CLINICAL VERSUS C.T. SCAN DIAGNOSIS IN STROKE–A COMPARATIVE STUDY OF 50 CASES

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Background: Cerebrovascular disease is one of the three leading causes of death in the world along with cancer and heart disease. Differentiation between cerebral infarction and intracerebral haemorrhage is important because now a days proper management of the acute stroke syndrome is based on the correct diagnosis of the pathological type. This study compared clinical and C.T. scan diagnosis of stroke and determined the reliability of the clinical diagnosis in cases of stroke. **Methods:** This study was conducted on 50 patients of stroke at Postgraduate Medical Institution, Lady Reading Hospital, Peshawar from Jan 1995 to May 1996. Clinical diagnoses were made in conformity with criteria for clinical diagnosis of intracranial haemorrhage, cerebral infarction due to embolism or thrombosis. The clinical diagnosis was then compared with the CT diagnosis. **Results:** We found that from careful history and clinical examination differentiation could be made between cerebral infarction and haemorrhage. In our study at Government Lady Reading Hospital, cerebral hemorrhage accounted for 42 % of cases of stroke and cerebral infarction in 58%. **Conclusions:** In order to make a clinical diagnosis of stroke, a detailed history and thorough clinical examination is mandatory. As far as treatment planning is concerned clinical diagnosis of stroke is not safe enough as a guide for anticoagulant or thrombolytic therapy. In order to confirm the aetiological diagnosis of stroke one must rely on C.T. scan examination.

INTRODUCTION

Cerebrovascular disease is one of the three leading causes of death in the world along with cancer and heart disease. Distinction between cerebral infarction and intracerebral haemorrhage is important because now a days proper management of the acute stroke syndrome is based on the correct diagnosis of the pathological type.

Computed tomography is an accurate, safe and noninvasive procedure for differentiating between cerebral haemorrhage and infarction. It also shows the correct site of lesion. This study not only helps in the management of stroke patients but also to determine the incidence of haemorrhage and infarction in various cases of stroke[1,2,3].

This study compared clinical and C.T. scan diagnosis of stroke and determined the reliability of the clinical diagnosis in cases of stroke.

MATERIALS AND METHODS

Fifty patients out of those admitted to Medical "B" unit of Postgraduate Medical Institute, Lady Reading Hospital (PGMI, LRH) Peshawar in 1995-96 with a diagnosis of acute stroke were included in this study.

History and clinical examination were recorded and all the findings were entered into a proforma. The following risk factors were specially considered, age, sex, atrial fibrillation[4,5] intermittent claudication, current smoking, hypertension (diastolic and systolic blood pressure), diabetes mellitus, any ischemic or valvular heart disease, former myocardial infarction (MI) and former transient ischaemic attack (TIA).

The following criteria for clinical diagnosis of acute stroke was made.

- A hypertensive patient with sudden onset of headache, vomiting, loss of consciousness and neurological deficit will be considered to have intracranial haemorrhage[6,8].
- A person with predisposing factors for thrombo-embolism who has abrupt onset of neurological deficit will be considered to have cerebral infarction resulting from embolism[6,8].
- A patient with gradual onset of stroke and past history of TIA will be considered to have cerebral infarction resulting from thrombosis[6,7].

From these clinical criteria a provisional diagnosis of cerebral infarction or cerebral haemorrhage was made and entered into the proforma. This diagnosis was then compared with the C.T. scan findings.

The time from onset of stroke to C.T. scan examination varied and was dependent on the accessibility of the C.T. scanner, which varied during the study period. In most cases it was done within 72 hours to a week.

RESULTS

Fifty (50) patients, 28 women and 22 men, aged 17-75 years were studied. Out of these 50 patients 37 (20 females) were hypertensive. The determination of presence of hypertension was based on the history and serial check ups of blood pressure. 30 of these patients were known hypertensive while 7 were found to be hypertensive in the hospital.

Of these 30 known cases of hypertension 7 were not taking any antihypertensive drugs while 23 were taking antihypertensives either regularly (12) or irregularly (11). Duration of hypertension in the known cases varied from 6 months to 25 years. Eight normotensive patients presented with high blood pressure at arrival but this came to normal after 48 to 72 hours.

Diabetes mellitus was an important risk factor in these stroke patients. Six (6) patients were known diabetics taking drugs either regularly (4) or irregularly (2). Duration of diabetes mellitus varied from 1 to 10 years.

Ischaemic heart disease was present in 9 patients. Two presented with myocardial infarction and four patients had atrial fibrillation at the time of stroke. Only one 17 years old girl was having rheumatic valvular heart disease (predominantly mitral stenosis) and was in atrial fibrillation at the time of presentation. Atrial fibrillation was confirmed on ECG. One patient was having congestive heart failure due to ischaemic heart disease. Only one postnatal lady having congestive cardiomyopathy presented with stroke. Three patients had history of transient ischaemic attack.

Using the fore mentioned clinical criteria for the diagnosis of cerebral infarction and intra cranial haemorrhage, 37 cases of stroke were labelled as cerebral infarction and the remaining 13 as intra-cranial haemorrhage. There was no history of headache and vomiting in the latter 8 cases.

All the 13 clinically diagnosed cases of intra-cranial haemorrhage were confirmed by C.T. scan brain.

Thus with C.T. scan we found 29 cases (19 females and 10 males) of cerebral infarction and 21 cases (9 females and 12 males) of intracranial haemorrhage. Among the 29 cases of cerebral infarction 54% (18 patients) were hypertensive while this percentage was 90% (19 patients) in 21 cases of intracranial haemorrhage. Table –1 gives results of C.T. scan brain.

Among the 21 cases of intracranial haemorrhage, 18 patients were having intracerebral haemorrhage. Of the remaining three, two were females having subarachnoid haemorrhages (SAH) and one was an elderly man of 75 years having developed subdural hematoma during sleep without any history of head injury.

Table-1: Findings on CT scan and percentage of hypertension in the patients with stroke

CT scan findings	Male	Female	Percentage of patients with Hypertension
Cerebral infarction (n=29)	10	19	54%
Intracranial haemorrhage (n= 21)	12	09	90%

Out of the 18 cases of intracerebral haemorrhage. 4 cases were having lobar haemorrhage mainly in the parietal area and 14 showed haemorrhages in the areas of the thalamus, basal ganglia and internal capsule.

The frequency of SAH was 4% and that of spontaneous subdural hematoma 2%.

It was strange to see haemorrhage on C.T. scan of those patients who had the clinical presentation of cerebral infarction. 4 out of these 8 patients were having big hematomas and the other 4 were having small haemorrhages near the basal ganglia.

Among the 14 patients showing haemorrhages near the centre of the brain, 8 patients showed haemorrhages near the basal ganglia and internal capsule area and 6 patients showed haemorrhages near the thalamus. Intraventricular extension was noted in 5 of these patients.

DISCUSSION

We found that from careful history and clinical examination differentiation could be made between cerebral infarction and haemorrhage.

Clinical variables potentially useful in differentiating cerebral infarction and haemorrhage, apart form age and sex are, loss of consciousness at onset, level of consciousness, headache, vomiting, diastolic blood pressure, signs of meningeal irritation, plantar reflex response, atheroma markers (diabetes mellitus, angina and intermittent claudication), history of hypertension, previous stroke event, TIAs and underlying heart disease or MI[2,6].

In this study the percentage of intracranial haemorrhage and infarction varied considerably from the studies done in the developed countries of the western world but varied little from the studies done in developing countries like Thailand and India[8,9].

Cerebral haemorrhage is found in 20% of patients with stroke in the developed countries[10]. But in developing countries, like Pakistan the lesion is quite common, partly because of poorly controlled hypertension. In our study at Government Lady Reading Hospital, cerebral hemorrhage accounted for 42 % of cases of stroke and cerebral infarction in 58%. This is similar to the studies done in Thailand showing 40-50% cases of cerebral haemorrhage and 50-60% cases of cerebral infarction[9].

In a study in India the percentage of intracerebral haemorrhage and cerebral infarction was exactly similar to those of ours i.e. 42.5% for haemorrhage and 57.5% for infarction[8].

Although the classic features of intracerebral haemorrhage e.g. sudden-onset of severe headache, vomiting, rapid deterioration of consciousness and lack of previous transient ischaemic attacks are reasonably specific for massive haemorrhage, yet computed tomography has shown that they are insensitive for the smaller peripheral haemorrahges that carry a better prognosis for survival and functional recovery[6].

In this study some cases of massive haemorrahge did not present with the classical features of haemorrhage and thus a clinical diagnosis of cerebral infarction was made. Primary intracerebral haemorrahge has got its predilection sites; basal ganglia, posterior limb of the internal capsule, thalamic area, area of the fourth ventricle of the cerebellum and potine tegmentum[11].

In this study intra cerebral haemorrhages were common at the basal ganglia, at the thalamic area and near the internal capsule but we could not find any case of cerebellar or pontine haemorrahge.

Among the risk factors hypertension was the most important risk factor for stroke, not only in haemorrahge but also in cases of cerebral infarction. Hypertension was there in 90% of the intra cranial haemorrhage and 95% of those with intracerebral haemorrahge. This is in contrast to the 64% of the intracranial haemorrahge and 83% of those with putamenal heamorrhage in studies done in India[12].

In this study the frequency of hypertension in cerebral infarction patients was lower and was found to be 54%.

Headache is the important symptom of intra cranial haemorrahge. In haemorrhagic stroke headache was observed in all cases of subarachnoid haemorrahge and in 58% of the intraparenchymal haemorrahge. It was also observed, though to a lesser degree, in cases of cerebral infarction[13].

Silent infarcts were found in 6% of the cases. This has a few independent risk factors like old age male sex, hypertension and claudication[14]. In our study all the three patients were elderly and hypertensive with a female to male ratio of 2:1.

Cerebral infarction involved mainly the middle cerebral artery territory (predominantly the parietal lobe) while cerebral haemorrhage involved mainly the basal ganglia and thalamus.

CONCLUSION

In order to make a clinical diagnosis of stroke, a detailed history and thorough clinical examination is mandatory. As far as treatment planning is concerned clinical diagnosis of stroke is not safe enough as a guide for anticoagulant or thrombolytic therapy. In order to confirm the aetiological diagnosis of stroke one must rely on C.T. scan examination.

The incidence of intracranial haemorrahge is very high (more than 40% in the developing countries. This is in contrast to the 5-20 percent in developed countries[6].

Hypertension is an important risk factor for intracranial haemorrahge and cerebral infarction and its poor control may be an important reason for the high incidence of intracranial haemorrahge in our part of the world. Hypertension must be evaluated very carefully since it may represent a physiologic adjustment to the infarction itself or the increased intracranial pressure.

It is best to avoid treating hypertension in the patient with cerebral infarction, especially during the first 24 hours, unless the blood pressure levels are high enough to suggest hypertensive encephalopathy.

Stroke can be prevented by treating the important risk factors. Improper health care, lack of education, poverty etc are important reasons for the increasing incidence of stroke in under developed countries like Pakistan. The incidence of stroke in western world is decreasing day by day. This is because of the better health care, proper control of hypertension, better management of heart diseases etc.

Sometimes the clinical presentation may not be helpful in making a clinical diagnosis here C.T. scan will help in the diagnosis.

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