

# Study on Role of Computed Tomography in Diagnostic Workup of Headache at a Tertiary Care Hospital

Swati Das<sup>1</sup>, Anup Kumar Mohapatra<sup>2</sup>

<sup>1</sup>Assistant Professor, Department of Radiodiagnosis, Kalinga Institute of Medical Sciences, Bhubaneswar, Odisha, India.

<sup>2</sup>Associate Professor, Department of Neurosurgery, M.K.C.G Medical College, Berhampur, Odisha, India.

Received: August 2019

Accepted: August 2019

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## ABSTRACT

**Background:** To determine the etiology of headache in patients undergoing computed tomography (CT) scan of brain without having prior neurologic abnormality and to know the age incidence and the sex incidence of the headache. **Methods:** A prospective study of one year duration was carried out at tertiary care hospital from Aug 2018 to Aug 2019. It included 1250 patients who underwent brain CT for headache. CT findings of patients were recorded and analyzed. **Results:** These etiologies were sinusitis (8.8%), followed by tumor (6.8%), infarct (6.4%), hematoma (4.4%), encephalitis (3.8%), abscesses (3.2%) and hydrocephalus (1.2%). Headache is more common in females (55%). Most common age group affected is 40-60 years (37.2%). **Conclusions:** CT of brain has revealed in 65.1% of cases as normal and detected the various causes in rest of the cases.

**Keywords:** Brain CT scan, Headache, diagnostic.

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## INTRODUCTION

Headache clinically can be defined as a pain that occur in any region of the head. Headaches may occur on unilateral or bilateral sides of the head. It has heterogeneous and complex set of causes.

Headache disorders are one of the most prevalent and burden global public-health problems. Health policy within countries depends on knowledge of health among the local populations.

It requires placing high demand on health-care services. Good knowledge of their prevalence and distribution throughout the population are a very important prerequisite for planning interventions and organizing services. Since it is one of the most frequent complaints in clinical practice worldwide, it causes a considerable burden in terms of the social cost. Headache is the most common complain of most of the patients presenting to Medicine and Neuromedicine department. It may lead to derangement of the normal day-to-day activity with alteration of the mental health of the patients.<sup>[1]</sup> Majority of the patients with headache does not require any imaging, especially if not accompanied with any neurological deficit.<sup>[2,3]</sup> Neuroimaging is useful in case of recent onset headache and headache with progressive worsening or with change in

headache pattern or associated with epilepsy, change in personality or with history of trauma. It is also helpful in presence of red flag signs (changes in headache pattern, new onset headache in people above 50 years of age, associated with systemic illness or personality change, raised intracranial pressure, early morning headache, or headache worsening with coughing, sneezing or straining).<sup>[4]</sup> In recent years, there is increasing trend of recommending neuroimaging, in all age group, in spite of normal neurologic baseline examination to exclude the possibility of intracranial mass.<sup>[5]</sup>

## MATERIALS & METHODS

This is a descriptive prospective study carried out at tertiary care hospital over a period from July 2018 to July 2019. It focused on all patients who underwent a head CT scan for headache.

### Inclusion Criteria

1. All patients above 5 years of age having headache coming first time for treatment.
2. Both male and female.

### Exclusion Criteria

1. Patients below 5 years of age
2. Already diagnosed cases of intracranial abnormality or history of head injury
3. Those who are not willing for participate in this study
4. Pregnancy.

### Name & Address of Corresponding Author

Dr. Anup Kumar Mohapatra  
Associate Professor,  
Department of Neurosurgery,  
M.K.C.G Medical College,  
Berhampur, Odisha, India.

The scanning was performed using a brand HITACHI ECLOS 16 slices CT scanner. All patients underwent helical acquisition without contrast medium injection. According to the context (notion of fever or combined hormonal taking or suspect image on the spontaneous contrast acquisition), another complementary acquisition was performed after iodinated contrast medium IV injection. Epidemiological and clinical data were obtained through the interview of patients with a survey sheet.

## RESULTS

The total number of patients was 1250. The average age was 45 years, with extremes ranging from 5 to 85 years. Highest incidence (37.2%) (n=465) was found in age of 40-60years. [Table 1] There was a predominance with 55% (n = 687) of women against 45% men (n = 563). [Table 2] In 65.14% (n = 814) of cases CT findings were normal [Table 3]. Abnormal CT revealed in 34.86% of cases a cause for headache. These causes were dominated by were sinusitis (8.8%), followed by tumor (6.8%), infarct (6.4%), hematoma (4.4%), encephalitis (3.8%), abscesses (3.2%) and hydrocephalus (1.2%).

**Table 1: Age distribution of patients**

Age in years	No of patients	Percentage (%)
5-20	168	13.44%
20-40	380	40.4%
40-60	465	37.2%
60-80	114	9.12%
>80	93	7.44%

**Table 2: Gender distribution of patients**

Gender	No of patients	Percentage(%)
Male	563	45%
Female	687	55%

**Table 3: CT findings of patients**

CT findings	No of patients	Percentage (%)
Tumor	81	6.8
Intracranial hematoma	56	4.4
Infarct	86	6.4
Sinusitis	110	8.8
Encephalitis	48	3.8
Abscess	40	3.2
Hydrocephalus	15	1.2
Normal	814	65.1

## DISCUSSION

In our study, women were more affected by headache than men. 687 patients (55%) were females and 563 patients (45%) were males. The female preponderance of headache observed in our study is in agreement with the literature data. In a retrospective study of 100 records of patients admitted to a medical emergency department in the United States, 74% of patients were women.<sup>[6]</sup> In the study of Subeede women were most affected by

headache with a prevalence between 16-88% for women and 9-69% for men.<sup>[7]</sup> In our study the average age of patients was 45 years with extremes ranging from 5 years to 86 years. Our results differ from those of Peterlin BR,<sup>[8]</sup> who found a predominance of the age group between 35 and 40 years. The difference in age between this study and the study by Jain P,<sup>[9]</sup> could be explained by the economical and educational differences in both countries. According to Gilbert,<sup>[10]</sup> symptomatic headache of intracranial lesions is rare; it requires explorations because certain conditions incriminated put at stake the prognosis for life. The first step of the diagnosis is clinical; it specifies the characteristics of pain and accompanying symptoms. Additional tests are required secondly in case of new-onset headache, change in the characteristics of the evolution of known headache, worsening of the intensity or increase in the frequency of known cephalalgic seizures or headache associated with other clinical signs. In 65.1% of cases the CT was normal. This demonstrates the high incidence of primary headache in accordance with the literature. The role of neuroimaging in headache is recognized by all. But its systematic use in the presence of headache is controversial. Our study, although prospective has not considered the clinical criteria of the feasibility or not of neuroimaging. All examinations requested for headache whatever the motive have been taken into account. These examinations consisted of the performance of a head CT scan without and after iodinated contrast medium IV-injection according to the case. No other neuroimaging was performed in our study. MRI, considered as the best diagnostic means of headaches was not possible for two reasons. Firstly, it is a costly examination and it is little available. Then in our country we only have MRI of low fields; which limits its diagnostic efficacy. Secondly, we can't communicate directly with the attending physician. We can do it only by a written report in which we have sometimes suggested MRI in addition. Patients with normal headache and with a normal scanner are mostly ambulant. Soma SS,<sup>[11]</sup> in a similar study had found 86 normal examinations and 78 abnormal examinations including 36 cases (22%) of lesions that were strokes. Strokes were ischemic in 25 cases, hemorrhagic in 5 cases and venous in 1 case (thrombophlebitis). In our study 6.4% had infarcts and 4.4% had hematoma. The other etiologies of headache demonstrated on CT scan in our study were sinusitis (8.8%), abscess (3.2%) and encephalitis (3.8%). In a study carried out by Detsky,<sup>[12]</sup> in a Danish population, infectious headache accounted for 63% of secondary headache and was the most common. ENT headache accounted for 15%; Traumatic headache 4%; cluster headache 1% and finally non-vascular headache 0.5%. According to Lester,<sup>[13]</sup> toxoplasmosis on HIV comes in the 2nd place of causes of headache in

Burkina Faso (17%) after stroke. Sometimes, despite the absence of red flag sign, CT scan of head is requested to relieve the anxiety of the patients and their relatives. However, this increases the radiation dose to the patients, especially in pediatric population. Hence, the use of CT scan has to be balanced against the radiation dose. Although CT scan is very useful for the evaluation, it should never be allowed to replace the proper clinical history taking and detailed clinical examination. Most types of headache can be diagnosed by taking careful history followed by general and neurologic examination. According to Evans 1996, most patients with headache only a few of patients actually suffered from serious disease that could be diagnosed with cerebral imaging, so no need to order cerebral imaging examination.<sup>[14]</sup> This study aims to give a guide for the decision on the utilization of computed tomography (CT) in the diagnostic workup. It also identifies if patients require neurological imaging (CT) for proper diagnosis or not. The study mainly focuses on (CT) imaging, as these are the most commonly used methods in the clinical practice of headache.

Migraine is the most common type of primary headache disorder, and it is more common in female usually starts around the age of 20.<sup>[15-17]</sup> Headache attacks extend between (4 and 72 h) and distinguish by unilateral location; also it characterize by moderate-to-severe pain intensity.<sup>[18]</sup> In agreement with the literature, our data revealed that most of the affected patients were males with an exception of tension type of headache, which were more in females, these results supported by a recently published study, showed that the males have the dominance with an exception in migraine headache.<sup>[19,20]</sup> However, the results disagree with a study conducted by El-Sherbiny et al., in 2015, which indicated that the females except for the cluster type were more affected. They explained their results with the female lifestyle and concluded that marriage and high education could increase the risk of chronic headache.<sup>[21]</sup>

## CONCLUSION

Headache requires neuroimaging as part of their diagnostic workup. These patients do not have a higher rate of relevant cerebral pathology than anyone else in the general population. Sometimes, however, it might be reasonable to perform neuroimaging in patients frightened that they are suffering from severe illness or who present with uncommon clinical features. Distinct 'red flags' in clinical neurological examination point to a secondary cause of the headache and require further neuroimaging to detect treatable causes and severe disease of this secondary headache. Sometimes, despite the absence of red flag sign, CT scan of head is requested to relieve the anxiety of the patients and

their relatives. However, this increases the radiation dose to the patients, especially in pediatric population. Hence, the use of CT scan has to be balanced against the radiation dose. Although CT scan is very useful for the evaluation, it should never be allowed to replace the proper clinical history taking and detailed clinical examination.

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**How to cite this article:** Das S, Mohapatra AK. Study on Role of Computed Tomography in Diagnostic Workup of Headache at a Tertiary Care Hospital. *Ann. Int. Med. Den. Res.* 2019; 5(5):RD11-RD14.

**Source of Support:** Nil, **Conflict of Interest:** None declared