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Neuroimaging in Outpatients with Tension Type Headache

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Abstract

Background: Research into the role of neuroimaging in primary headaches such as tension type headache (TTH) is ongoing. In the present study, we aim to evaluate the ability of neuroimaging to detect potential abnormalities in patients with new onset TTH and normal neurological exam.**Materials and Methods:** In a prospective study, 294 cases of new onset TTH with normal neurological exam, that had neuroimaging, were selected. Imaging was evaluated for significant abnormalities. The percentage of abnormal findings in imaging was calculated. **Results:** 64(21.8%) patients had MRI. Of them, 21.8% of MRIs revealed abnormal findings. Meanwhile, from 238 CTs, only 0.4% showed abnormalities.**Conclusion:** Neuroimaging with current quality does not play an important role in management of patients with new onset TTH and normal neurological exam. **[GMJ.2015;4(2):62-66]**

Keyword: Neuroimaging; Headache; Tension Type Headache (TTH)

Introduction

Tension type headache (TTH) is the most common prototype of headache in general population with mild female predominance [1-4]. Despite its high prevalence and economic burden on society, it is mostly neglected by health authorities and shadowed by other types of headaches especially migraine [1, 3]. However, the disability caused by TTH can be a major public health problem worldwide impacting not only patients and their families but also the whole society.

TTH presents with bilateral mild to moderate tightness or constriction in head without migrainous feathers [5-7]. In 2004, international headache society stated its last definition for TTH in framework of "International Classification of Headache Disorders 2" (ICHD2) [1,3, 8]. Similar to previous versions, in ICHD2, the diagnosis is based on accurate history more than exam or paraclinic. Pathogenesis of TTH is not clarified yet [6, 9]. Many studies suggest both central (sensation and control of pain) and peripheral (muscular spasm) systems to be involved in its pathogenicity but the status of each is not exactly clear [1, 6].

In today's medicine, history is the key to diagnosis compared to other workups and imaging studies. Indeed, use of imaging in current topic is limited to atypical form and presence of abnormal neurologic exam [10, 11], and there is still a debate on its efficiency and cost-effectiveness under other circumstances. However, due to cultural boundaries and concern of patients about their health, in many countries such as Iran, many physicians still use imaging methods as a routine workups for that purpose.

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To clarify imaging role, many studies have been done during last decades. Frishberg et al in 1993 reviewed researches about this role in chronic TTH cases with normal neurological exam; they did not report any abnormality but they found data insufficient to make a recommendation [12]. Since then, most studies have confirmed this result. Overall, scholars unanimously believe that imaging is a worthless technique in management of these cases. Among them, Tsushima et al paper could be mentioned. They called MRI an unrewarding device in the assessment of patients with chronic and recurrent headache and normal neurologic findings [10].

Despite this consensus, what prompts us to study this subject is the lack of data about neuroimaging role in management of new onset TTH. Therefore, in this study we aim to evaluate this role in patients with tension type headache and normal physical examination with less than 3 months duration.

Material and Methods

In this prospective chart review cross-sectional study, patients with a clinical diagnosis of TTH were recruited at outpatient neurological clinic of Imam Reza, as a referral center, which is affiliated to Shiraz University of Medical Sciences between 2009 and 2014. We defined TTH based on international headache society criteria [2].Other inclusion criteria were as followed: a) normal neurological exam and b) less than 3 months from the onset of headache.

Participants did not fulfil any criteria for other primary headaches. Moreover, none of them had a history of physical or neurological signs of secondary headache. Furthermore, we excluded patients with headache red flags, which are adapted from Cleveland Clinic Headache Centre criteria in 1998 [13], too. Content of these criteria was declared in table 1.

Health status of all understudied patients was stable, without any comorbidity. Also, there was no age limitation to enter this study.

We selected 294 patients with similar profiles which had neuroimaging including magnetic resonance imaging (MRI) and computed tomography (CT) which was requested earlier by other physicians. Findings of imaging were divided into only two groups: normal and abnormal which can induce headaches including brain mass, encephalitis, arteriovenous malformation, aneurysm, subdural hematoma and stroke (hemorrhagic and ischemic) [14].

Table 1. Red Flags

-Onset of new or different headache
-Nausea or vomiting before headache
-Worst headache ever experience
-Progressive visual or neurological changes
-Onset of headache after age of 50 years
-Onset of headache with exertion, sexual activity or coughing
-Abnormal neurological exam or focal neurological sign:
-Paralysis
-Weakness, ataxia or loss of co-ordination
-Drowsiness, confusion, memory impairment or loss of consciousness
-Papilloedema
-Stiff neck
-Numbness
-Asymmetry of papillary response
-Sensory loss

All data are expressed as percentage. Results were statistically analyzed by Chi-square for detecting the portion of abnormalities in imaging of understudied subjects. The statistical software package SPSS for windows, version 16.0 (SPSS, Chicago, IL, USA) was used for data analysis.

This study was supervised by Departments of Neurology of Shiraz University of Medical Sciences and was also approved by the local ethical committee.

Results

294 patients were entered into this study with diagnosis of new onset TTH, referred to Imam Reza clinic from 1388 to 1393 including eighty one men (27.6%) and 213 women (76.4%). CT or MRI had been performed for all participants previously. The mean age of patients was 38.5±16 and 39.23±15.8 years in men and women, respectively (minimum 16 years in men and 13 years in women, and maximum 82 years in both men and women). Among participants, 238(80.9%) of them brought CT at the time of referral which had abnormal finding in only one case.

The finding was an old CVA. In other words, only 0.4% of requested CT in patients with normal neurological exam had abnormal findings.

64(21.8%) patients had MRI that was requested by referring physicians. Of them, 14(21.8%) had minor abnormalities, non-specific white matter lesions and ischemic change due to microangiopathy, that were not important findings.

8 patients had both CT and MRI (2.7%). No other abnormalities were detected in CT or MRI (0%). Summary is shown in table 2.

Discussion

"… In patients with atypical headache patterns and/or a history of seizures or physical examination findings of focal neurologic signs or symptoms, CT or MRI may be indicated [10]."

This part of well-known statement of American Academy of Neurology has become an inseparable part of practice guidelines for imaging in patients with chief complaint of headache but normal neurological exam over two decades. Since then, many studies have been conducted to evaluate neuroimaging role in management of headache; nearly all agree that CT and MRI are unrewarding techniques without a diagnostic decision-making aid in patients with primary headaches such as TTH without specific findings in exam [10, 11, 15]. Nevertheless, patients' demands for getting ensured of their health state and fear of missed space occupying lesions in new onset headache make many physicians request neuroimaging in such cases.

Table 2. Number and percentage of CT and MRI performed for patients

	MRI	CT	CT and MRI
Number of patients	64	238	8
Abnormal findings	14	1	0
Percentage	21.8%	0.4%	0%

In present study, we evaluate significant number of patients with a history of new onset TTH, duration of less than 3 months, which were referred to our center by other physicians. All of them had neuroimaging including CT (238 cases) or MRI (64cases); while, they all had normal neurological exam. We performed a statistical analysis on data obtained from these imaging to appraise the effects of them on the course of diagnosis and treatment. Our data concur with previous studies and showed normal findings in most of the cases. Only 0.4% of requested CTs had abnormal findings in which none of them changed the plan of patients. On the other hand, 21% of MRIs revealed findings. This could be because of more sensitivity of MRI than CT in detecting abnormalities of brain [10]. However, none of these patients had concurrent CT to compare their findings. In addition, notably higher number of CTs compared with MRIs in our study can be caused by lower price or availability of it in our region.

The point distinguishing present study from previous ones is the study group that is chosen from new onset of TTH. Our reason for this decision is lack of adequate data regarding the role of neuroimaging in diagnosis and management of this group. In addition, this review can help delimit causal relations between imaging findings and headaches more specifically. In addition, if we can identify acute cases faster and more accurate, we can treat and manage them better and prevent complications and decrease missing cases.

As we noticed, in our literature review, unlike present study, almost all the papers we found, discussed imaging in chronic or recurrent types of headache (more than 3 months). One of these few reports that surveyed TTH and imaging was Giuseppe De Benedittis et al study in 1995 [16]. In a case-control study, they investigated MRI findings in 35 patients with diagnosis of chronic TTH. Although they found some minor abnormalities, overall, they did not consider any important finding [16]. Henry Z. Wang and his colleagues reached the same conclusion. They reviewed MRI studies of 444 patients with headaches with normal exam (including TTH, migraine and atypical headache). They noticed that only 1.6% of

patients with TTH had major abnormalities in MRI and most of abnormal findings were seen in atypical cases [11].

Few researchers obtained different results. For instance, in 2005, an article was published with this title: Gray matter decrease in patients with chronic type headache." They compared alteration in MRI of 20 patients with chronic TTH with 20 patients that suffered from medication overuse headaches (MOH). The intensity and duration of pain were almost similar in both groups. They could find a significant decrease in gray matter of patients with chronic TTH but not MOH. This finding implies that the changes may not be just the consequence of chronic headache, structural changes can play a role in this type [17]. However, due to chronicity of cases' complaints in this study, these findings do not necessarily contradict our findings.

Shortly after this article was published, Arne May in a review article assessed the changes in headache syndrome. He pointed Schmidt-Wilcke et al paper and a significant decrease in gray matter in chronic TTH that was noticed there. Accordingly, the area of this change inbred with pain processing area. Therefore, he concluded that this alteration may be a consequence of the chronic pain not the cause [18].

The majority of our reviewed articles focused more on MRI compared to CT. It occurred due to timeframe we chose for review literature. Most studies on CT date back to 90s and earlier. John E. Jordan reviewed studies before 1991 and summarized it in one sentence: screening patients with isolated, non-traumatic headache by means of CT or MR imaging is not warranted [19].

Overall, those articles did not recommend CT or MRI as a diagnostic modality in headaches with normal neurological exam (19-22). We designed this study as a non-interventional one; therefore, we cannot request new CTs or MRIs for any participant. As a result, comparison of findings in CTs with MRIs in patients was not possible.

Conclusion

To sum it up, our results showed that similar to chronic cases, MRI and CT with current quality and capacity do not appear to be effective in diagnosis or treatment of patients with TTH shorter than 3 months. Indeed, it seems that in this condition not only does neuroimaging, including MRI and CT, impose a financial burden on patients and waste of their time but also radiation used in CTs can be harmful and cause other disorders in patients. In spite of small samples chosen in reviewed articles and their intention to chronicity of headache, results of founded studies supported and confirmed our claim. Therefore, we did not recommend imaging as a routine workup in TTH.

Conflicts of Interest

Authors declare that there is no conflict of interests.

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