

COMPUTERISED TOMOGRAPHIC SCANNING FOR HEADACHE

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ABSTRACT

Objective: To assess the utility of Computerized Tomographic (CT) scanning of brain in the evaluation of patients presenting with headache.

Study Design: Cross-sectional retrospective study.

Place and Duration of Study: Department of Radiology, Pakistan Air Force Hospital, Islamabad from April 2007 to August 2009.

Patients and Methods: The referral forms of CT scanning of brain for evaluation of headache, available in our radiology department were reviewed. Patients were divided into two groups. Group I included those patients who's only presenting complaint was headache while group II patients had other symptoms associated with headache. The results of their CT scans of brain were compiled and analyzed.

Results: Out of a total of 829 CT scans of brain 58 were done for evaluation of headache. Twenty four (41%) patients had a CT scan for headache only (group I) and all of them had a normal CT of brain. Rest of the patients had headache with other associated symptoms (group II). Out of 34 (59%) of group II patients, four (12%) had an abnormality.

Conclusion: CT scanning of brain is not useful in the diagnosis of headache in the absence of other associated symptoms and/or signs.

Key words: Brain Headache Scan. CT scanning

INTRODUCTION

Everybody has had a headache. It is one of the common symptoms for which patients seek medical consultation. Mostly it has a benign cause and can usually be diagnosed following a thorough history and neurologic and focused general physical examinations. As the potential etiologies can threaten life and neurological function, headaches cause understandable concern on the part of the patient and health care provider¹. Some life threatening brain disorders present with secondary headache, where the headache is caused by the disease. A brain tumor, for example, is best diagnosed by brain imaging early in the course of the disease, which is essential for optimal management of this and other secondary headache disorders. However, brain tumors, as an example, account for less than 0.1% of the lifetime prevalence of headache. This contrasts with the fact that most headaches in the community are either associated with mild systemic infection or due

to primary headache, where the headache is itself the disorder. Discriminating between primary and secondary headache is the problem, since, by definition, primary headache does not need brain imaging because no underlying disease process exists². A thorough & systematic headache history is the key to effective diagnosis. If the history is adequate, physical examination rarely reveals unexpected signs, rather it reassures the patient and physician. Measurement of blood pressure and a brief but comprehensive neurological examination, including that of the optic fundi, are recommended. Investigations, including neuroimaging, rarely contribute to the diagnosis of headache when the history and examination suggest no underlying cause³.

PATIENTS AND METHODS

We receive patients from PAF Hospital and Naval Hospital, Islamabad. Seven different medical specialists of these two hospitals had referred these patients for CT scanning, during study period. A proper record of all the referral forms requesting a CT scan is maintained in our radiology department. These forms contain a short history and relevant findings of clinical

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examination and other investigations. Reason for requesting the CT scan is also mentioned. A total of 829 CT scans of brain were done from April 2007 to August 2009. Fifty eight of these were done for evaluation of a headache. All scans were done as plain scans and intravenous contrast was considered only in those patients where an abnormality in brain warranted its use. Patients were divided into two groups. Group I patients presented with headache only while group II patients had associated symptoms/signs. The results of their CT scans were retrieved from the record register in radiology department and were compiled according to these two groups. Where necessary all medical records of patient were retrieved from the stat office. The data was then analyzed and interpreted.

RESULTS

A total of 58 patients had undergone a CT scan of brain for evaluation of headache, during the study period. There were 24 (41%) patients in group I while 34 (59%) were in group II. In group I, 16 (67%) patients had severe persistent headache, 5 (21%) had chronic headache and 3 (12%) suffered from hemicranial headache, of varying durations. All the patients in group I had a normal CT scan of brain.

In group II only four (12%) patients had an abnormality in brain detected on CT scanning out of a total of 34 patients. One (3%) patient each had a glioblastome multiforme, cerebral edema, intracerebral hematoma and metastasis from carcinoma of breast. The patient with glioblastome multiforme presented with fever & confusion in addition to headache and had normal cerebrospinal fluid (CSF) examination. High grade fever, vomiting & photophobia were associated with severe headache in case of cerebral edema. Patient who had a small intracerebral hematoma presented with headache and weakness of left side of body while the patient with metastasis from carcinoma of breast had vomiting, headache and feeling of imbalance. Table-1 lists different associated symptoms with headache in group II patients. Some of the patients had more than one of these associated symptoms in addition to headache.

DISCUSSION

Headache, or cephalalgia, is defined as diffuse pain in various parts of the head, with the pain not confined to the area of distribution of a nerve. It is diagnostically and therapeutically useful to consider headaches as being divided into two categories: primary and

Table: showing difference symptoms associated with headache in group II patients.

Type of symptom	No of patients
Vertigo	8
Vomiting	5
Episode of loss of consciousness	3
Bilateral mild swelling of optic disc	3
Hypertension	3
Weakness of a limb	2
High grade fever	2
Amaurosis Fugax	3
Fits	2
Abnormal limb movements	2
Blurring of vision	1
Pain in neck	1
Road traffic accident	1
Nausea	1
Blurring of vision	1

secondary. Primary headaches, which include migraine, tension-type headache and cluster headache, are benign; these headaches are usually recurrent and have no organic disease as their cause. Secondary headaches are caused by underlying organic diseases ranging from sinusitis to subarachnoid hemorrhage⁴. In clinical practice it is generally accepted that the so called red flags of headache should lead to a search for secondary headache. These include change in the pattern of headache; new onset of headache in people older than 50; onset of seizures or headache associated with systemic illness or personality change. Headache with symptoms suggestive of raised intracranial pressure, such as new onset headache in the early morning; or headache that is worsening with coughing, sneezing, or straining should each be viewed with concern². A detailed headache history and thorough neurological and general physical examination should help in deciding which patients with headache need CT scanning of brain to find out the underlying

brain pathology. At times despite the absence of red flags a CT scan of brain is requested to allay the anxiety of the patient and relatives. But this raises the issue of radiation dose to the patient especially in young children. Computed tomography accounts for 40% of medical diagnostic radiation but represents only 4% of radiology examinations. The use of computed tomography has to be balanced against the radiation dose. Computed tomography is a highly useful tool for solving problems, but it should never be allowed to replace proper history taking and clinical examination. Radiologists must use their knowledge to ensure that requests for computed tomography are appropriate and use low dose protocols to solve the clinical problem⁵.

Various studies have been conducted to assess the utility of CT scanning in patients of headache. In one such study conducted at Saidu Medical College & Teaching Hospital in Swat, Pakistan, it was found that 69% of patients presenting with sudden thunderclap headache had no abnormality in CT scans of brain⁶. A study was conducted at Samsun, Turkey, to investigate the frequency of intracranial lesions detected by CT scanning amongst adult patients who had clinical warning criteria (CWC) for secondary neurological headaches and to determine the importance of CWC in predicting a possible lesion on CT scan. The CWC included: increase in the intensity and frequency of headache, abrupt onset of headache, persistence of headache despite analgesics, alteration of the characteristics of headache and presence of focal neurological symptoms or findings. Out of all the patients, 35.7% had a neurological cause identified by CT scan and 64.3% had a normal CT scan. In the patients without a lesion, 64.4% were primary and 35.6% were from undefined headache group⁷. In our study only 12% of those patients had an abnormality on CT scan of brain, who had headache associated with other neurological features. The reason for this may be that because of the peculiar circumstances of Armed Forces some of the CT scans may have been done for reasons other than purely clinical. The use of CT scanning in young

children should be done very carefully to avoid the hazardous exposure to radiation at a young age. A study of pediatric patients was done at George Washington University School of Medicine, Washington, DC, to determine whether CT scans led to better acute care of young children with headache presenting to the emergency department. It was found that for young children presenting with headache but normal neurological examination and non-worrying history, CT scans seldom lead to diagnosis or contribute to immediate management^{7,8}. In a recent update, a significant structural difference in gray matter density of the hypothalamus has been shown in patients with cluster headache compared with healthy volunteers. The co-localization of morphometric and functional changes demonstrates the precise anatomical location for the central nervous system lesion of cluster headache and suggests an involvement of this area as a *primum movens* in acute attack⁹. The activation of the hypothalamus is highly specific for trigeminal autonomic headaches, and imaging data from patients with cluster headache prompted successful deep brain stimulation of this area. Data from morphometric studies suggest that patients with migraine and those with tension-type headache have a decrease in gray matter volume in pain-transmitting areas, as a consequence of frequent pain⁹. A study was conducted at Gunma University Hospital, Gunma, Japan, to evaluate the ability of magnetic resonance imaging (MRI) to depict an abnormality in patients with chronic or recurrent headache without neurologic abnormality¹⁰. Out of a total of 306 patients, 169 (55.2%) had no abnormality, 135 (44.1%) had a minor abnormality while only two (0.7%) had a clinically important abnormality at MR imaging.

CONCLUSION

The results show us that CT scanning of brain is rarely of help in the diagnosis of headache if it is not associated with other symptoms and / or signs of an intracranial pathology. When to scan a patient for headache is a dilemma faced by physicians in their daily practice. Patients with red flags or clinical warning criteria of secondary headache

probably must undergo a CT scan of brain. In the absence of these, the only reason for doing a CT scan seems to be reassuring the patients and their loved ones.

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