

Computed Tomography (CT) in A Headache Patient: Is Routine Evaluation Really Necessary?

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Abstract

Objective: To determine the likelihood ratio of a positive computed tomogram of the brain in the routine evaluation of headache patients.

Materials and method : This was a prospective study conducted in the Department of Radio-Diagnosis at NKP Salve Institute of Medical Sciences and Lata Mangeshkar Hospital, Nagpur from April 2007 to September 2010, in which consecutive patients with a chief complaint of headache were evaluated with computed tomography of the brain.

Results: Consecutive sample of 760 patients with a chief complaint of headache, regardless of the presence or absence of physical or neurologic signs, were referred for computed tomography of the brain. Out of the total number of patients, 213 had computed tomographic findings that were clinically significant. All of the patients with significant computed tomographic findings had an abnormal physical or neurologic exam or unusual clinical symptoms.

Conclusion: Routine computed tomography of the brain in headache patients with normal physical and neurologic exams and no unusual clinical symptoms has a low likelihood ratio for discovering significant intracranial disease.

Key Words : Headache, CT scan, evaluation

Introduction

Headache is one of the most common medical complaints experienced by 75% of the American population(1). With the increasing practice of defensive medicine (diagnostic or therapeutic measures conducted primarily not only to ensure the health of the patient, but as a safeguard against possible malpractice liability), neuroimaging is widely used to evaluate headache. Since Headache affects our daily activities, it affects our work and is associated with a number of illnesses and disorders

(Headache has been associated with 316 disorders and illnesses(2) there is a definite need of determining the cause of headache.

Apart from the above there are certain challenges faced by clinicians while diagnosing the cause of headache in a routine setting

- Patients have difficulty in describing their symptoms accurately and objectively
- Limited availability of clinical tests that allow precise diagnosis for many headache syndromes

Types & Causes of Headache (3)

PRIMARY	Migraine	Tension type	Cluster	Idiopathic stabbing	Exertional
SECONDARY	Systemic infection	Head injury	Vascular disorders	Subarachnoid haemorrhage	Brain Tumour

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Aim and Objectives

- Warrant the use of CT scan imaging in the diagnosis of cause of headache
- Help the physicians to select the patient's diagnostic requirements (in this case CT scan)
- Determine the likelihood of a positive CT scan of brain in the routine evaluation of headache patients

Material and Method

The prospective study was done at NKP Salve Institute of Medical Sciences and Lata Mangeshkar Hospital providing primary and secondary care to

patients from rural India in the central state of Maharashtra. A total of 760 patients were subject to this study which was carried out from April 2007 to September 2010.

Eligible patients were those consecutive patients with a chief complaint of headache referred from all departments except paediatrics. All patients were in the adult age group (18years and above). Patients not willing to participate in the study and who were known cases of positive Neuro imaging in the past and with patients less than 18 years of age were excluded from this study.

Patients were explained about the study & radiation exposure and a written informed consent was taken prior to the evaluation.

Patients were divided into 2 groups: TABLE 1

Group 1	Headache with other symptoms and a positive neurological exam	
Group 2	Headache with no other complaint and a normal neurological exam	Sub-categorised according to the CT scan results into 2A (positive scan) & 2B (normal scan)

Observations & Results

Out of the total 760 patients,511 patients had normal neuro-imaging; however these patients also had no other complaint apart from headache (Table2).

Out of the positive scan patients, 213 patients (group 1) had other symptoms with positive neurological examination (Table2). The rest 36 (group 2A) had a positive CT finding; they also came with headache however they showed no other symptoms or signs

Table 2

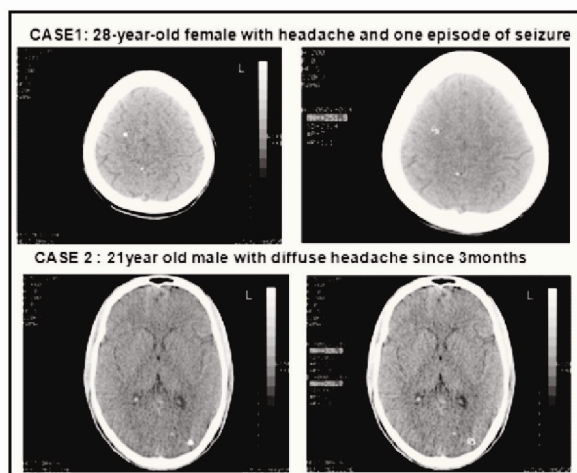
GROUP	CT scan result	Headache	Other signs & symptoms	Number
1	+	+	+	213
2A	+	+	-	36
2B	-	+	-	511

NEUROIMAGING Positive cases: Types & Number

TYPE	NUMBER
Calcified granulomatous lesions in brain	111
Head Injury	56
Intra-cerebral haemorrhage	35
Arachnoid cyst	23
Generalized cerebral atrophy	16
Brain tumour	8

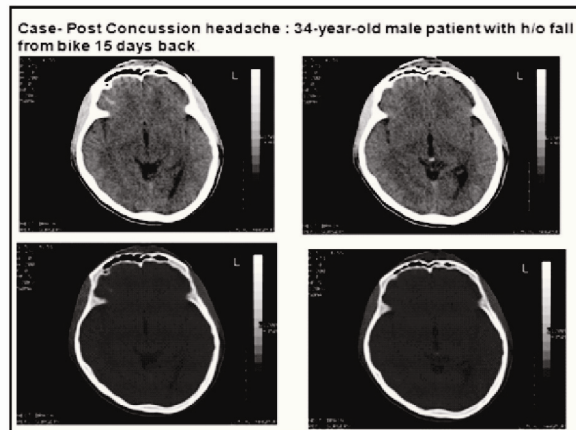
Few positive cases:

Case A: Granulomatous lesions



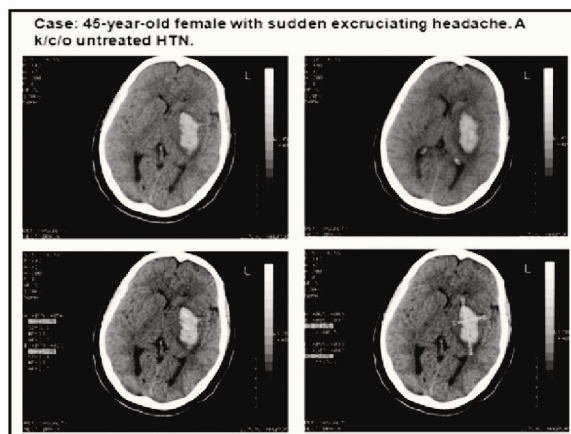
Case 1: 28 years old female with headache and one episode of seizure: well defined small homogeneous calcified lesions in the right high parietal region and another in parafalcine region. Case 2- 21year old male with diffuse headache since 3months: Calcified lesions are seen in the left occipital region without perilesional edema. Dx: Calcified Granulomatous lesions

Case B :



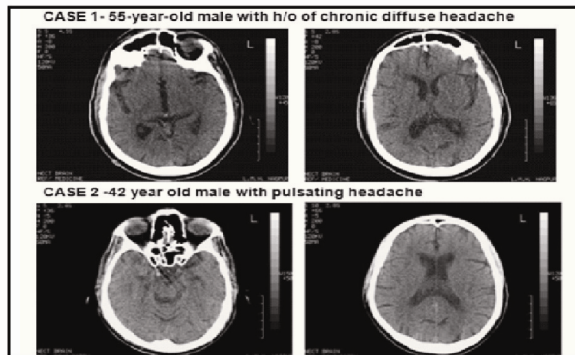
34 years old male patient with h/o fall from bike 15 days back. Now presenting with frontal headache. NECT axial section soft tissue window reveals subgaleal hematoma in the prefrontal region with few interspersed air specks within with a depressed fracture of the underlying frontal bone in the bottom bone window images. Dx: Post concussion headache

Case C :



45 years old female with sudden excruciating headache and loss of consciousness. k/c/o untreated HTN since 3years. NECT axial image soft tissue window reveals a large well defined hyperdense lesion involving the left lentiform nucleus, internal and external capsule with mild perilesional oedema with effacement of body of left lateral ventricle with mild effacement ipsilateral Sylvian fissure. The lesion had an HU value of +55 to +65 s/o acute bleed - intracranial hemorrhage

Case D :



Case 1: A 55-year-old male with diffuse headache : moderate generalized cerebral atrophy in the form of prominence of the ventricular system and the sulco-gyral spaces. Case 2- 42 year old male with headache- mild generalised cerebral and cerebellar atrophy

Outcomes

Out of the total 547 patients that came with only headache, only 6.5% had a positive CT finding. We can generally conclude that in such headache patients, CT scan investigation can be avoided. In patients of headache with normal physical and neurologic exams and no unusual clinical symptoms and signs there is a low likelihood for discovering intracranial pathology.

References

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Discussion

Several studies have looked at the use of CT scans in patients with headache. Baker examined 505 patients and found 7% had a positive CT finding(4). This correlates very well with our study where we calculated the incidence to be 6.5%.

Some have suggested criteria for referring migraine patients for CT scanning like Mohr's suggestion that all migraine patients undergo contrast enhanced CT scanning to the more conservative suggestion by Joseph and collaborators that neurological deficit, papilledema, resistance to therapy, change in headache characteristics ,unilaterality or prolonged aura are reasons for CT scan analysis. These latter criteria correspond to the inference in our study(5,6).