

Role of Brain Computed Tomography for evaluation of headache in adults

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Objective: To assess the role of computerized tomography scanning of the brain in evaluation of patients with headache

Methodology: A retrospective study was held over 17 months in Prince Ali Military Hospital, Jordan and included 1413 patients. All had headache as the main indication for CT and their reported results were analyzed. The patients were sorted in two groups: Group 1: who had only headache and Group 2: who had symptoms and /or signs associating headache.

Results: Out of a total of 6480 CT scans, 1413

were done for evaluation of headache. Six hundred ninety two (48.9%) patients had CT scan for headache only (group 1). Rest of the patients had headache with other associated symptoms (group 2). Abnormalities were seen in 228 (32.0%) patients.

Conclusion: The yield of brain CT scanning in headache may be maximized by optimizing clinical judgment for selecting indicated cases. (Rawal Med J 2013;38:335-337).

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

INTRODUCTION

Headache is a common symptom so that almost everyone had experienced it at least once in his lifetime and regarded it as normal. Headache becomes a problem at some time in the lives of about 40% of people in Europe.¹ It is a common presenting symptom to the medical providers accounting for 4.4% of consultations in primary care.² Headaches fall into two categories of primary (non organic) and secondary (organic) headache.³ The primary headache accounts for more than 90% of headache presenting to primary care.⁴ Examples are tension-type headache, migraine and cluster headache that are not associated with underlying pathology. Although benign in nature, but are often disabling. The secondary headaches usually require the investigations since presence of an underlying cause - like vascular, inflammatory, is more likely. Most of patients who present with chronic or recurrent headache have no neurological abnormality, still many patients undergo evaluation with computed tomography (CT) and, more recently, magnetic resonance (MR) imaging.⁵ The aim of this study was to assess the role of CT scan of the brain in evaluation of patients with headache.

METHODOLOGY

This retrospective study was conducted from July 2010 to December 2011 at Prince Ali Military Hospital, Amman, Jordan. A total of 6480 CT scans of brain were performed during the study period. Of these, 1435 were included in the study. These were outpatients, headache was their main presenting symptom, age was above 16 years, had no history of trauma.

The radiological requests were collected from the radiology department archives. The needed clinical or laboratory data were obtained from the patients records. 22 patients were excluded from the study because patient's records were unavailable. The patient's personal data, past relevant history, related clinical findings were noted. All scans were done without intravenous contrast unless an indication to warrant its use. Patients were divided into two groups. Group 1 patients presented with headache only while Group 2 patients had associated clinical features like nausea, vomiting, dizziness, fever, etc.

RESULTS

Out of 1413 patients, 771 (54.56%) were male and 642 (45.43%) were female. The age range was 16-

83 years with a mean age of 49.5(39.5) years. The male-female ratio was 1.2:1 (Table 1). There was no significant difference in the age distribution according to sex ($P=0.49$, χ^2 test) noted.

Table 1. Demographic characteristics of the study population.

Age (yr)	Number (Women)	Number (Men)
16-39	171 (26.6%)	184 (23.9%)
40-59	274 (42.67%)	341 (44.23%)
Above 60	197(30.7%)	246 (31.91%)
Total	642	771

There were 692 (49%) patients in Group 1 and 721 (51%) in Group 2. In Group 1, normal CT scan was reported in 668 (96.5%) patients, while abnormal findings were reported in 3.47 % of patients (Table 2).

Table 2. Diagnostic yield of CT scan for patients in Group 1.

Abnormality	Number	Percentage
Stroke, including chronic ischemic processes	8	1.16%
Sinusitis	5	0.72%
Brain tumor	3	0.43%
Sagittal sinus thrombosis	2	0.29%
AVM	2	0.29%
Sub-Dural hematoma	2	0.29%
Aneurysm	1	0.14%
Hydrocephalus	1	0.14%
Total	24	3.47%

Table 3. Diagnostic yield of CT scan for patients in Group 2.

Abnormality	Number	Percentage
Stroke	63	8.85%
Intracerebral hemorrhage	37	5.2%
Subdural hematoma	34	4.78%
Metastatic lesions	23	3.23%
Cerebral edema	22	3.09%
Hydatid cyst	15	2.11%
Primary brain tumor	13	1.83%
Brain abscess	9	1.26%
Superior sagittal sinus thrombosis	8	1.12%
Encephalitis	4	0.56%
Total	228	32.03%

Normal results were reported in 493 (67.13%) patients of Group 2 while 228 (32.03%) patients had abnormality detected on CT scan (Table 3).

Table 4. Associating clinical findings in Group 2 patients.

Clinical symptoms	Number	Percentage
Nausea or vomiting	221	30.7
Blurred vision	97	13.5
Systemic illness (fever, general weakness)	69	9.6
Side weakness, Numbness	87	12.1
Confusion	148	20.5
Signs of meningeal irritation	61	8.5
Neck stiffness	56	13.2
Onset of with exertion	45	6.2

There were different associating symptoms and signs. Some patients had more than one of these associations (Table 4).

DISCUSSION

Headache is defined as diffuse pain in various parts of the head, with the pain not confined to the area of distribution of a nerve.⁶ Many controversies exist in the literature regarding the nomenclature and classification of headache but it is more helpful diagnostically and therapeutically to consider headaches as being divided into two categories: primary and secondary.⁷ Secondary headaches are less common compared to the large number of patients with primary headache.⁸ It is not always easy to discriminate the primary causes of headache, however. Patient anxiety about serious illness presenting with headache is often very high because of information from media and worries from friends and family. This might make clinicians often feel obligated to request CT scan to relieve their concerns and avoid misdiagnosis (or delay in diagnosis), which can lead to mortality or lifelong disability.

There are warning symptoms and signs, red flags, which alert the clinician, to select those patients who require investigations. These include recent onset headache, age above 50 years, increasing intensity and frequency, among other signs.⁹ Sobri et al discussed the red flags in patients presenting with headache and concluded that there are three statistically significant red flag in predicting abnormal neuroimaging in patients with headache. They were paralysis, reduced level of conscious and papilledema and patients with headache who have

three or more red flag features should have a prompt neuroimaging.¹⁰

Sometimes, red flags are absent, still CT scan is requested to reassure the patient and relatives. This will raise the issue of radiation to the patient especially if young; so that the use of CT scan has to be balanced against the radiation dose. Radiation dose in brain CT scan is 3 mSv (equivalent to 30 skull x rays). CT for headache has low diagnostic yield 0.2-2%.¹¹ This negative yield should be thought of positively considering the social benefits from negative imaging studies of headache. Tension and pain caused by headache would interfere with productivity of the patient and quality of life.¹²

Nausea and vomiting were the commonest findings accounting for 30.7% of the reported associated clinical features in Group 2 patients. Confusion was recorded in 148 patients. Abnormal radiological findings were reported in 3.47% in Group 1 and 31.6% of Group 2 patients. The positive yield was 9 fold in the presence of clinical features.

In our hospital, about 11% of CT scan workload is for headache. Some of the scans may have been done for reasons other than purely clinical indications due to the military nature of our hospital. In such a peripheral hospital, urgent cases like subdural hematoma or ruptured aneurysm should be definitely diagnosed before arrangement for transfer to the tertiary center in another city. These factors might be related to the workload of CT in our hospital.

CONCLUSION

Brain CT scanning is a significant informative examination if red flags are well utilized. This emphasizes the role of proper history and physical examination for detection of patients who need investigations which further raises the positive outcome of CT.

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