Utilization of a neurology specialty service by primary care providers for headache management at a tertiary care hospital

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ABSTRACT

BACKGROUND: Recent data indicate that the three-month prevalence of severe headaches or migraines in the US general population is close to 25%. Participation of primary care providers will therefore be critical in providing care to affected individuals.

OBJECTIVE: To determine the number of headache disorder consult requests to a neurology outpatient service in a tertiary medical center, the appropriateness of the consult requests, and the effectiveness of a lecture series on headache diagnosis and management in preventing inappropriate consult requests from non-neurology providers.

METHODS: Clinical data on US Veterans is captured and documented in the Veterans Health Information Systems and Technology Architecture (VISTA). The Computerized Patient Record System (CPRS) electronic medical record (EMR) was used for data entry and retrieval. All consult requests for the study period within the VA North Texas Health Care System were identified in VISTA, and the clinical information reviewed in CPRS. Based on a defined algorithm, headache consult request were categorized as appropriate or inappropriate. A board-certified neurologist provided four in-person/virtual lectures to ambulatory care providers, primary care providers, internal medicine residents, and emergency room providers within the VA North Texas Health Care System on the diagnosis and management of headaches. Prior and post the lecture series, the total number of headache consults per day was assessed over 45-day periods.

RESULTS: The number of daily headache consult requests in the 45-day period prior to the lecture series was 3.6 per day (standard deviation 2.7), and 6.0 per day after the lecture series (standard deviation 2.1). The difference was not statistically significant. There were as many inappropriate headache consult requests after the lecture series as appropriate ones (50% each).

CONCLUSION: We found that a short-term educational initiative that instructed primary care providers on the diagnosis and management of common headache disorders did not reduce the number of consultation requests and, surprisingly, it did not improve the appropriateness of the consults. Given the prevalence of headaches in the general population, better training of all primary care providers in headache management should be pursued.

KEYWORDS: Headache, migraine, therapy, education, treatment, VA, veterans

Introduction

Headache is a highly prevalent group of disorders.1,2 Combined six-year data from the 1999-2004 U.S. National Health Examination and Nutrition Survey (NHANES) showed that the three-month prevalence of severe headaches or migraines in the US general population was 22.73%.3 Females and young adults had a higher prevalence than males and older adults. A recent targeted systematic review that identified up-to-date prevalence estimates of migraine and severe headache in adults from population-based US government surveys demonstrated that approximately 1 out of every 6 American and 1 in 5 women self-reported either diagnosis over a 3-month period.4 Headache is consistently the fourth or fifth most common reason for assessments at emergency departments. In reproductive aged women, headache is the third leading cause of emergency department evaluations. There is a higher burden of migraine in those aged 18-44, the elderly and disabled, people who are unemployed, and individuals with family income less than $35,000 per year. The prevalence of migraines and severe headaches has been quite stable over a period of 19 years.

The pathogenesis of headaches is incompletely understood, and there are currently no biomarkers to diagnose, monitor, or
prognosticate headache disorders. The understanding of the epidemiology of headache disorders is currently also incomplete. Epidemiological investigations have attempted to define the extent of headache occurrence, and to determine its actual impact on work and social life. However, headache disorder prevalence studies have been substantially limited by objective methodological constraints, namely the absence of a validated disease biomarker. Instead, headache disorders are currently classified by the International Headache Society (IHS) based on headache frequency and other clinical characteristics (https://ichd-3.org/). The absence of diagnostic criteria that are supported by biological correlates have also limited headache-specific interventions.

Headache disorders have a major socioeconomic impact, and constitute a major logistical burden for health care systems. This includes emergency room visits, as well as consult requests to primary care providers and specialty clinics. While some headache disorders are considered neurological emergencies that should be assessed in an emergency department or by a neurologist, many headache disorders are chronic, mild-to-moderate in severity, and can be managed in a primary care setting. In fact, given the numerous co-morbidities associated with many headache disorders, participation of primary care providers in the care of these patients appears intuitive.

When tracking all neurology consult requests over a 12-month period at our institution, approximately 25% of consult request are for headache disorders reflecting the reported national database prevalence of migraines and severe headaches. The number of headache consult requests does not change over the course of a year. The vast majority of headache consult requests are placed by a relatively small number of providers, despite the fact that each request triggers a standardized electronic consult (e-consult) that provides relatively extensive information on how to manage these patients.

The purpose of this study was to determine the number of headache disorder consult requests to a neurology outpatient service in a tertiary medical center, the appropriateness of the consult requests, and the effectiveness of a lecture series on headache diagnosis and management in preventing inappropriate consult requests from non-neurology providers.

Methods
Identification of outpatient headache consults
The US Veterans Health Administration (VHA) is the largest integrated national healthcare delivery system in the United States. Health care is delivered in 18 geographical areas termed "Veterans Integrated Service Networks (VISNs), which were created to better meet local health care needs and provides greater access to care. The VA North Texas Health Care System is located within VISN 17 (VA Heart of Texas Health Care Network) serving nearly 145,000 veterans in approximately 38 Texas counties. The Dallas campus has an 853-bed facility with 250 inpatient acute-care beds with the remainder constituting accommodations in the spinal cord injury and rehabilitation unit, community living center (CLC), and domiciliary. The Dallas VA had a large ambulatory care clinic with 110 primary care providers and 75 internal medicine resident physicians. The primary care clinics have an estimated 200,000 annual patient encounters.

Clinical data on US Veterans is captured and documented in the Veterans Health Information Systems and Technology Architecture (VISTA), a health information system deployed across all VA clinical sites that consists of clinical, financial, and administrative applications. To facilitate patient data entry and retrieval, the Computerized Patient Record System (CPRS) electronic medical record (EMR) was introduced nationally in 1998. All consult requests for the study period within the VA North Texas Health Care System were identified in VISTA, and the clinical information reviewed in CPRS.

This study was deemed not to require review by the Institutional Review Board at VA North Texas Health Care System after review by a scientific review board. No identifying patient information was accessed.

CPRS outpatient consult reviews and triage
All outpatient consult requests are reviewed by one or more board-certified neurologists within 48 hours. This assessment is ongoing and preceded the onset of this study. Headaches were triaged according to the perceived level of urgency. Relevant factors that prompted an accelerated assessment included: Sudden onset of headache; new onset of headache; increased frequency or severity of headache; onset of headache after 50 years of age; headache with concomitant systemic illness; headache associated with focal neurologic signs or symptoms; headaches associated with papilledema; prior status migrainosus diagnosed by a neurologist; treatment-refractory cluster headaches; consult requests by a community neurologist.

Headaches that were not considered urgent or emergent, or that did not require a service that was exclusively offered by the neurology service were initially addressed with an e-consult on CPRS. E-consults are comprehensive documents that provide: A brief educational component about headache management and management of patient expectations; instructions to provide relevant information about the patient’s headache; the potential benefits of prophylactic medications for certain patients; a treatment recommendation for a specific prophylactic headache medication; information about the potential risk of overusing abortive medications, and recommendations to limit the use of those agents; information about the existence and management of relevant co-morbid conditions; recommendations for additional laboratory or imaging diagnostic tests.
The appropriateness of headache consults request were only determined in the 45-day period following the lecture series. Consult requests were considered inappropriate if 1: Information provided in the consult request regarding the relevant medical history of the patient was found to be incorrect or incomplete; 2: patients with frequent headaches had not trialed at least three prophylactic agents at appropriate doses for an appropriated time as previously instructed; 3: the overuse of abortive medications had not been appropriately addressed; 4: relevant co-morbidities, including obstructive sleep apnea, tobacco smoking, overweight, obesity, morbid obesity had not been managed; 5: recommended diagnostic testing had not been initiated.

Lectures

A board-certified neurologist provided four in-person/virtual lectures to ambulatory care providers, primary care providers, internal medicine residents, and emergency room providers within the VA North Texas Health Care System on the diagnosis and management of headaches. Each lecture was delivered as a Microsoft Powerpoint presentation. The lectures were given in monthly intervals, and most attendees only attended a single lecture. Prior to the lecture series, the total number of headache consult requests per day was assessed over a 45-day period. Following the lecture series, the total number of headache consult requests per day, the number of appropriate headache consult requests per day, and the number of inappropriate headache consults per day as defined above was assessed over a 45-day period. The difference between absolute headache consult requests in the 45 day period prior to the lecture series was not significantly different (N.S.) from the number of all consult requests (box including light box on top of dark box) or inappropriate headache consult requests (dark box only) in the 45 day period following the lecture series.

Figure 1. Experimental outline. A board-certified neurologist provided four in-person/virtual lectures (Lecture 1, Lecture 2, Lecture 3, Lecture 4) to ambulatory care providers, primary care providers, internal medicine residents, and emergency room providers within the VA North Texas Health Care System on the diagnosis and management of headaches. Each lecture was delivered as a Microsoft Powerpoint presentation. The lectures were given in monthly intervals, and most attendees only attended a single lecture. Prior to the lecture series, the total number of headache consult requests per day was assessed over a 45-day period. Following the lecture series, the total number of headache consult requests per day, the number of appropriate headache consult requests per day, and the number of inappropriate headache consults per day as defined above was assessed over a 45-day period. The difference between absolute headache consult requests in the 45 day period prior to the lecture series was not significantly different (N.S.) from the number of all consult requests (box including light box on top of dark box) or inappropriate headache consult requests (dark box only) in the 45 day period following the lecture series.

Results

Lectures

An average of 20 health care providers attended each lecture. An oral survey identified attendees as ambulatory care providers, primary care providers, and emergency department providers. Most attendees only attended a single lecture.

Number of headache consult requests per day

The number of headache consult requests in the 45 day period prior to the lecture series was 3.6 per day (standard deviation...
The number of headache consult requests in the 45 day period following the lecture series was 6.0 per day (standard deviation 2.1) (Figure 1B). The difference was not statistically significant.

**Appropriateness of outpatient headache consult requests**

The number of appropriate headache consult requests in the 45 day period following the lecture series was 3.0 per day (standard deviation 2.7). The number of inappropriate headache consult requests in the 45 day period following the lecture series was 3.0 per day (standard deviation 2.7). The difference between absolute headache consult requests in the 45 day period prior to the lecture series was not significantly different from the number of all headache consult requests or inappropriate headache consult requests in the 45 day period following the lecture series.

**Discussion**

As stated, the intent of this study was to determine the number of headache disorder consult requests to a neurology outpatient service in a tertiary medical center, the appropriateness of the consult requests, and the effectiveness of a lecture series on headache diagnosis and management in preventing inappropriate consult requests from non-neurology providers.

In a tertiary medical center, referral of patients to neurology for headache is common and many of these referrals are inappropriate. An intervention, namely an educational lecture series, failed to diminish the number of consult requests for headaches to the neurology service, or improve their appropriateness. While there was no statistically significant difference in the number of total headache consult requests prior and post the intervention, there was a trend towards more headache consult requests after the lecture series. Perhaps more importantly, there were as many inappropriate headache consult requests after the lecture series as appropriate ones.

The outcome of the study is perhaps surprising, as one may have assumed that instructions on how to diagnose and manage common headache syndromes would lead to a reduction in headache consult requests. As we did not interrogate the lecture attendees about the potential impact of the lecture content on their consultation behavior, we are left to speculate what led to a negative outcome of our study. Possible reasons include: The primary care providers that place a lot of headache consult requests did not attend the lectures; the number and availability of the lectures were limited, which limited their educational impact; the lectures lacked clarity, were too complicated, or incompletely understood; lecture attendees became more aware of the neurology service, and felt encouraged to consult them for patients with headaches; the lecture content overwhelmed attendees with the complexity of headache management; primary care providers do not want to assume management of patients with headache.

As stated, headache syndromes are a common medical problem that mostly lack a biomarker for diagnosis or monitoring of disease activity and treatment response. Thus, taking care of patients with headaches frequently presents a challenge for providers. During the most recent 12-month interval, the percentage of inappropriate headache consult requests defined by the criteria above was 75% at every monthly interim analysis. There are at least two patient complaints per month because of what the patients perceive as an unwillingness of neurologists at our institution to see them. All patients are contacted, and invariably it is clear that they were not informed that there had been an e-consult with recommendations to their primary care provider, and invariably most of the recommendations were not followed. These numbers may reflect an intrinsic feature of the e-consult system wherein the consulting provider maintains the responsibility of carrying out the recommendations despite possible expectations to the contrary. In addition, there may be socio-economic reasons within the US Department of Veterans Affairs health care system that may incentivize a diagnosis of headaches and associated disability ratings. It appears intuitive that no therapeutic intervention would possibly provide a meaningful beneficial effect under those circumstances. From our interactions with primary care providers, we also understand that many US veterans appear to think that their chances of a higher disability rating depend on whether they are being seen by a neurologist. This may explain the pressure provided on some of these primary care providers for headache consult requests to a neurology specialist.

Some of the headache consult requests are driven by other external factors, including requirements imposed by insurance companies on specific medications to control or limit their use. This also applies to the US Department of Veterans Affairs health care system. The latest national VA criteria for use of anti-calcitonin gene-related peptide (CGRP) antibodies (erenumab, galcanezumab, and similar agents) require that the “Patient is under the care of a VA/VA-authorized Neurologist or locally designated expert who is responsible for prescribing and monitoring therapy”. No medical or scientific reasons are provided for this requirement, and given the risk:benefit ratio of these agents, it is not intuitive. In addition, the aforementioned criteria now account for a substantial number of headache consult requests for which our neurology service is not resourced.

The primary care model is critical to a high-functioning healthcare system, including the US Department of Veterans Affairs health care system. Ideally, the model delivers advanced patient care, reduces total cost of care, and emphasizes the clinician-patient relationship. The primary care model can only function if the providers are trained to manage common medical problems, including headache disorders, and exercise judicious use of specialty consultants. It is therefore concerning that many medical schools in the US no longer provide a neurology rotation in their core curriculum. Specifically, only 56% of US medical schools required a neurology clerkship experience in 2014. Our observations suggest that deficiencies in neurological training of primary care providers may be one
reason for an overuse of neurology consult requests for common headache disorders. This issue will need to be addressed during formal medical education. The volume of headache consult request also has the potential of adversely affecting medical student education who are completing neurology rotations, as well as the training of neurology residents. Before stringent criteria were applied to limit the in-person assessment and management of patients with headache disorders, more than half of the general neurology clinics at our institution were exclusive to those patients.

Our study has weaknesses. Only the absolute number of pre-lecture headache consult requests was recorded. Thus, it is theoretically possible that, despite an increase in headache consult requests by 40% post lecture series, this increase was driven by appropriate consult requests. However, as stated above, the number of inappropriate consult requests has been 75% every month since consult requests were first assessed in this regard. Therefore, it is highly likely that inappropriate headache consult requests account for the majority of the increase of total consult requests post lecture series.

Other weaknesses inherent to this study will have to be addressed outside the scope of this research project. They include determining the motivation of primary care provider in managing and referring headache patients. Furthermore, primary care providers should be questioned about educational initiatives that would increase their confidence and desire to see patients with these disorders.

Author contributions
O.S. serves on the editorial boards of Therapeutic Advances in Neurological Disorders, has served on data monitoring committees for Genentech-Roche, Pfizer, Novartis, and TG Therapeutics without monetary compensation, has advised EMD Serono, Celgene, Genentech, TG Therapeutics, and Genzyme, and currently receives grant support from EMD Serono and Exalys.

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