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CT SCAN FINDINGS IN CEREBROVASCULAR DISEASE: A LOCAL EXPERIENCE

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ABSTRACT

Objective: To determine the frequency of various CT scan findings in cerebrovascular disease patients at Post Graduate Medical Institute, Hayatabad Medical Complex, Peshawar.

Materials and Methods: This was a descriptive study conducted at the Radiology Department of Hayatabad Medical Complex, Peshawar over a period of twelve months (from June 2007 to May 2008). Adult patients of either sex suffering from stroke and referred for CT scan examination of the brain, were included in the study. Various CT scan findings were noted.

Results: Out of 100 patients, 70 were male and 30 were female. Majority of patients, (n=45) were in the age range of 51-60 years. Twenty seven patients were known hypertensive and 17 patients were diabetic. On CT scan, cerebral infarction was found in 85 cases and cerebral hemorrhage was found in 15 cases. Among the cases with infarction, right temporo-parietal region was most commonly involved (n=13, 5.29%), while right basal ganglia (n=4, 26.66%) is most commonly involved in patients with hemorrhagic stroke. Other regions of the brain are involved less frequently.

Conclusion: CT scan of brain showed that Ischemic stroke is more common than hemorrhagic stroke. Right temporo-parietal region was the most common area of infarction. In the hemorrhagic group, the right basal ganglia was involved in the majority of cases. Stroke is more common in males and diabetes mellitus and hypertension are risk factors for stroke.

Key Words: Cerebrovascular accident; Ischemic stroke, diagnosis; neuroimaging; computed tomography.

INTRODUCTION

Computed tomography (CT) has revolutionized the assessment of patients who present with an acute neurologic deficit. The non-contrast head CT scan remains the first-line imaging study in suspected stroke patients due to its exquisite sensitivity for the detection of blood and infarction. On the initial emergency CT scan, overt non-stroke processes must be confidently excluded. These "stroke mimics" include tumors, subdural or epidural hematomas, subarachnoid hemorrhage, and intraparenchymal hemorrhage. Since thrombolytic therapy may produce lethal bleeding in patients with intracranial hemorrhage, exclusion of hemorrhage has been the key criterion in the major thrombolytic trials[1-5].

While detection of hemorrhage is the most fundamental and critical step in the evaluation of the brain CT, the European Cooperative Acute Stroke Study (ECASS) trial demonstrated that early signs of major cerebral infarction (e.g. sulcal effacement, mass effect, edema, and loss of the insular ribbon) are also important features to look for, since they are associated with an increased risk for intracerebral hemorrhage in patients who receive thrombolytic therapy.[6-9] Some guidelines have incorporated the presence of these more subtle signs into recommendations against thrombolytics.[10-12] Previous studies show that stroke is commoner in males and Ischemic stroke is more common than hemorrhagic stroke.[13-15]

While CT is the current brain-imaging method of choice for determining qualification for thrombolysis, this may change in the future. Though MRI, especially diffusion-weighted and perfusion-weighted MRI, is highly sensitive to early pathologic changes of ischemic infarction and subtle brain edema, CT remains the current brain-imaging method of choice for determining a qualification for thrombolysis.[16-18] The major limitation of MRI remains its relative insensitivity to detecting hemorrhage, which is the key neuroimaging branch point in a clinical protocol. Therefore we decided to determine the frequency of various CT scan findings in stroke patients in our hospital.

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MATERIALS AND METHODS

The study was conducted at the Department of Radiology of Hayatabad Medical Complex, Peshawar. A total of 100 patients of all ages and both sexes, from June 2007 to May 2008, suffering from stroke and referred for CT scan examination of the brain were included in the study. Patients who suffered from convulsions or seizures were excluded from the study. Standard protocol for unenhanced CT scan of the brain was adopted. CT scan was performed with the patient in supine position and the plane of section at 10-25 degrees to the Reid's baseline. Serial 10 mm axial sections were taken from the base of the skull to vertex. In doubtful cases, contrast enhanced study was conducted. Urograffin (ionic) 76 % made by Schering (Germany) was used as contrast medium. In patients who had allergy to Urograffin, or there was history of allergy, asthma or renal problem, Ultravist (non-ionic) by Schering (Germany) was used instead of urograffin. Helical CT scanner, TOSHIBA (Xvision / GX) Japan was used for scanning. Data was analyzed by statistical software, SPSS version 10.

RESULTS

This study was conducted on 100 consecutive patients having acute neurological deficit and referred to our department for CT scan. Cerebral infarction was detected in 85 cases (85%) as a cause of stroke, while the remaining 15 cases (15%) revealed cerebral hemorrhage. The majority of the patients were male (70%). The majority of the patients (n=45, 45%) were in the age range of 51-60 years. Twenty seven patients (27%) were known hypertensive while 17 patients (17%) suffered from diabetes.

On computed tomography scanning, among the 85 cases with infarction, the following features were recorded: right temporo-parietal region involved in 15.29% (n=13), right parietal region in 12.94% (n=11), left parietal region in 11.76% (n=10), right basal ganglia in 9.41% (n=8), left basal ganglia region and left temporo-parietal region in 8.23% (n=7) each, left parietal-occipital region and right parietal-occipital area in 4.70% (n=4) each, right occipital region and left parietal-basal ganglia in 3.52% (n=3) each, left occipital region and parietal-basal ganglia region in 2.35% (n=2) each, and left-right basal ganglia, left frontal, left fronto-parietal-occipital, left frontal-left parietal-right parietal, right frontal, right-left frontal-right parietal, right frontal right parietal, right frontal-left parietal, right frontal-right temporal, right parietal-left frontal-left occipital, right parietal-left parietal-right occipital regions involved each in 1.17% (n=1).

On computed tomography scanning among the 15 hemorrhage cases, the right basal ganglia was involved in 26.66% (n=4), right parietal region in 20% (n=3), left basal ganglia in 13.33% (n=2), right parieto - occipital region in 13.33% (n=2) and left frontal, left parietal - left basal ganglia, left temporal, left temporo-parietal areas each in 6.66% (n=1).

Among these patients, besides infarction or hemorrhage, cerebral atrophy (right or left sided) was found in 19 patients (19%), hydrocephalus (right or left sided) in 5 patients (5%), and subdural hematoma (right or left sided) 5 patients (5%).

DISCUSSION

Stroke is a syndrome caused by the disruption of blood flow to a part of the brain due to either (a) occlusion of a blood vessel (ischemic stroke, seen in approximately 80% of cases); or (b) rupture of a blood vessel, resulting in injury to cells and causing sudden loss of focal brain functions.[19] Imaging plays a key role in helping exclude hemorrhage or other mimicking lesions because patients with ischemic stroke can benefit from thrombolytic therapy contrary to those with hemorrhagic stroke who would be adversely affected by thrombolytic therapy.[20]

Most of the study subjects were between 51–60 years of age, in accordance to the data available.[13-15] Our study shows that out of 100 patients, 85 had ischemic stroke and 15 had hemorrhagic stroke. Out of these 70% (n=70) were males and 30% (n=30) females. This male-to-female ratio matches a study conducted by Khan AN et al at CMH Lahore (male to female ratio of 3.2:0.8).[14] Contrary to this, Almani SA et al found almost equal preponderance of stroke amongst males and females (male to female ratio 1.1:1).[13] while Khan A et al showed that females suffered from stroke more than males (male to female ratio 0.8:1.2).[16]

Our study shows that ischemic stroke is more common than hemorrhagic stroke, in accordance with previous local as well as international studies. Almani SA et al showed a 3.5:1.5 ratio between ischemic and hemorrhagic stroke in their study.[13] Another study conducted by Khan A et al also concluded that ischemic stroke is more common as compared to hemorrhagic stroke with a ratio of 7:1.[14]

CONCLUSION

The non-contrast CT brain remains the first line imaging study in suspected stroke patients due to its ubiquity and exquisite sensitivity for the detection of blood and infarction. Ischemic stroke is more common than hemorrhagic stroke.

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