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Evaluation of Non-traumatic Recurrent Chronic Headache among adult Patients Using Computed Tomography

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Abstract

Background: Headache is a common symptom encountered in clinical practice and may be a manifestation of an underlying neurological diseases. Although many headaches may be benign, however a large number of patients presenting with recurrent chronic headache may require radiological investigations to rule out underlining brain pathology. Neuroimaging with skull x-ray, CT and MRI are common imaging modalities to investigate patients with recurrent headache. However, should all patients with recurrent chronic headache be referred for brain CT and MRI? The objective is therefore, the aim of our study is to document the pattern of Computed tomographic findings among adult patients who presented with non-traumatic recurrent chronic headache with neurological features and compare with patients without neurological features. **Material & Methods:** This descriptive cross-sectional study comprises of 89 adult patients who presented with history of non-traumatic recurrent chronic headache and referred for brain CT at the Radiology department of University of Abuja Teaching Hospital, Gwagwalada from January 2017 to June 2018. **Results:** Majority of the patients with chronic headache with neurological features had more abnormal findings representing 35(76.1%) with cerebral atrophy being the commonest. Normal head CT was the commonest finding among patients without neurological features accounting for 25(58.1%) with sinusitis the commonest abnormal CT finding. The difference in the spectrum of CT findings among patients with chronic headache with and without neurological features was statiscally significant with p=0.004. **Conclusions:** Evaluation of patients who present with headache using neuroimaging should be with caution especially for patients who do not have any neurological symptom.

Keywords:- Headache, computed tomography, recurrent, non-traumatic, adults, chronic.

INTRODUCTION

Headache is a common symptom encountered in clinical practice and may be a manifestation of an underlying neurological diseases.[1,2] Headache commonly refers to pain in the head, face and sometimes include the upper neck[1,]. It can be classified as secondary or primary. Primary headache has no organic cause while secondary headache has an established cause.[1]

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Most primary cause of headache do not usually require radiological evaluation; however, majority still present for neuroimaging.

Chronic headache is defined as headache occurring for 15 days or more days in a month for at least three months.[3] Once headache become chronic and recurring usually patients seeks for clinical consultation with a physician which may warrant neuroimaging.

Computed tomography (CT) and Magnetic resonance imaging (MRI) are the two available neuroimaging modalities in evaluating patients with headache. However, these machines are not readily available and are costly coupled with the radiation risk of CT. Therefore, there is need to justify the use of this machine in patient with recurrent chronic headache.

Therefore, the aim of this study is to document the CT findings in patient with non-traumatic recurrent headache with neurological features compare with those without neurological symptoms.

MATERIAL AND METHODS

This descriptive cross-sectional study comprises of 89 adult patients who presented with history of non-traumatic recurrent chronic headache with and without neurological features referred for brain CT at the Radiology department of University of Abuja Teaching Hospital, Gwagwalada from January 2017 to June 2018. All patients with previous history of trauma presenting with headache were excluded from the study. The biodata (age, gender, marital status, level of education, tribe), neurological features and CT head finding of patients who presented with chronic headache were recorded.

Computed tomographic examinations were carried out using the Toshiba Activion 16-slice CT scanners. A range of 120–140 kvp and 150–300 mAs were used, and images were acquired in the axial plane at 2.5 mm from the base of the skull to the vertex. Low-osmolar intravenous contrast medium iopamidol 40 ml was given.

Data Analysis: Data were collated and analysed using SPSS 19.0 software 2010 by IBMR USA and statistical test of association was carried out using Chi –square. P-value<0.05 was considered statistically significant. The results are presented in the form of tables and charts.

RESULTS

A total of 89 patients' CT head were analysed. The mean age of the subjects is 49±11 years with age range of 21-79years. Majority of the patients were in 41-50 and 51-60 age group accounting 31.5% and 21.5% respectively and in 71-80 age group had the lowest number of patients representing 9.0%. There were 51 males and 38 females with male to female ratio of 1.3:1. Table 1.

Among the study population 46(51.7%) presented with other neurological features apart from headache while 43(48.3%) had no neurological features. The different neurological features seen in the study population includes seizures, memory loss, blurred lesions, vomiting, weakness of limb, lateralizing sign, anosmia, dizziness and tinnitus. Among the patients with neurological features 15(32.6%) had more than one neurological symptom.

The spectrum of computed tomography findings in patients with chronic non traumatic headache includes normal findings in

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36(40.4%), mass 7(7.9%) [Figure 1], infection 7(7.9%), chronic infract 8(9.0%), subdural collection 4(4.5%), cerebral atrophy 11(12.4%) [Figure 2], sinusitis 13(14.6%), calcification 2(2.2%) and cavum septum pellucidum 1(1.1%) [Figure 3]. [Table 2]. From the 46 patients who had headache with neurological features 35(76.1%) had abnormal findings while 11 patients representing 23.9% had normal findings. The spectrum of abnormal findings in patients with chronic headache with neurological symptoms include mass, infection, chronic infract, cerebral atrophy and sinusitis representing 5(10.9%), 7(15.2%), 5(10.9%), 4(8.7%), 8(17.4%) and 6(13.0%) patients respectively. Cerebral atrophy was the commonest abnormal CT findings among patients with chronic headache and neurological features. Normal finding was the commonest brain CT findings in patient with chronic headache without neurological features representing 25(58.1%). The commonest abnormal finding was sinusitis among patients with headache without neurological features representing 7(16.3%). The difference in CT findings among patients with chronic headache with neurological features and those without neurological features was statically significant. P=0.004.

Cerebral atrophy accounted for 6(75%) patients with chronic non traumatic head in 71-80 years age group being the commonest while in 21-30 age group sinusitis the most common abnormal CT finding accounting for 5(41.7%) of patients. The difference in the CT head findings with age was statistically significant. p=0.0186 Table 3

The commonest abnormal CT head finding in female was sinusitis accounting for 8(21.1%) of patients while in male it was cerebral atrophy representing 7(13.7%). The difference between CT findings in males and females was not statistically significant p=0.625. Table 4. More females (31.5%) had abnormal CT findings compared to males (29.2%), however this was not statistically significant p=0.12

Table 1: Age and Sex distribution of patients with chronic non traumatic headache.

Age group			**Male**		**Female**	
Years	**Freqency**	**Percentage**	**Freqency**	**Percentage**	**Freqency**	**Percentage**
21-30	12	13.5	6	11.8	6	15.7
31-40	10	11.2	8	15.7	2	5.3
41-50	28	31.5	15	29.4	13	34.2
51-60	19	21.3	9	17.6	10	26.3
61-70	12	13.5	8	15.7	4	10.5
71-80	8	9.0	5	9.8	3	7.9
Total	89	100	51	100	38	100

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Table 2: CT findings in patients with chronic headache with and without neurological features.

CT findings			Headache with neurological features		Headache without neurological features		P-Value
	Freqency	Percentage	Freqency	Percentage	Freqency	Percentage	
Normal	36	40.4	11	23.9	25	58.1	0.0012
Abnormal	53	59.6	35	76.1	18	41.9	0.0003
Mass	7	7.9	5	10.9	2	4.7	0.437
Infection	7	7.9	7	15.2	0	0.0	0.004
Chronic infract	8	9.0	5	10.9	3	6.9	0.019
Subdural collection	4	4.5	4	8.7	0	0.0	0.0001
Cerebral atrophy	11	12.4	8	17.4	3	6.9	0.0032
Sinusitis	13	14.6	6	13.0	7	16.3	0.896
Calcifications	2	2.2	0	0.0	2	4.7	0.003
Cavum septum pellucidum	1	1.1	0	0.0	1	2.3	0.025
Total	89	100.0	46	100.0	43	100.0	

Table 3: Age and CT findings in patients with chronic non traumatic headache

FINDINGS	21-30	31-40	41-50	51-60	61-70	71-80		P-value
NORMAL	6(50.0)	4(40.0)	16(57.1)	5(26.3)	4(33.3)	1(12.5)		0.0186
MASS	0(0.0)	2(20.0)	0(0.0)	4(21.1)	1(16.7)	0(12.5)		
infection	0(0.0)	0(0.0)	5(17.9)	2(10,5)	0(0)	1(100)		
Chronic infract Subdural collection	0(0.0) 0(0.0)	3(30.0) 1(10.0)	3(10.7) 0(0)	2(10.5 0(0.0)	0(0.0) 3(25.0)	0(0) 0(0)		
cerebral atrophy	0(0.0)	0(0.0)	1(3.6)	2(10.5)	2(16.7)	6(75)		
sinusitis	5(41.7)	0(0.0)	2(7.1)	3(15.7)	3(25.0)	0(0)		
Calcification	0(0.0)	0(0.0	1(3.6)	1(5.3)	3(16.7)	0(0)		
Cavum septum pellucidum	1(8.3)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)		
Total	12(100.0)	10(100.0)	28(100.0)	19(100.0)	12(100.0)	8(100.0)		

Table 4: Gender and CT findings among patients with chronic non traumatic headache

CT Finding	Male		Female		P-value
	Freqency	Percentage	Freqency	Percentage	
Normal	26	50.9	10	26.3	p= 0.624
Mass	5	9.8	2	5.3	
Infection	3	5.9	4	10.5	

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Chronic infract	4	7.8	4	10.5	
Subdural colle	1	2.0	3	7.9	
Cerebral atrophy	7	13.7	4	10.5	
Sinusitis	5	9.8	8	21.1	
Calcifications	0	0.0	2	5.3	
Cavum septum P	0	0.0	1	2.6	
Total	51	100	38	100.0	

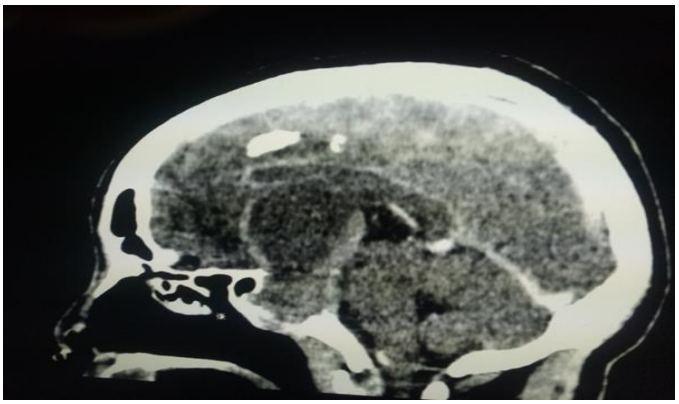

Figure 1: Contrast enhanced CT of the brain showing mildly enhancing large pituitary mass extending to the optic chiasma.

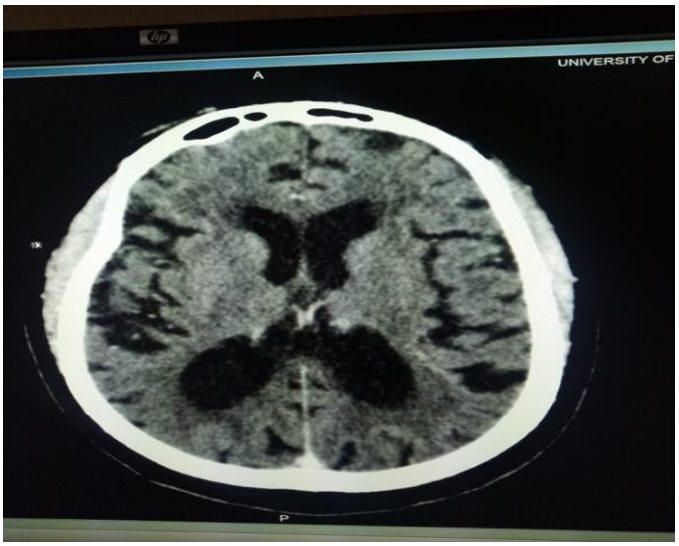

Figure 2: NECT of the brain showing diffuse cerebral atrophy

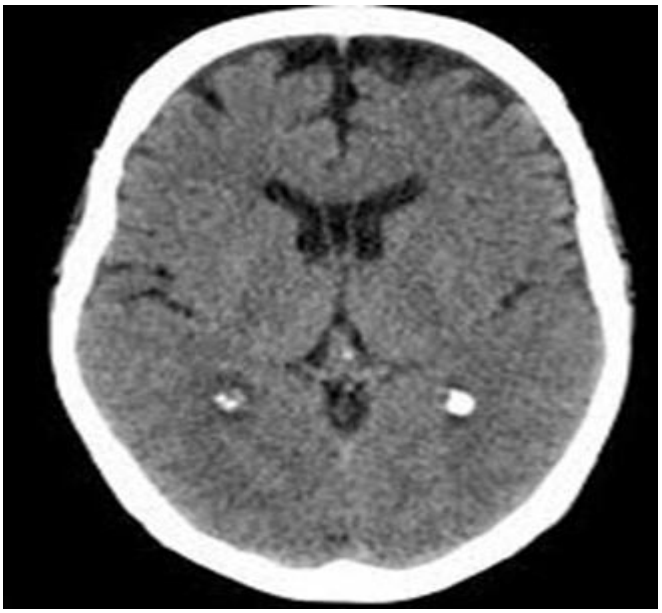

Figure 3: Midline rectangular shaped hypodensity in cavum septum pellucidum

DISCUSSION

Computed tomography is one of the neuroimaging deployed to evaluate patients with chronic headache. It is not readily available in our environment but it is less costly when compare to MRI. However, its high radiation dose will require necessary caution especially in children and in our environment where patients pay out of pockets for medical services.

There were more males in this study. Similar finding was obtained in the study by Igor et al[1]. Kamran et al,[2] and Ndabahweje et al,[4]

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but contrary to findings of Sanju et al,[5] Konan et al,[6] and Gupta et al.[7] Although reports from the literature showed more female preponderance for headache[1,6] The mean age in this study was 49±11±11.12 years which differs from what was obtained by Kamran et al,[2] (40.18±16.72years) and Guptal et al,[7] (36.62 years) but similar to the observed mean age by Young et al,[8] Wang et al,[9] and Micheal et al.[10] The predominate age population was 41-50 age group which is in agreement with what was observed by Konan et el[6] but differs from Micheal et al.[10] The differences in the sex, mean age and predominate age group could be due to variation in sampling and different geographical location.

In this study, among patients with chronic headache with neurological features there were more abnormal CT findings of 76.1% when compared with 41.1% abnormal CT findings in patients who presented with only chronic headache. Our finding is in agreement with Guptal et al study where 6.2% and 13.62% of patients had abnormal CT findings for patients with symptom of chronic headache only and those with neurological features with chronic headache respectively.[7] Several other studies have demonstrated low yield of abnormal neuroimaging findings in patients with chronic headache without neurological features.[2,10] This was further buttress by in a study by Garjesh et al,[11] where patients were divided into two groups. One group consist of patients with headache with associated red flags or clinical warming criterion (CWC) and second group without red flags or CWC. They observed more abnormal neuroimaging findings amongst patients with red flags and CWC. In a study by Guptal et al,[7] where CT findings were characterised into significant and insignificant findings among patients with chronic headache only and those with neurological features, a large proportion of patients with chronic headache with neurological features had significant CT findings which included neoplasm, infection, chronic infracts, hydrocephalus and extradural collection. Similar finding was also demonstrated in this index study, however more patients with neurological features and chronic headache had more abnormal CT findings compared to Guptal et al study.[7]

In general sinusitis, was the predominant abnormal Ct finding demonstrated in this study representing 14.6%. Our finding is consistent with finding in studies by Kamran et al[2] (36%), Micheal et al,[10] Garjesh et al,[11] and Hawala et al.[12] However, this was in variance with Gupta et al,[7] with cerebral atrophy being the commonest abnormal CT head finding in their study. The predominance of sinusitis is not surprising as disease of the paranasal sinuses are often associated with headache and CT is more sensitive in detecting inflammatory changes in the sinuses compare to plain x-ray. In a study by Konal et al[6] to determine the CT findings of adult chronic headache in Sub-Saharan Africa, stroke especially ischemic stroke was the predominate CT finding in headache. This differs from what was observed in this index study.[6] The difference between our study and Konan et al study may likely be due to the differences in the type of patient recruited. In Konan et al,[6] study patients with both acute and chronic headache were all recruited while in our study presence or absence of neurological features in patient with

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Page no- 01-08 | Section- Research Article (Radiology)

chronic headache in the absence of trauma was the criteria for recruitment.

From our study, sinusitis was the most frequent abnormal CT findings in the 21-30 age group which comprises of the younger age representing 41.7% while cerebral atrophy was the most common abnormal findings in the extreme age group 71-80 representing 75%. However, our findings differ from what was obtained from Guptal et al,[7] where calcified granuloma and infection was the commonest among children and younger adults. Our study did not however recruit children and this may be responsible for the differences in Ct findings. Our findings of cerebral atrophy conforms with findings obtained by Gupta et al,[7] among the extreme age group.

The percentage of abnormal CT findings were higher in females (31.5%) than males (29.2%) in this study and this finding is contrary to a study by Sobri et al.[13] However, this was not statistically significant.

Sobri et al in their study where 'Red flags in patients presenting with headache: clinical indications for neuroimaging' were evaluated. Their study demonstrated that presence of red flags that can predict abnormal neuroimaging in patients with headache and patients with two or more red flags should have prompt neuroimaging. This is in agreement with our study as patients with neurological features had abnormal CT findings.

CONCLUSIONS

This study has clearly demonstrated more abnormal computed tomographic findings among patient with chronic headache with neurological features compared to patients without absent neurological features. Further buttressing the need to careful evaluate patients with headache with no significant neurological features for neuroimaging especial in climes like ours where patients pay out of pocket for clinical services.

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