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ORIGINAL ARTICLE

Types of Non-Acute Headache and Neuroimaging in the Evaluation of Patients with this Type of Headache

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ABSTRACT

The aim of this study was to find the type of non-acute headache and to estimate the frequency of significant intracranial lesions in this type of headache. Non-acute headache was defined as any type of headache that had begun at least four weeks before. All the patients aged > 15 years attending the neurology and neurosurgery clinics of Post Graduate Medical Institute (PGMI), Lady Reading Hospital (LRH) Peshawar with non-acute headache were included in the study. The pregnant women and patients with facial pain alone were excluded from the study. They were followed prospectively for over a year. Detailed history and through neurlogic examination was performed. The headache was classified according to the International Classification of Headache Disorder (ICHD) second edition of the International Headache Society (IHS). Every patient was investigated by neuroimaging studies. The computed tomography (CT) was done in all patients. Magnetic resonance imaging (MRI) was done in 86 patients to improve their diagnosis. Neuroimaging results were classified as "significant abnormalities", "non-significant abnormalities" or "normal". Significant abnormalities included neoplastic disease, hydrocephalus, vascular malformations, chiari malformation, large aracnoid cysts, intracranial hemorrhage and acute cerebral infarcts. The total number of patients was 1200; 795 women and 405 men. Their mean age was 38 years (15-75 years). Neuroimaging studies detected significant lesions in 18 patients (1.5%). The proportion of patients with headache and intracranial lesions is relatively small but neither neurological examination nor the features in the clinical history permit us to rule out such abnormalities.

***Key words**: Headache, computed tomography, magnetic resonance imaging, diagnosis.*

INTRODUCTION

Headache is a common disorder with many potential causes. The lifetime prevalence of all types of headaches varies from 31% to 96%.[1,2] Headache is the chief complaint of 20% of the patients seen by general neurologist.[1-3] The differential diagnosis of headache is one of the longest in medicine, with more than 300 different types[7]. The physician must diagnose headache as precisely as possible as choosing proper treatment is needed. In this paper the headache is diagnosed according to the criteria of the International Headache Society, 2nd edition 2004, which have become the worldwide standard for classification[7]. Although most headaches are of benign and still poorly understood origin (primary headaches) some headaches can have serious and sometimes life- threatening causes. Primary headaches include migraine, tension type, cluster and miscellaneous headache. These disorders, mainly migraine and tension type headache account for the majority of the headaches.[2,3,8] However, many patients and physicians are concerned that an intracranial lesion may be responsible for the headache. The main reason for obtaining a neuroimaging study of the brain, whether computed tomography (CT) or magnetic resonance imaging (MRI), is to detect a treatable lesion such as tumor or vascular malformation.[6,18,19] It may also be helpful to reassure the patient and to avoid medico legal concerns.[20,35]

This study was carried out to see the frequency of the different types of non-acute headache and to estimate the frequency of significant intracranial lesions in patient with non-acute headache.

MATERIAL AND METHODS

The study was performed in neurology and neurosurgery departments of PGMI Lady Reading Hospital

(LRH) Peshawar. This was started from 1st December 2005 and closed on 31 August 2007. This study includes 1200 patients, 795 women and 405 men. Non-acute headache was defined as any type of headache that had begun at least 4 weeks before. Indeterminate or unspecified headache is the headache which does not clearly fits into a defined type of headache according to the headache classification by International Headache Society[7].

Every patient was examined by two consultants and followed up for at least over one year. The neurological examination included examination of the cranial nerves and limbs. Mental status examination was performed if the history suggested a disturbance of higher function. The headache was typified, according to the International Classification of Headache Disorder (ICHD) 2nd Edition of the International Headache Society (IHS).

Every patient was investigated by neuroimaging studies, such as CT or MRI of brain. The CT scan of brain was done in all patients. MRI brain was done in selected patients to improve their diagnosis. Neuroimaging results were classified as "significant abnormalities", "non-significant abnormalities" or "normal". Significant abnormalities included neoplastic disease, hydrocephalus, vascular malformations (aneurysms, arteriovenous malformations, dural fistula, cavernous angiomas), Chiari malformation, large arachnoid cysts, intracranial hemorrhage and acute cerebral infarcts. MRI was performed after a normal CT, if the patient's headache did not respond to treatment. MRI was also performed in some patients with dubious abnormalities on CT to improve their diagnosis.

The patients with abnormalities on neuroimaging were discussed with the neurosurgical team. They were assessed and followed and managed appropriately.

Inclusion Criteria:

1. All adult patients (aged ≥ 15 years) who presented with non-acute headache as their main symptom.
2. Normal neurological examination.

Exclusion Criteria:

1. Patients with facial pain alone.
2. The pregnant women.

RESULTS

Sex Incidence

During the time of the study 1200 patients (795 women and 405 men) were included.

Age Range

Their mean age was 38 years (range 15-75 years).

Clinical Factors

The most common type of headache was migraine (598 patients, 49.80%), followed by tension type (425 patients, 35.40%) and indeterminate or unspecified (120 patients, 10%). Cluster headache was less common (13 patients, 1.10%).This is shown in table 1.

Table 1: *The type of headache and percentage (Total patients =1200).*

Type	No of patient	Percentage
Migraine	598	49.80
Tension-type	425	35.40
Cluster	13	01.10
Post-traumatic	44	03.70
Indeterminate	120	10.00

Investigations

Regarding the neuroimaging, CT scan brain was done in all patients and MRI brain in only 86 selected patients to improve their diagnosis. Neuroimaging studies detected significant lesions in 18 patients (1.5%). The abnormalities detected and their headache types are shown in table 2.

Treatment

Of these 18 patients, 10 were treated surgically; pituitary adenoma (n = 3), large arachnoid cyst (n = 2), meningioma, hydrocephalus, colloid cyst, papilloma, acoustic neuroma (one of each).

Role of Imaging

Neuroimaging studies discovered incidental findings in 14 patients; three pineal cysts, three intracranial lipomas and eight arachnoid cysts.

The yield of neuroimaging studies was higher in the group with indeterminate headache than in the migraine or tension-type headache, as shown in table 3.

Table 2: *Patients with non-acute headeache and significant abnormalities on CT / MRI of the brain.*

7Neuroimaging findings	Clinical characteristics
1. Pituitary adenoma	Migraine with out aura
2. Pituitary adenoma	Indeterminate type
3. Large arachnoid cyst	Indeterminate type
4. Low grade astrocytoma	Tension-type headache
5. Meningioma	Indeterminate type
6. Acute stroke	Migraine with out aura
7. Meningioma	Tension-type headache
8. Chiari malformation	Tension-type
9. Cavernous angioma	Tension-type headache
10. Hydrocephalus	Indeterminate type
11. Colloid cyst	Indeterminate type
12. Brain stem glioma	Tension-type headache
13. Acoustic neuroma	Migraine with out aura
14. Hydrocephalus	Indeterminate type
15. Pituitary adenoma	Episodic cluster
16. Large arachnoid cyst	Tension type
17. Papilloma	Indeterminate type
18. Dural fistula	Migraine with visual aura

Table 3: *Rates of significant abnormalities in patients with different types of non-acute headache.*

Headache diagnosis	Significant abnormality	Percentage
Migraine	4/598	0.67
Tension type	6/425	1.40
Cluster	1/13	7.60
Post traumatic	0/44	0.00
In determinate	7/120	5.83

CT scan showed definite lesions in 14 patients (1.2%). The four dubious lesions were clearly detected by MRI such as a small meningioma and an acoustic neuroma. MRI done in other 82 patients excluded significant abnormalities.

DISCUSSION

The primary headache disorders such as migraine and tension-type headache, account for 49.80% and 35.40% respectively of the non-acute headaches in our study (table 1) that make a total of 85.20%. The studies conducted by Lipton RB et.al,[1] Henry P et.al,[2] Rasmussen BK et.al,[3] Ultrich V et.al[5] and Frishberg BM et.al[6] also concluded that these two types of headaches, account for more than 80% of the non-acute headache. A prospective study conducted in a large health maintenance organization, including 1007 patients, only migraine accounted for 51% of the cases[4] as compared to 49.80% in our study. In two other population based studies including 10169 and 6400 patients, the migraine was responsible for 47% and 50.20% of the cases, respectively.[9,10]

Tension-type of headache alone, accounted for 35.40% of the cases in our study, while 38.30% in a study conducted by Rasmussen et.al[4] and 24.30% in a study conducted by Ulrich V et.al[5]. Cluster headache alone accounts for 0.5-3% of the non-acute headache in the studies conducted by Bovin G et.al,[13] Ford RG et.al[14] and Kudrow L et.al.[15] This is 1.10% in our study.

The rate of significant intracranial abnormalities in series of patients with non-acute headache ranged between 0 and 3%.[16] The US Headache Consortium considers as significant those lesions that require further action, such as an acute stroke, neoplastic disease, hydrocephalus or vascular malformations. Abnormalities of the paranasal sinuses are frequently detected on MRI but they are considered incidental findings unless there is clinical evidence of rhino-sinusitis. We considered as significant those lesions that would eventually require surgery or another kind of therapy. The findings of a meningioma may not need surgery at the time but it deserves follow up and may require surgery later on.[16-19]

The yield of neuroimaging studies in patients with non-acute headache in our study was 1.5%. Another study determined the prevalence of serious findings unrelated to stroke on MRI in a population of elderly people. In this study, MRI revealed 41 relevant intracranial lesions among 3672 patients (1.1%), which included 19 meningiomas, 6 pituitary adenomas, 5 cavernous malformations, 4 aneurysms and seven other findings.[20] However, since headache is a common medical problem, it is not unusual for physicians to treat patients with headache that harbor potentially relevant intracranial lesions.[21-23,28]

In a meta-analysis, the estimated prevalence of significant intracranial abnormalities on neuroimaging in patients with migraine and normal neurological examination was 0.2%.[24] They found four relevant lesions

such as pituitary adenoma, arteriovenous malformation, hydrocephalus and colloid cyst. So far, only two studies, each including fewer than 50 patients, have analyzed the prevalence of intracranial lesions in patients with tension-type headache. Both studies reported no patient with significant intracranial lesions.[25,26] In our study, the prevalence of significant intracranial abnormalities on neuroimaging in the group of 425 patients with tension-type headache and normal neurological examination was 1.4%. There have been several case reports linking cluster headache with intracranial neoplasms, but there are no reliable estimates of the prevalence of intracranial abnormalities in patients with cluster headache.[27] We found only one patient with a pituitary adenoma having cluster headache. The type of headache was not clearly determined in 10% of patients at the first visit. The risk of intracranial abnormalities was relatively high in this group (5.83%) in our study.

The prevalence of asymptomatic aneurysms with MRI was 7% in a prospective study,[29] we did not find any aneurysm in patients who underwent MRI. The detection rate of intracranial saccular aneurysm with MRI was also low in other studies, about 0.1%.[23,24,26] We found only one patient with ≥5mm caudal decent of the cerebellar tonsils but the headache was not attributed to Chiari malformation. In a retrospective series of 3498 patients with headache, only one patient was diagnose with Chiari type1 malformation.[30]

There are limited data regarding the relative effectiveness of CT and MRI for detecting significant lesions. Even the US Headache Consortium stated that "evidence is insufficient to make specific recommenddations regarding neuroimaging in the non-acute headache".[31,32] But neither the neurological examination nor the features in the clinical history permit us to rule out such abnormalities. Moreover, there are other reasons for neuroimaging, such as reassurance and patient quality of life. Now a days, most people with headache demand CT/MRI of the brain as an essential part of their medical attention.[33,34] Investigative tests may produce positive psychological benefits and improve the symptoms of the patients independently of other aspects of managements.[35]

CONCLUSION

The most common type of headache is migraine followed by tension type and indeterminate headaches. Cluster is less common. Neuroimaging detected "significant abnormalities" in 1.5% (18/1200) of the patients, mostly in indeterminate, cluster and tension types of headaches. But neither the neurological examination nor the features in the clinical history permit us to rule out such abnormalities.

Future studies in the field of neuroimaging in headache should address the impact of these studies on patient management, satisfaction and quality of life.

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