COMPUTED TOMOGRAPHY SCAN FINDINGS OF PATIENTS PRESENTING WITH HEADACHE AT TRIPURA MEDICAL COLLEGE AND DR. B.R. AMBEDKAR MEMORIAL TEACHING HOSPITAL, HAPANIA, AGARTALA, TRIPURA- A CROSS-SECTIONAL STUDY

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ABSTRACT

BACKGROUND

Headache is one of the causes of discomfort to a human being and can be classified as primary or secondary headache. CT scan has proved to be useful when the neurological physical examination is abnormal.

The aim of the study is to-

1. Determine the causes of headache of patients presenting with nontraumatic headache by CT scan at Tripura Medical College and Dr. B.R. Ambedkar Memorial Teaching Hospital, Hapania, Agartala, West Tripura.
2. Correlate the clinical diagnosis and the CT scan findings of patients with nontraumatic headache.

MATERIALS AND METHODS

A total of 157 patients presented with nontraumatic headache underwent CT scan examination in the Radiodiagnosis Department of Tripura Medical College and Dr. B.R. Ambedkar Memorial Teaching Hospital, Hapania, Agartala, West Tripura and scans were viewed for the presence of any secondary cause of headache and findings were expressed as frequency and percentage.

Statistical Analysis- The data were entered in spreadsheet and analysed using SPSS 21 statistical software. Results were expressed as frequency and percentage.

RESULTS

In our study, female patients (50.96%) were slightly more than the male (49.04%) patients and majority of the patients were in the age group of >20 to ≤40 years (54.14%) followed by >40 to ≤60 years (25.47%).Primary headache (73.89%) was found to be more common than secondary headache (26.11%). Sinusitis (73.17%) was the commonest cause of secondary headache. Prevalence of positive CT scans of patients presenting with headache was 26.11%. Most of the clinical diagnosis did not correlate (61.78%) with the CT scan finding. Patients with clinical diagnosis of migraine correlates mostly with the CT scan finding (69.44%), which is one of commonest cause of primary headache where we got negative findings in CT scan followed by sinusitis (38.77%), CVA/ICH (cerebrovascular accident and intracerebral haemorrhage) 32.25% and brain SOL (25%).

CONCLUSION

CT scan has a role in determining the cause of headache. Primary headache is more common than secondary headache. CT scan has a significant role in detecting intracranial pathology in patient presenting with headache associated with abnormal neurological function.

KEYWORDS

Migraine, Sinusitis, CT Scan, Headache.

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BACKGROUND

Headache is one of the most common symptoms in medical practice and varies from an infrequent and trivial nuisance to a pointer to serious disease.[1] Population based estimates suggest that about 4% of adults have daily or near daily headache.[2] It is one of the causes of discomfort to a human being and accounts for about 1% of all ED in the United States of America.[3,4]

Though headache is one of the common presenting complaints in patients, only about 10% of patients with recurrent headache have secondary cause.[5] Most of the patients suffering from primary headache can be managed with primary care and do not require neuroimaging in most of the cases.[6] Many of the patients with chronic or recurrent headache who do not have any neurologic abnormality undergo evaluation with Computed Tomography (CT) scan to exclude important abnormalities.[7]

Headaches were classified as being acute less than 4 weeks or chronic more than 4weeks. Headache can be also be classified into primary and secondary headache.[8] Primary headache is the headache that has no associated cause and secondary headache is the one that has an organic origin. Examples of primary headache include migraine, cluster and tension headache. Primary headache is more common than secondary.[9]

Tension headaches are often related to stress, depression or anxiety. Approximately, 90% of all headaches are classified as tension-type headache with prevalence of 40% in males and 42% in females. It is not associated with nausea or aggravation by physical activity. It can be further classified into episodic or chronic tension headache (ETH and CDH). ETH is whereby it has a certain frequency, which is not systematically known and CTH is when there are 15 episodes in a month for more than three months in a year.[10] Cluster headache are sharp, extremely painful headaches that tend to occur several times per day for months and then go away for a similar period of time. Migraine headache is more common in females (38.2%).[11] Menstrual migraine, a type of hormonal headache occurs in women before, during or immediately after the period, or during ovulation.[12]

Secondary headache is always caused by underlying organic diseases ranging from extracranial benign condition such as sinusitis or mastoiditis to life-threatening intracranial pathology like subarachnoid haemorrhage or brain tumours or intracerebral haemorrhage. It can also be due to brain infections like malaria, etc. In cerebral haemorrhage, headache may present as acute severe headache that is accompanied with abnormal neurological symptoms.[13] Risk factors documented include age, about 40 years and the gender whereby more female affected than male.[14] Among illnesses, hypertension is associated with headache.

CT scan has proved to be useful when the neurological physical examination is abnormal. It is the easiest, quickest and cheap method. There are previous studies that have showed that CT is of low yield in patients who undergo imaging for chronic headache without neurologic abnormality.[15] Yet patient's demand for thorough and high-tech evaluation has accelerated the use of CT despite the evidences against their use.

In comparison with secondary headache, majority of the patient with primary headache raises concern about the wisdom of routine CT scan of brain, orbit and paranasal sinuses to exclude the causes of headache. Detection of cause and manageable lesions that impact the quality of life remains the primary motto to obtain a neuroimaging study.

Objectives-

1. To determine the causes of headache of patients presenting with nontraumatic headacheby CT scan at Tripura Medical College and Dr. B.R. Ambedkar Memorial Teaching Hospital, Hapania, Agartala, West Tripura.
2. To correlate the clinical diagnosis and the CT findings of patients with nontraumatic headache.

MATERIALS AND METHODS

The study was conducted in the Radiodiagnosis Department of Tripura Medical College and Dr. B.R. Ambedkar Memorial Teaching Hospital, Hapania, Agartala, Tripura, for the period of six months duration w.e.f. September 2016 to February 2017. It was a cross-sectional type of study. 163 patients presenting with nontraumatic headache were referred from other clinical departments to radiology department for evaluation during the study period; 157 patients were included in the study, because 6 patients refused to participate in the study. Patient with posttraumatic headache were excluded from the study. Multidetector CT scan (Philips Brilliance 16) machine was used for the study. All scans were viewed for the presence of any secondary cause of headache. Ethical permission was taken from Institutional Ethical Committee of Tripura Medical College and Dr. B.R. Ambedkar Memorial Teaching Hospital, Hapania, Agartala, West Tripura. Written consent was obtained from the participants.

Statistical Analysis-The data were entered in spreadsheet and analysed using SPSS 21 statistical software. Results were expressed as frequency and percentage.

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RESULTS

Demographic Variables	No.	Frequency (%)
Gender		
Male	77	49.04
Female	80	50.96
Age Group (in years)		
≤20	22	14.02
>20 to ≤40	85	54.14
>40 to ≤60	40	25.47
>60	10	6.37
Total	**157**	**100**

Table 1. Demographic Distribution of the Study Participants

In the present study (Table No. 1), female patients (50.96%) were slightly more than the male (49.04%) patients. Majority of the patients were in the age group of >20 to ≤40 years (54.14%), followed by >40 to ≤60 years (25.47%).

Type and Duration of Headache	No.	Frequency (%)
Severity of Headache		
Mild	126	80.25
Severe	31	19.75
Duration of Headache		
Acute	75	47.77
Chronic	82	52.23

Table 2. Severity and Duration of Headache

Most of the patients had mild type (80.25%) and chronic duration (52.23%) headache.

CT Scan Result	No. of Cases	Frequency (%)
Normal (Negative finding)	116	73.89
Abnormal (Positive finding)	41	26.11
Total	**157**	**100**

Table 3. CT Scan Result

Most of the patients had normal CT scan with negative finding (73.89%) compared to abnormal CT scan with positive finding (26.11%).

Causes of Secondary Headache	No. of Cases	Frequency (%)
Sinusitis	30	73.17
Acute cerebral infarction	6	14.63
Meningioma	3	7.31
Acute intraventricular haemorrhage	3	7.31
Obstructive hydrocephalus	3	7.31
Acute subarachnoid haemorrhage	1	2.43
Pituitary macroadenoma	1	2.43
Calcified granuloma	1	2.43
Basilar artery dolichoectasia	1	2.43
Haemorrhagic cerebral infarct	1	2.43
Focal chronic infarct	1	2.43

Table 4. Positive CT Scan Findings

Most common cause of secondary headache was sinusitis (73.17%). Of the 30 sinusitis, most commonly involved sinus was maxillary sinus, i.e. 16 patients (53.33%) followed by frontal sinus, i.e. 5 patients (16.66%) and pan-sinus, i.e. 5 patients(16.66%). CT images are shown below.

Duration of Headache	CT Findings		Total
	Positive	**Negative/Normal**	
Acute	26 (34.66%)	49 (65.33%)	**75**
Chronic	15 (18.29%)	67 (81.70%)	**82**
Total	**41**	**116**	**157**

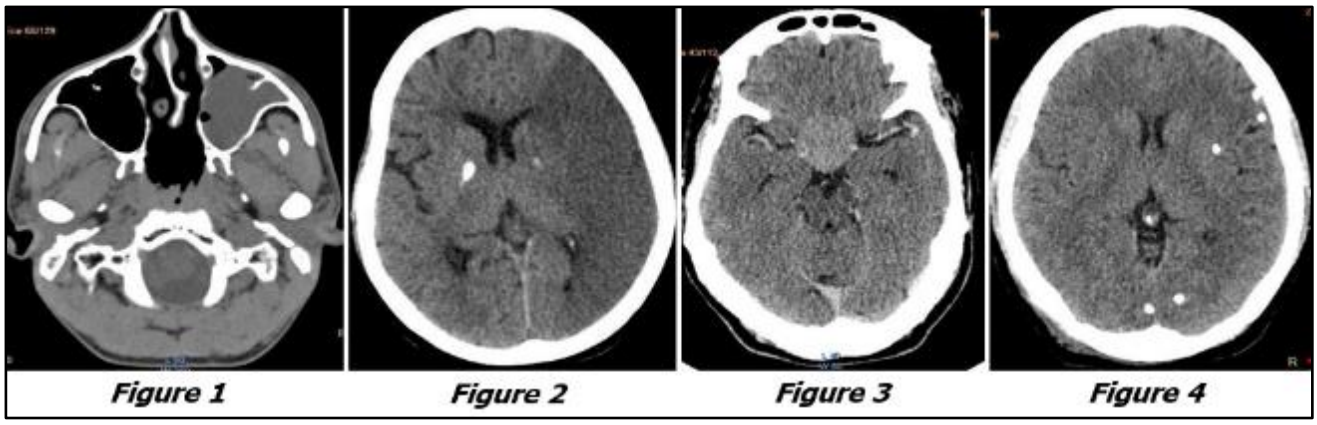
Table 5. Duration of Headache and CT Findings

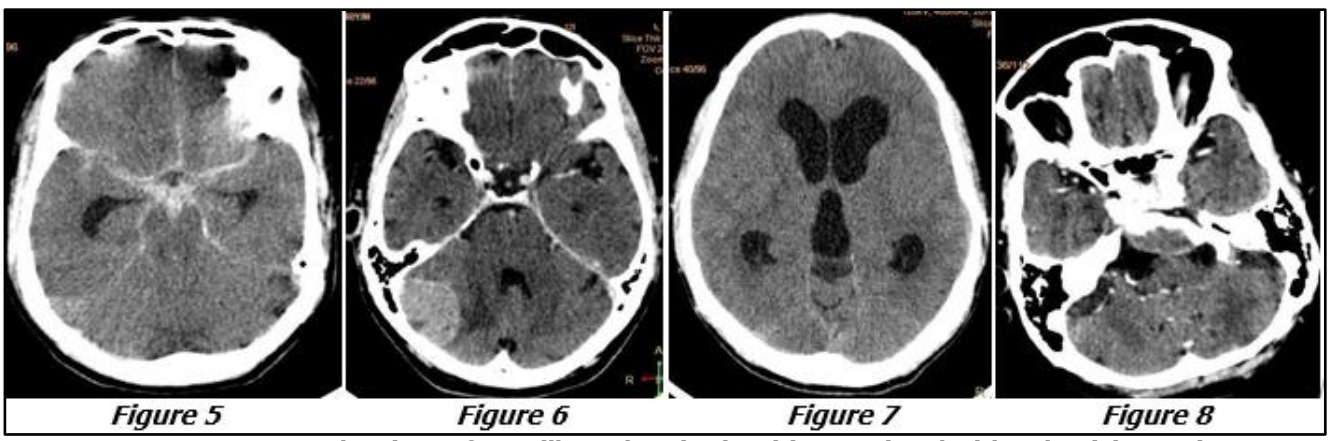
Most of the patients with acute and chronic durations of headache had normal CT scan with negative findings (65.33% and 81.70%, respectively).

Clinical Diagnosis	Correlates with CT Scan Findings	Not Correlating with CT Scan Findings	Total
Sinusitis	19 (38.77%)	30 (61.22%)	49 (31.21%)
Migraine	26 (69.44%)	21 (44.68%)	47 (29.93%)
CVA/ICH	10 (32.25%)	21 (67.74%)	31 (19.74%)
Brain SOL	5 (25%)	15 (75%)	20 (12.73%)
Meningitis	0 (0%)	10 (100%)	10 (6.36%)
Total	**60 (38.22%)**	**97 (61.78%)**	**157**

Table 6. Correlation Between Clinical Diagnosis and CT Scan Findings

Most of the clinical diagnosis do not correlate (61.78%) with the CT scan finding. Patients with clinical diagnosis of migraine correlates mostly with the CT scan findings (69.44%), followed by sinusitis (38.77%), CVA/ICH (cerebrovascular accident and intracerebral haemorrhage) 32.25%, brain SOL (25%). None of the patients with clinical diagnosis of meningitis correlates with CT findings (0%).





CT Scan Images Showing Left Maxillary Chronic Sinusitis Associated with Polyp (Figure 1), Acute Left Cerebral Infarct (Figure 2), Pituitary Macroadenoma (Figure 3), Multiple Calcified Nodules/Granuloma/Neurocysticercosis (Figure 4), Acute Subarachnoid Haemorrhage (Figure 5), Meningioma (Figure 6), Obstructive Hydrocephalus (Figure 7) And Basilar Artery Dolichoectasia (Figure 8)

DISCUSSION

A study done in India by Garjesh Singh Rai et al (2016) found that headache is more common in female (62.6%) than male (37.4%) and the commonest age group ranging from 20-30 years (29%) followed by 30-40 years (27.8%) and 40-50 years (15.8%).[16] Another study done in the United States of America showed that migraine headache, the commonest primary headache diagnosed in primary healthcare setting peaks between the ages of 25-55 years.[17] In our study, female patients (50.96%) were slightly more than the male (49.04%) patients and majority of the participants were in the age group of >20 to ≤40 years (54.14%) followed by >40 to ≤60 years (25.47%). Most of the patients had mild type (80.25%) and chronic duration of headache (52.23%). Primary headache (73.89%) was found to be more common than secondary headache (26.11%).

Various studies have been conducted at different parts of the world at different time to assess the utility of CT scan in patients with headache. A study conducted at Chitwan Medical College, Nepal, in 2013 among 256 patients showed that 73% of patients presenting with headache had no morphological abnormality in CT scans of brain and reported absolutely normal scan.[18]In a study of evaluation of chronic headache by CT scan in the year 2012 by Subedee A, a total of 56 patients were studied, out of which, 50 had normal CT (89.28%), 4 had minor abnormality (7.14%) that did not alter patient management and 2 had significant lesions (3.57%).[19]

Weingarten et al in their study showed that a headache associated with brain tumour maybe nonspecific and so many times cannot be reliably differentiated from other more common benign causes of headache strictly on clinical grounds, so in those cases, neuroimaging play an important role to include or exclude the possible cause.[20] Presence of white matter disease is mostly coexisting with chronic hypertension and ageing process in most of the cases,[21] but it may not be primary cause of headache.

In our study, out of 157 patients, most of the patients had normal CT scan with negative findings (73.89%) compared to abnormal CT scan (26.11%) with positive findings, which is a secondary cause of headache. Most common cause of secondary headache was sinusitis (73.17%). Of the 30 sinusitis, most commonly involved sinus is maxillary sinus, i.e. 16 patients (53.33%). Other causes of secondary headaches were acute cerebral infarct (14.63%), meningioma (7.31%), acute intraventricular haemorrhage (7.31%) and obstructive hydrocephalus (7.31%). One each case of acute subarachnoid haemorrhage, pituitary macroadenoma, calcified granuloma, basilar artery dolichoectasia, haemorrhagic cerebral infarct and focal lacunar infarct were also found.Most of the patients with intracranial cause of secondary headache have some neurological deficit.

We have also correlated the CT scan finding with the clinical diagnosis. Most of the clinical diagnosis does not correlate (97 cases/61.78%) with the CT scan findings, while 60 cases/38.22% correlates with the clinical diagnosis. Patients with clinical diagnosis of migraine correlates mostly with the CT scan findings (69.44%), followed by sinusitis (38.77%), CVA/ICH (cerebrovascular accident and intracerebral haemorrhage) 32.25% and brain SOL (25%). None of the patients with clinical diagnosis of meningitis correlates with CT findings (0%). Those with clinically diagnosed CVA/ICH patients with abnormal neurological function correlate more with CT scan than with normal neurological function.

Thus, a meticulous history with eagle's eye physical examination is sufficient enough to exclude major intracranial cause and it is a very cost effective means for evaluating headache. CT scans should not use as a screening tool and it can be reserved for those patients in whom there is a high clinical suspicion of some serious intracranial cause having neurological deficits on examination. Sinusitis and other paranasal sinus disease are certainly associated with headache in many cases. Computed tomography scan is sensitive for inflammatory changes in the sinuses than plain x-ray, but the clinical significance and cost effectiveness of such type of CT scan remains a question.

CONCLUSION

Computed tomography scan of brain, orbit and paranasal sinuses has a significant role in determining the cause of headache. Primary headache is more common in comparison to secondary. Sinusitis is the commonest cause of secondary headache. Detection of intracranial abnormality by CT scan in headache patients is proportion to previous studies. CT scan has a significant role in detecting intracranial pathology in patient presenting with headache associated with abnormal neurological function, while the detection rate is poor in chronic headache without neurological abnormality.

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