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## ORIGINAL ARTICLE

# Correlation between Clinical and Computer Topography Findings in patients of Stroke

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## ABSTRACT

Stroke is one of the common diseases among medical problems, giving rise to a lot of morbidity and mortality. Stroke is third leading cause of death and important cause of hospital admission after cancer and ischemic heart diseases in the industrialized 60. Clinical presentation of stroke is very variable pathologically. Strokes are either an infarction or hemorrhage in distinguishing cerebral infarction from hemorrhage. This study was conducted to correlate clinical features with computed tomography findings in patients having cerebral vascular accidents. In this study 100 patients admitted through accidents and emergency ward having clinical diagnosis of stroke were enrolled. After history taking and physical examination clinical diagnosis was made and confirmed by C.T Scan. The age range was 16-90 years , most common age group was 50-70 years (64%) between 71-90years (38%) and less than 40 years were 9 patients (18%). Out of 100 patients 58(58%) were male and 42(42%) were females. The hemorrhagic stroke was found in 36 patients (36%) while ischemic in 64 patients (64%). The most common clinical presentation was hemi paresis (68%) , the rest of patients were those who presented with quadraparesis 10%, loss of consciousness 10%, headache 28% and fits 12%. Headache and seizures were more common in patients who had hemorrhagic stroke. Clinically, 58 patients (58%) were diagnosed as ischemic stroke and 42(42%) as hemorrhagic, but C.T Scan findings. The correlation was very significant (P value 0.002). The sensitivity of clinical diagnosis remained 93%. There was a strong correlation between clinical findings and C.T findings in patients of stroke (P value 0.002). But clinical diagnosis is not dependable for therapeutic and prognostic purpose when planning for anti- coagulation or thrombolytic therapy, the use of C.T Scan is mandatory.

**Key words** cerebrovascular accident (CVA), computed tomography (C.T), electrocardiography (ECG), Echocardiography (Echo)

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## INTRODUCTION

The generic term stroke signifies the abrupt impairment of Brain function caused by a variety of pathologic changes involving one (focal) or several (multi focal) intracranial or extra cranial blood vessels<sup>1</sup>. WHO defines stroke as "rapidly developed clinical signs of focal (or global) disturbance of cerebral function lasting more than 24 hours or leading to death" with no apparent cause other than vascular origin<sup>2</sup>. If the deficit improves within 24 hours it is known as Transient Ischemic Attack (TIA). If the neurological deficit improves 24 hours and within 1 week, it is termed as Reversible Ischemic Neurological Deficit (RIND)<sup>3</sup>. Stroke is the third commonest cause of death after coronary artery disease<sup>4</sup>.

The incidence of stroke is 0.5-1.0 per population. It affects males 1.5 times more than females. The age adjusted annual death rate from

stroke is 116 per 100,000 population in the USA and 200 per 100,000 in the UK (12% of all deaths). It is higher in black African population than in Caucasian. The death rate following stroke is around 25%<sup>5</sup>.

Stroke is classified according to the basic underlying pathogenic mechanism as ischemic stroke and hemorrhagic stroke. Worldwide 80% of strokes are ischemic and 20% are hemorrhagic. Ischemic stroke can be due to embolism from heart or great vessels in the neck (30% of cases) or could be due to atherothrombosis involving great vessels (40%) or atherothrombosis affecting end arteries resulting in lacunar infarcts 30%. Intracerebral hemorrhage is the cause of around 30% of strokes. Subarachnoid hemorrhage accounts for 10% cerebrovascular disease and has an annual incidence of 6 per 100,000<sup>6</sup>. Thrombotic or embolic occlusion of a major vessel leads to cerebral infarction. The resulting deficit depends upon the particular vessels involved and the extent of any collateral circulation<sup>9</sup>. The hemorrhagic stroke is very sudden in onset with severe headache, vomiting and rapid deterioration of conscious level over periods of hours. Embolic

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strokes are also sudden in onset but are not progressive; rather the symptoms and signs improve with time unless the emboli are recurrent. Cerebral infarction have gradual onset and are usually progressive over a period of day or so, till they reach their peak<sup>10</sup>. C.T Scan is a simple, non invasive and accurate investigation in distinguishing cerebral infarction from hemorrhage though the facilities are not available to every patient in Pakistan<sup>11</sup>.

These, though valuable clinically, are arbitrary. Completed stroke means the deficit has become maximal, usually within 6 hours. Stroke in evolution describe the progression during the first 24hours. Minor stroke patient recover without significant deficit, usually within a week<sup>12</sup>. Thrombotic stroke Embolic stroke Hemorrhagic stroke (intraparenchymal hemorrhage). Lacunar stroke Sub arachnoids hemorrhage<sup>13</sup>.

Hypertension Diabetes mellitus Hyperlipidemia Cigarette smoking Cardiac disease Atrial fibrillation<sup>14,15</sup>. Drug abuse Heavy alcohol consumption Family history of stroke<sup>15</sup>. AIDS (Acquired Immune Deficiency Syndrome) Obesity Sedentary habits Carotid artery Stenosis Advancing age Female sex Previous transient ischemic attacks<sup>16</sup> Hypothyroidism Oral contraceptive pill<sup>17</sup> Raised haematocrit Sleep apnea<sup>18</sup>.

## OBJECTIVE

To correlate clinical feature with computed tomography findings in patients having cerebro vascular accidents.

To correlate various risk factors with clinical and C.T findings in stroke patients

## MATERIAL AND METHODS

This descriptive study was carried out in medical & neurology ward of Lahore General Hospital. 100 patients admitted through Accident and Emergency ward having clinical diagnosis of stroke will be enrolled in the study .After history taking and physical examination, C.T Scan brain will be done to confirm the diagnosis. Other supportive laboratory investigations for diagnosis, complications and assessment of various risk factors will be carried out as laid down in the proforma. The data will be recorded on a given proforma and will be analyzed statistically and correlation between clinical features and computed tomographic findings will be made in patients with stroke. Convenient sampling technique will be applied for sample collection

## RESULTS

A total of 100 patients with stroke were included in this study. Out of these patients 58(58%) were male and 42(42%) were females. The most likely stroke prone age was 50 to 70(64%), 18 patients were between 71-90 years (18%) and 18 patients were less than fifty years of age (18%). Hypertension was one of the most important risk factor in these patients (50%). Out of these hypertensive patients, hemorrhagic stroke was found in 36 patients (72%) and ischemic stroke in 14 patients (28%). Diabetes Mellitus was four and in 16 patients all had ischemic heart stroke. Twenty eight patients (28%) had cardiac source of embolism out of these patients valvular lesion were found in six patients (21%), 20 patients had dilated cardiomyopathy with dilated cardiac chambers (71%) LA, LV clot were found in six patients (21%). twenty patients had abnormal ECG with evidence of atrial fibrillation and ischemic heart disease. Most of these patients had ischemic stroke except one patient who had sub acute bacterial endocarditic with myocotic aneurysm leading to hemorrhagic stroke. Carotid Doppler study was abnormal on 10 patients, out of these 6 patients (60%) had carotid artery stenosis > 70% and 4 patients (40%) had carotid stenosis < 70%. All these patients had ischemic stroke. In our study 68 patients (68%) presented with hemi- paresis, out of these 44 patients (64.7%) had ischemic stroke, while 24 patients (35%) had hemorrhagic CVA.

## DISCUSSION

The management and functional outcome of stroke patients depend upon the type of stroke (infarction or hemorrhage) the site and size of lesion. Therefore it is important to establish an accurate diagnosis at an earlier stage for better prognosis. We studied 100 patients with stroke and tried to establish the diagnosis on physical examinations, clinical grounds and correlated with C.T.Scan. We found in our study that most of the patients had stroke between 50-70 years of age. The incidence of stroke increases as the age advances. Females were affected at an earlier age i.e. 50-60 years as compared to males, who were predominantly affected at 50-70 years of age. Similar age and sex incidence figure were reported by Warlow<sup>19</sup>.

Two third of our patients 64% had ischemic stroke (cerebral infarction) this figure is similar to that reported by Ali et al<sup>20</sup>

Thirty four of our patients had hemorrhagic stroke and this figure is slightly higher than reported in other studies<sup>19,20</sup>.

The clinical criteria to differentiate between hemorrhagic stroke from ischemic stroke included presence or absence of headache, vomiting, fits altered conscious level, signs of meningeal irritation and raised blood pressure. Allen<sup>20</sup> used thirteen sign symptoms apoplectics onset, level of consciousness, planter responses, diastolic blood pressure, atheroma markers, history of hypertension, previous TIA or stroke, cardiac murmurs, cardiac failure, cardiomyopathy atrial fibrillation, cardiomegaly and myocardial infarction during previous six months<sup>20</sup>.

These variables are given different scores and members and calculation is made. The score above 14 is considered as hemorrhage and below 14 is infarction. As this score system uses many parameters, it is difficult to collect data and calculations are relatively difficult. In the study performed by Dada et al, In the Indian population predictive accuracy for the clinical diagnosis in hemorrhagic stroke was 66% and for ischemic stroke was 69% by Allen score system<sup>21</sup>, while with siraj score system the predictive accuracy for clinical diagnosis of hemorrhagic stroke was 80% and for ischemic stroke it was 83%. We found in our study that the predictive value for ischemic stroke was around 90% while for hemorrhagic stroke the predictive value was 80%.

In our study, we found hypertension to be the most risk factor for stroke 50%. This figure is lower than that reported in Ali et al (56%), Khawaja et al (56.8) and Al Rajeh et al (56.4%). Diabetes mellitus was present in 32% of our ischemic stroke patients. These figures are comparable with those reported by Ali et al<sup>22</sup> (ischemic 32%). None of the hemorrhagic stroke patients had previous history of TIA, but 2 of our ischemic stroke patients had preceding history of Transient Ischemic Attack (TIA). In Ahma's study<sup>20</sup> fifty patients were enrolled to see the correlation between clinical presentations verses C.T.S can findings regarding the type of lesion in stroke. In their study they found 66% of patients had ischemic strokes, while in our study we found ischemic stroke was found in 64% of patients. The incidence of hemorrhagic stroke in their study was 34%, while our study also showed the similar figures (34%)<sup>23</sup>. The stroke prone age in their study i.e., 50-70 is also comparable with our study. The sex distribution of the patients also correlated between Ahmad, s and our study. In their study the overall predictive accuracy was 70% to 72%, while in our study it was around 93% whereas, with siraj score system the predictive accuracy for clinical diagnosis of stroke is 80%-83%. In Ahmad s study 50patients were enrolled while in

our study the number of patients was 100. In Voila, s study 50 cases of ischemic stroke were evaluated for the correlation between dimensional transcranial Doppler, MR Angiography C.T. and clinical findings. In their study the Canadian neurological scale (CNS) CT correlation proved to be highly significant p< 0.0001<sup>24</sup>. In our study of 100 cases the correlation between clinical findings and C.T. finding is also significant and comparable with their study. The results of our study and those other studies that have used siraj and Allen score system for types of stroke showed that certain degree of certainty can be achieved with the clinical diagnosis in differentiating hemorrhagic from ischemic stroke. Clinical methods/skills can still be the best way of orienting etiology as well as prognosis. However, the limitation of clinical diagnosis particularly regarding type of stroke should be understood. C.T. or MRI is necessary if we really have to embark on anticoagulation therapy as many patients with small deep hematomas behave like infarction.

## CONCLUSION

1. The importance of detail history and clinical examination cannot be denied as evidenced by our study that there is a strong correlation between clinical findings and C.T. findings in patients of stroke.
2. The hemorrhagic strokes are more common in hypertensive patients. Whereas, diabetics are more prone to get ischemic strokes.
3. Patients with previous history of T.I.A, patients with atrial fibrillation and those with dyslipidemia are at risk of getting ischemic strokes.
4. The most likely stroke prone age was from 50-70 years (64%).
5. The clinical methods and skills can still be the best way of orienting etiology as well as prognosis .however, the limitations of clinical diagnosis particularly regarding type of stroke should be understood. Computed Tomography (C.T.) or Magnetic Resonance Imaging (MRI) is necessary if we really have to embark on anti-coagulation therapy as some patients with small deep hematomas behave like infarction.

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