related peptide receptor antagonists.⁴ Although other longstanding medications, like triptans (eg, sumatriptan), are commonly used in the acute treatment of migraines,⁵ gepants like Nurtec have a high efficacy in rapidly aborting migraine headaches.^{6,7} Its specific indications include the acute treatment of migraines in adults, making it a noteworthy addition to the arsenal of medications designed to address the immediate relief of migraine symptoms.⁴ What sets Nurtec apart is its rapid onset of action and its versatility as both an oral tablet and an orally disintegrating tablet, providing patients with flexible options for administration.^{4,8} This adaptability and efficacy has contributed to its rising popularity among migraine patients. The direct-to-consumer (DTC) advertising campaigns regarding Nurtec have

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been instrumental in disseminating its benefits to potential patients.⁹

Nerve release surgery, notably championed by Dr. Guyuron in 2000,¹⁰ has ascended to prominence among plastic surgeons as a potential remedy for mitigating migraine symptoms.^{11–14} Dr. Guyuron’s journey in advancing nerve release surgery as a viable treatment option for migraines provides a compelling narrative that underscores the evolution of migraine management. The intricacies of nerve release surgery involve identifying and releasing specific nerves believed to contribute to migraine occurrences.¹⁵ This surgical intervention has demonstrated noteworthy success, as multiple studies have demonstrated the safety and efficacy of migraine surgery.^{16–21} Although the success of this procedure has been demonstrated, it is unclear whether advancements in migraine treatment are known to the general public.²²

In contrast to the targeted marketing and visibility enjoyed by pharmaceutical innovations like Nurtec, surgical interventions for migraines, such as nerve release surgery, often remain overshadowed in public awareness. Google Trends, an analytical tool progressively integrated into medical research, has proven invaluable in capturing and dissecting public interests and trends in healthcare. Its applications extend beyond individual health concerns, as it has been used to track disease outbreaks²³ and investigate patterns,^{24–26} especially in plastic surgery research.^{27–30} This study delves into public awareness surrounding migraine treatments, specifically nerve release surgery and Nurtec. By leveraging Google Trends data, we aimed to uncover whether knowledge about this surgical option is widespread among individuals grappling with migraines or if it remains a relatively obscure aspect of migraine management. Thus, the study explores the intersection of healthcare and digital information dissemination, shedding light on the landscape of patient awareness and information-seeking behaviors in the context of migraine treatments.

METHODS

In this cross-sectional study with a descriptive approach, data retrieved from Google Trends on December 1, 2023, were used to elucidate patterns in internet search behavior. Approval from the institutional review board at Vanderbilt University confirmed the study’s exemption from further review. Adherence to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines was ensured.

Google Trends, a publicly accessible analytical tool, was used to gather monthly search volume data for specific terms over a defined time frame and region. The normalization and scaling of search data, ranging from 0 to 100, facilitated the derivation of a relative search volume (RSV) for each topic. Notably, these numerical values signify a comparable measure of interest over time rather than an absolute count of searches. The peak on the chart represents the period when the term achieved its maximum relative popularity under the specified parameters.

Takeaways

Question: How do pivotal events and marketing strategies influence public awareness of migraine management options?

Findings: Significant peaks in “Nurtec” relative search volume coincided with Food & Drug Administration approvals, marketing campaigns, and expanded usage, indicating heightened public interest. In contrast, relative search volume for “migraine surgery” remained consistently low, underscoring limited awareness.

Meaning: This study reveals the potent influence of strategic events and marketing on public interest in migraine management, underscoring the need for enhanced promotion and education regarding surgical interventions, and offering insights to optimize information dissemination and guide informed decisions in migraine treatment.

Google Trends was used to retrieve monthly RSV data for the terms: “migraine surgery,” “Nurtec,” and “Rimegepant.” Various search terms related to the surgical procedure were tested, with “migraine surgery” yielding the most robust results. Nurtec was chosen over other gepants such as Ubrovelvy (ubrogepant), Qulipta (atogepant), and Zavzpret (zavegepant) because it had the highest RSV. Although “Rimegepant” was included in the search query, its effects were not as comprehensive as those obtained for “Nurtec.” Therefore, only the results for “Nurtec” were described in this study. The data encompass searches conducted within the United States from January 1, 2004, to November 11, 2023, acknowledging that Google Trends does not furnish data predating 2004. The results were standardized to the month with the highest search volume for “migraine treatment”—November 2023—to facilitate comparison. A visual representation of the monthly RSV trends for each search term is presented graphically (Fig. 1). A comparison of the characteristics, including positive effects, onset of effects, dosing, effect duration, side effects, and cost, for “Nurtec” and “migraine surgery” is provided in Table 1.

Statistical Analysis

Mean monthly RSV values and percentage changes were determined for the specific periods of interest (ie, those preceding or associated with significant events surrounding migraine treatment—see Fig. 2). Data are presented descriptively. All analyses were performed using IBM SPSS Statistics 27 (IBM, Armonk, N.Y.). Figures were created using Prism (GraphPad, San Diego, Calif.).

RESULTS

From January 2004 to February 2020, the mean RSV for “Nurtec” did not increase above 5%. A sharp increase in RSV of 344% (9%–40%) was observed from March 2020 to April 2020, coinciding with Food & Drug Administration (FDA) approval and the initial launch of the medication. From June 2020 to July 2020, relative RSV increased by 66% (29%–48%), coinciding with the Khloe Kardashian DTC

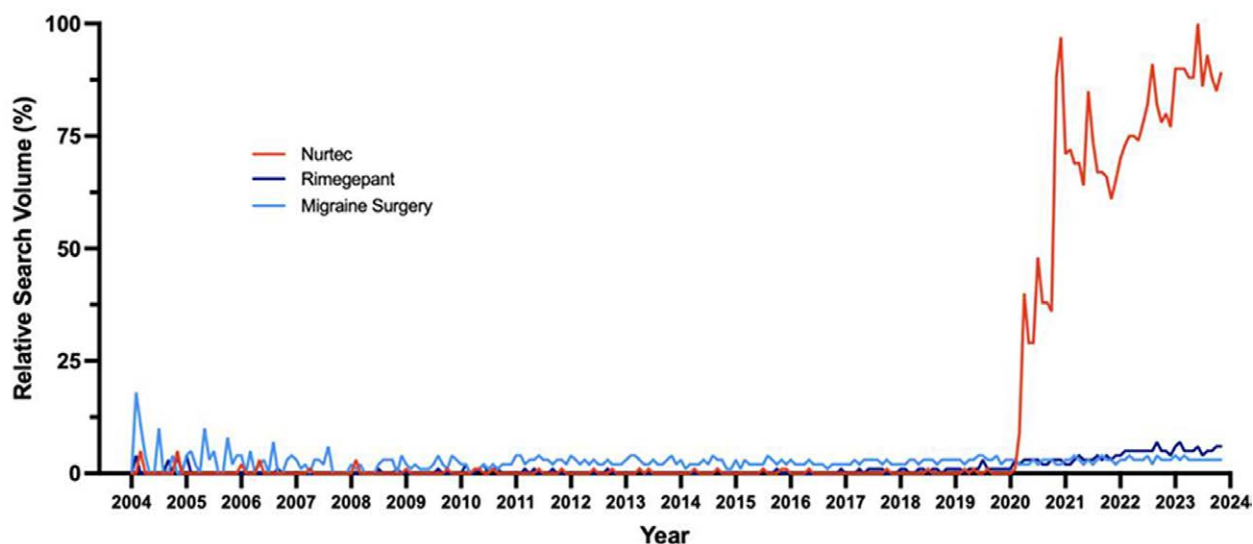


Fig. 1. US search volumes for Nurtec, Rimegepant, and migraine surgery, from January 2004 to November 2023.

Table 1. Characteristic Comparison of Nurtec and Migraine Surgery for Migraine Treatment

Intervention	Nurtec	Migraine Surgery
Positive effects	Acute treatment and prevention of migraines ⁴	Curative or significant reduction of migraines, frequency, duration, and intensity ¹
Onset of effects	1–2 h ⁴	Postoperatively ¹
Dosing	75 mg every other day ⁴	Usually, a one-time surgical intervention ¹
Effect duration	24–48 hours ⁴	Permanent ¹
Side effects	Nausea (2.7%), indigestion/stomach pain (2.4%), hypersensitivity reactions (<1%) ⁴	Numbness (12%), itching (5%), hair loss (2%), bleeding (0.3%), sensitivity issues (3%), neck stiffness (2%) ¹
Cost	\$30,000 annually without insurance ³¹	\$11,000 ³²

advertisement. From October 2020 to December 2020, RSV increased by 169% (36%–97%), likely. Specifically, a 33% (64%–85%) increase in RSV was observed from May 2021 to June 2021, coinciding with expanded FDA approval. From May 2023 to June 2023, a modest peak of 14% (88%–100%) was observed, coinciding with the release of a new commercial with Stefani Joanne Angelina Germanotta (“Lady Gaga”) (Fig. 1).

RSV for “migraine surgery” showed a 400% (2%–10%) increase from March 2005 to May 2005. However, following 2006, RSV for “migraine surgery” consistently remained low and did not rise above an RSV of 5%. No noticeable peaks were observed for pertinent dates related to “migraine surgery” (Fig. 1).

DISCUSSION

Examining the RSV for “Nurtec” from 2004 to 2023 unveils discernible patterns indicative of significant shifts in the public interest. From 2004 to February 2020, the RSV for “Nurtec” consistently maintained levels below 5% during the initial phase. However, a pronounced deviation from this norm occurred in March 2020, signifying a substantial surge of 344%. This noteworthy increase coincided with the FDA approval and subsequent medication launch. The following elevations

in RSV following target advertisement with celebrities and expanded FDA approval suggest a correlation between pivotal events, strategic marketing, and heightened public interest.

The surge in RSV for “Nurtec” can be deconstructed by examining various contributing factors. Primarily, the accessibility of the medication as an oral treatment option provides a straightforward and convenient choice for individuals seeking migraine management solutions. Therefore, the observed peaks in RSV might indicate the broader appeal of an uncomplicated pill regimen. Furthermore, the significant uptick in RSV aligns coherently with substantial investments by Pfizer in comprehensive advertising campaigns. For example, in 2022, Pfizer was reported to have spent nearly \$185 million in DTC advertisement for Nurtec,³³ following an \$11.6 billion acquisition of the original company, Biohaven.² The discerning impact of these strategic marketing endeavors is evident in creating widespread awareness, such as partnerships with well-known celebrities.³⁴ These efforts have successfully fostered proactive engagement from potential patients, as revealed by RSV trends, in their quest for effective migraine relief.

Conversely, the RSV trajectory for “migraine surgery” presents a distinct narrative. Although an initial surge of 400% was observed from March 2005 to May 2005, subsequent data revealed a consistent and sustained decline,

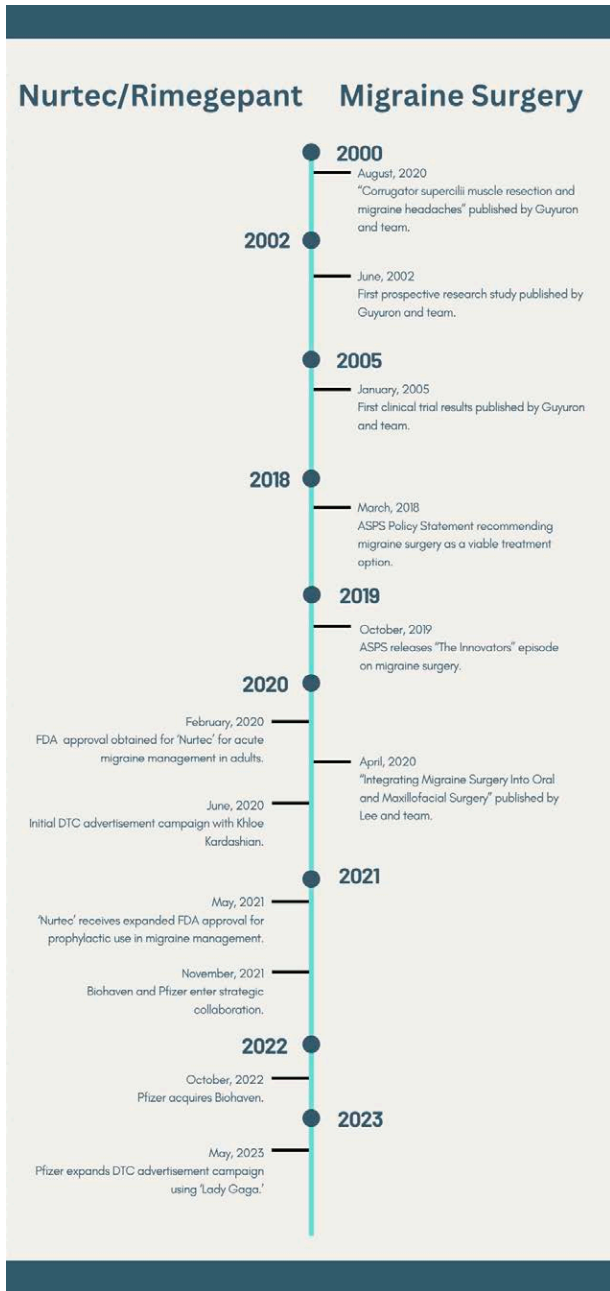


Fig. 2. Timeline of pertinent dates for Nurtec and migraine surgery.

remaining below 5% post 2006. Importantly, key dates in the timeline of “migraine surgery,” including acclamation from ASPS in 2018,³⁵ did not show appreciable changes in RSV. This trajectory may be attributed to the absence of extensive promotional efforts for surgical interventions compared with pharmaceuticals. Surgical procedures, unlike medications, may not receive commensurate attention in promotional campaigns, resulting in limited public awareness.

There are a variety of reasons why patients might prefer a pill-based treatment over a surgical intervention. Patients may be hesitant to undergo a surgical procedure due to the risk of complications. ElHawary et al.¹⁶ reports

that up to 32.1% of patients experienced some complication following migraine surgery, with 12.1% of patients experiencing paresthesia. For other chronic conditions, there is a clear patient preference for oral pharmacological therapies over surgical interventions.³⁶ Additionally, most surgical patients have hesitancy, fear, or issues with general anesthesia.³⁷

Moreover, recently published data demonstrating the effects of delayed referral for migraine surgery³⁸ suggests a potential perception issue even among providers, with the procedure often considered a last resort.³⁹ Hazewinkel et al³⁸ calculated a mean of 19 years of nonsurgical treatments for 226 patients with occipital neuralgia before undergoing curative treatment with nerve decompression surgery. Over these 19 years, the average calculated cost of nonsurgical treatment per patient was over \$500,000. On the other hand, the average price for a nerve decompression surgery is slightly more than \$10,000 (Table 1).

Despite recent acknowledgment by esteemed organizations such as the ASPS, it appears that the procedure is yet to attain broader recognition, despite reports showing high patient satisfaction following surgery.⁴⁰ One study revealed that 83.7% of patients experienced at least a 50% reduction in migraine frequency, compared with 57.7% in the placebo group.³¹ Similarly, a recent meta-analysis demonstrated that migraine surgery resulted in 13 days per month reduction in headaches compared with baseline,³² further strengthening evidence that migraine surgery is an effective treatment.

A measured and strategic approach is warranted to address the challenge of low awareness surrounding specific procedures like migraine surgery. Strategies reminiscent of those used by pharmaceutical companies may prove effective. A comprehensive approach could include heightened advertising initiatives, targeted educational campaigns aimed at the public and healthcare professionals, and collaborative efforts with medical experts. By adopting such principles, the objective would be to systematically disseminate information, stimulate informed discourse, and potentially influence a perceptual shift, positioning these procedures as viable options within the spectrum of migraine management strategies.

Limitations

Some limitations must be considered when using Google Trends data as a research tool. As mentioned previously, causal inferences cannot be drawn from these data. Additionally, Google Trends data do not directly reflect public awareness of a subject. Instead, these data serve as a proxy for public awareness via relative search traffic, which might be better categorized as a measurement of public interest. It is worth noting that the search volume data for “migraine surgery” might be contingent on the specific terminology used. The lack of a standardized, widely recognized term for this surgical approach could contribute to fluctuations in search patterns. There may be alternative phrases or representations that the general public employs when seeking information about migraine surgery, and these might not have been accounted for in our analysis. Despite these limitations, Google Trends

remains a powerful tool for examining public engagement with specific topics. Importantly, medical management with treatments like Nurtec and surgical interventions for migraine represent fundamentally different treatment paradigms, which may not be directly comparable. Although Nurtec provides a noninvasive option for temporary symptom relief, migraine surgery aims to offer a more invasive but potentially curative approach to migraines. Hence, comparing public interest in these two options may have inherent limitations due to the different nature of the interventions.

CONCLUSIONS

In conclusion, the analysis of RSV trends for “Nurtec” and “migraine surgery” from 2004 to 2023 provides valuable insights into the dynamics of public interest and awareness surrounding migraine management. The surges in RSV for “Nurtec” align with pivotal events, such as FDA approvals and strategic marketing campaigns, reflecting the potent influence of these factors on shaping public engagement. The medication’s accessibility as an oral treatment option further contributes to its popularity. Conversely, the subdued RSV for “migraine surgery” underscores the impact of limited promotional efforts and a potential perception issue, with the procedure often regarded as a last resort. A strategic and nuanced approach, borrowing principles from pharmaceutical promotion, could be considered to enhance awareness and understanding of surgical interventions. By fostering informed discussions and broadening public attention, these insights can inform future strategies aimed at optimizing the dissemination of information and guiding patients toward a more comprehensive understanding of available migraine management options.

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DISCLOSURES

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