

Magnetic Resonance Imaging Findings in Patients Presenting with Headache in Port Harcourt, Rivers State, Nigeria

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Abstract

Background: Headache is a common complaint in clinical practice, though most patients who present with headache have no neurological abnormality on Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) investigations. Good knowledge of the patterns of MR image findings in patients with a headache would serve as a guide to neurosurgeons and clinicians in the management of these patients. This study was designed to evaluate the MR image findings in patients with headache in our locality.

Materials and Method: A retrospective cross-sectional study design was adopted in this study and it was conducted in Port Harcourt metropolis, Rivers State Nigeria to cover three diagnostic centers with MRI facilities. The population of the study consisted of patients' records of all cases of brain MRI investigations done based on headache as the clinical indication. Permission for this study was obtained from the management of the selected study centers. All patients' information that was obtained in this study was treated with a high level of confidentiality and used for the purpose of this study only. A sample size of 150 MRI reports was reviewed and selected purposively based on the inclusion criteria set for this study. Data for this study were obtained using a data capture sheet. The obtained data were analyzed using Statistical Package for Social Sciences (SPSS) version 21. Descriptive statistics (frequency, table and percentages) were adopted for data analysis.

Results: Out of 150 cases studied, 58% (n=87) were females while males were 42% (n=63) with male to female ratio of 1:1.4. Of the 150 cases evaluated, 31.33% (n=47)

were within the age group 26-30 years of age as highest, followed by age group 31-35 years 18.67% (n=28) and the least were within the age group 15-20 years of age, which is 4% (n=6). With regards to the frequency and percentage distribution of the MRI findings in patients presented with headache, out of 150 cases assessed, 48% (n=72) had normal MRI finding as highest, followed by sinusitis 21.34% (n=32) and the least were pituitary mass and meningitis, which is 1.33% (n=2) each irrespectively.

Conclusion: Female preponderance was noted in this study. The majority of the subjects were mostly within 2nd to 4th decades of age. Normal MRI findings were the most prevalent patterns in patients presenting with headache in this study. The most common pathology was sinusitis.

Keywords: Headache; Magnetic imaging finding; Magnetic resonance imaging

Introduction

Headache is one of the commonest symptoms in general medical practices and it virtually affects all persons at some point [1,2]. Headache has been ranked among the tenth most disabling conditions globally according to World Health Organization parameters [3,4]. Depending on the etiology, the headache may be classified into primary and secondary. A primary headache disorder is not caused by a specific medical condition. A primary headache is more common than the second type of headache [5]. Secondary headache disorder has another disorder that activates the pain-sensitive nerves of the head. The differential diagnoses of secondary headaches could be a legion and are very likely more numerous than for any other symptom [5]. The fear of missing a potentially sinister but treatable cause of headaches, coupled with patients' anxiety and medicolegal reasons are

usually what prompts the investigation of headaches with neuroimaging modalities such as Magnetic Resonance Imaging (MRI) and Computerized Tomography scan (CT) [6]. Headaches can be infrequent (episodic) or may become chronic. Chronic headache refers to a headache that occurs on 15 or more days in a month for at least three months [4,7,8].

A headache may have an extraordinarily high number of causes, which may be grouped into primary and secondary causes [9]. Primary causes include migraines, tension-type headaches, cluster headaches, and medication overuse headaches, while secondary causes include; Infections (paranasal sinusitis, meningoencephalitis, cerebritis and brain abscess), brain neoplastic (posterior fossa neoplasms, meningeal carcinomatosis and pituitary tumor), vascular causes (saccular aneurysms, AV malformation, carotid or vertebral dissection, cerebral infarcts, vasculitis, subdural or epidural hematomas, intracranial hypertension/hypotension), cervicomedullary lesions (Chiari malformation, foramen magnum meningioma) and systemic illnesses.

The majority of the patients who present with chronic or recurrent headaches have no neurological abnormality [10], still a greater number of the patients undergo an evaluation with Computed tomography and Magnetic resonance imaging [10,11]. Despite the higher costs, MRI is generally preferred to CT for the evaluation of headaches. The yield may vary depending on the field strength (0.2 Tesla to 3 Tesla), the use of paramagnetic contrast, the selection of acquisition sequences and the use of MRA and MRV [12]. In emergency situations, the CT scan could be performed first, depending on the patient's symptoms. MRI is more sensitive, particularly for lesions in the posterior fossa, as well for neoplasms, cervicomedullary lesions, pituitary lesions, intracranial hyper/hypotension, and vascular disease (arterial and venous infarctions [12].

In Africa, there is rarity of data on the prevalence of headaches. A study conducted in rural Tanzania recorded the 1-year prevalence of headache as 23.1% [13] while Osuntokun et al. [14], in Nigeria recorded an estimated prevalence ratio of migraine headaches to be 5.3 per 100 (5 per 100 in males and 5.6 per 100 in females). In a report on the global burden of headache, Stovner et al. [3] recorded a prevalence of 50% in Australia, Europe and North America.

Headache is a common public health challenge, and a good knowledge of the patterns of MRI findings in patients presenting with a headache would serve as a guide to clinicians and neurosurgeons in the management of these patients. There is a dearth of information on the MR imaging findings in patients presenting with headaches in our locality. This study was designed to evaluate the patterns of MRI findings in patients presenting with headache in Port Harcourt, Rivers State, Nigeria.

Materials and Methods

This was a cross-sectional retrospective review of radiological reports of patients who underwent MRI investigations in three private diagnostic centers in Port

Harcourt metropolis, Rivers State, Nigeria. A sample size of 150 was used for this study, and they were selected purposively based on the inclusion criteria from the radiology department database of the selected study centers from January 2015 to December 2017. Radiological reports with information such as age, gender, clinical indications and radiological findings were selected and included in this study. Permission to collect data for this study was obtained from the Human Research and Ethics Committees of the study centers. All patients' information obtained was treated with a high level of confidentiality. Information retrieved included the patient's gender, age, clinical indications and the radiological findings. The obtained data were processed using Excel 2013 version and Statistical Package for Social Sciences (SPSS) version 20 (IBM Corporation, Chicago, IL, USA). The data were analyzed in line with the study objective using descriptive statistics (frequency table, chart and percentages).

Results

Out of 150 subjects' records evaluated in this study, 58% (n=87) were females when compared to their male counterparts, which is 42% (n=63) with male to female ratio of 1:1.4 (Table 1). Of the 150 cases evaluated, 31.33% (n=47) were within the age group 26-30 years of age as highest, followed by age group 31-35 years 18.67% (n=28) and the least were within the age group 15-20 years of age, which is 4% (n=6) (Table 1).

Table 1: Frequency and percentage distribution of the demographic Variable.

Demographic variables	Frequency (n)	Percentage (%)
a) Gender		
Male	63	42
Female	87	58
Total	150	100
b) Age group (Years)		
15-20	6	4
21-25	20	13.33
26-30	47	31.33
31-35	28	18.67
36-40	17	11.33
41-45	14	9.33
46 and above	18	12.01
Total	150	100

With regards to the frequency and percentage distribution of the MRI findings in patients presented with headache, out of 150 cases assessed, 48% (n=72) had normal MRI finding as highest, followed by sinusitis 21.34% (n=32) and the least were

pituitary mass and meningitis, which is 1.33% (n=2) each irrespectively (**Table 2**).

Table 2: Frequency and percentage distribution of MRI findings with a headache.

Imaging findings	Frequency (n)	Percentage (%)
Bilateral maxillary antral polyps	12	8
Pituitary mass	2	1.33
Cerebral atrophy	8	5.33
Cerebral abscess	4	2.67
Normal	72	48
Intracerebral infarct	5	3.33
Intracerebral mass	10	6.67
Mastoiditis	3	2
Sinusitis	32	21.34
Meningitis	2	1.33
Total	150	100

Discussion

In this study, greater numbers of the cases were females when compared with their male population. This finding is in keeping with the findings of similar studies conducted by Young et al. [15], Wang et al. [16], Osuntokun et al. [14] and Ukamaka and Adaorah [4]. In Young et al. [15] study, out of 190 patients who underwent 304 neuroimaging studies, females accounted for 65% of the total subjects studied. In Wang et al. study, of the 1070 patients with primary headache and 1070 healthy controls, females accounted for 67.8% (n=725) when compared to their male counterparts. Osuntokun et al. [14] study in Nigeria, equally documented the crude prevalence ratio of migraine headache to be 5.3 per 100 (5 per 100 in males and 5.6 per 100 in females). In their study, female preponderance was also noted. In addition, Ukamaka and Adaorah [4] study, which evaluated 126 patients' CT reports in the radiology department of the University of Abuja Teaching Hospital with a complaint of chronic headache, also noted slight female preponderance with 64% as against their male counterparts 54%. Female preponderance noted in this study and other previous studies could be attributed to the fact that females are usually more anxious and disturbed about the symptoms of a headache than their male counterparts thereby making them be more exposed to neuroimaging investigations [6].

In this study, greater numbers of the subjects were within the 2nd to 4th decade of ages with a mean age of 42.25 ± 13.17 years. This finding is in keeping with the results of similar studies conducted by Wang et al. [16] and Young et al. [15]. Wang et al study documented a mean age of 40.18 ± 12.46 years and 40.05 ± 12.30 years for healthy controls and patients with primary headaches respectively. Mean age of 46.5years with age range of 18-91 years was documented in Young et al.

[15] study. The finding of this study is inconsistent with the finding documented by Ukamaka and Adaorah [4]. In their study, they reported a mean age of 39.9 ± 13.7 years with the majority of all patients in the 45-54 age range. These differences in our findings could be attributed to the differences in our sample sizes, and the geographical variation of the aforementioned studies. In this study, 150 subjects' records were evaluated while in Wang et al. [16], Young et al. [15] and Ukamaka and Adaorah [4] studies, their sample size was 1070, 190 and 126 patients respectively.

In this study, normal MRI finding preponderance was noted. This finding is in agreement with the findings of similar studies and literatures by Cain et al. [17], Wang et al. [16], Young et al. [15], Jordan et al. [18], Simpson et al. [19], Frishberg [20] and American Academy of Neurology [21]. In Cain et al. study, only 0.58% (n=4) patients with primary headache and 0.73% (n=5) healthy control had significant abnormalities. According to them, neuroimaging is unnecessary for patients with established primary headache disorders. In Young et al. [15] study, abnormal neuroimaging findings were found in 3.1% of patients. They attributed their findings to the fact that inadequate understanding or application of red flags may contribute to recommendations of imaging patients against current guidelines. They recommended that there is a high need to reduce unnecessary neuroimaging of patients with a headache by designing and implementing interventional policies [15]. According to Simpson et al. [19] and Frishberg [20], a large number of patients with chronic headaches usually manifest as normal findings on CT scans, since most of them do not have any serious or treatable underlying medical cause of the headache. In their opinion, the routine investigation of all cases of headache should not be recommended.

Based on these problems, the United States headache Consortium has given recommendations for neuroimaging in chronic headache patients, which include non-acute headaches associated with abnormal findings on neurological examinations [21]. They recommended that neuroimaging should be used in patients with Certain Clinical Warning Criteria (CWC) of secondary headache, which includes headache associated with focal neurological symptoms, change in the character of headache, the headache of sudden onset, the onset of headache after 50 years, no response to analgesics.

In this study, the most pathological condition was sinusitis. This is in keeping with the finding of the study conducted by Ukamaka and Adaorah [4]. In their study, they reported sinusitis as the most prevalent lesion. This is contrary to the finding reported by Atci et al. [22], in which areas of cerebral infarction was the most prevalent lesion, followed by sinusitis.

Conclusion

Female preponderance was noted in this study. The majority of the subjects were mostly within 2nd to 4th decades of ages. Normal MRI findings were the most prevalent patterns in

patients presenting with headache in this study. The most common pathology was sinusitis.

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