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Research Article

## IN CEREBRAL INFARCTION STUDY TO KNOW THE FREQUENCY OF CAROTID ATHEROSCLEROSIS

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**Abstract:**

**Objective:** To determine the carotid atherosclerosis frequency with color Doppler ultrasound in patients with ischemic stroke in our population.

**Study Design:** An Observational Study.

**Place and duration:** In the Medicine Department of Mayo Hospital, Lahore in collaboration with Radiology department for one year duration from November 2018 to October 2019.

**Methodology:** All patients presenting with stroke test during this period were selected for the study. In all these subjects, risk factors were stratified. According to the study rules; all patients with ischemic stroke were performed with doppler ultrasound.

**Results:** In the study, 100 total patients were selected for six months. Of these, cerebral infarction was noted in 66%. The diabetes (35%), hypertension (72%), obesity (20%) and smoking (29%) were usual risk factors. In acute ischemic stroke; carotid atherosclerosis frequency in patients was 21%.

**Conclusion:** Carotid atherosclerosis is the most important predictive factors and indicators and independent risk factors for ischemic stroke development.

**Key words:** Doppler Ultrasound, Atherosclerosis, Carotid Artery.

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**INTRODUCTION:**

In elderly patients; the 3rd most common cause of death worldwide is stroke and cause chronic disability<sup>1-2</sup>. The doctors are trying to identify a population that is susceptible to stroke in a time when intervention can prevent disability. For ischemic stroke; Carotid atherosclerosis is the major risk factors. Atherosclerosis, Greek atherium (papilla or pastry) and sclerosis (hardness) is derived from the word<sup>3</sup>. Fat, cellular waste products, cholesterol cause fibrin and calcium accumulations in the artery in its inner lining cause lumen stenosis<sup>4</sup>. Atherosclerosis can affect the heart, brain, vital organs, kidney, arteries of the brain, legs and arms. Paralysis may occur when atherosclerosis occurs in the feeding arteries of the brain<sup>5</sup>. There are several diagnostic methods for the carotid atherosclerosis evaluation. For the evaluation of vessels; the first diagnostic imaging method is angiography. Ultrasonography was performed in the 1960s, computed tomography in the 1970s, magnetic resonance imaging in the 1980s, followed by color Doppler imaging, CT and MR angiography<sup>6</sup>. It can be used in vascular system as a non-invasive evaluation<sup>7</sup>. The latest in the main technological success series in diagnostic ultrasounds relates to the reassessment of computer technology in the 1980s, resulting in the development of color Doppler images<sup>8</sup>. A 10 MHz linear probe is required for orientation of the image. Grayscale images in B mode are used to characterize and identify the plaque<sup>9</sup>. The color addition helps to identify easily and accurately to measure the lumen. Speed measurements are used to classify stenosis.

**MATERIALS AND METHODS:**

This Observational Study was held in the Medicine Department of Mayo Hospital, Lahore in collaboration with Radiology department for one year duration from November 2018 to October 2019. In the study; all stroke patients were selected. 100 total patients (38 females, 62 males - 1: 1: 1) were included for the analysis without any discrimination in terms of age, gender, socioeconomic or ethnicity status. A complete physical examination and detailed history were

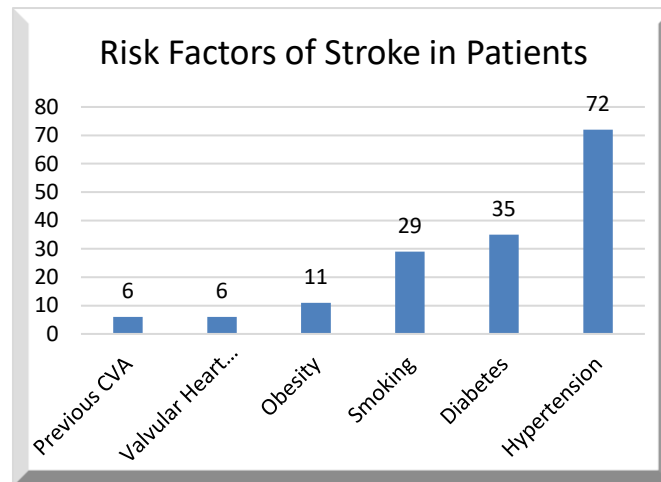
performed in all patients. Risk factors are also layered. To exclude any source of cardiac embolization, all patients underwent a research list including electrocardiography (ECG), lipid profile, computerized tomography of the brain (CT), echocardiography and chest X-ray (PA). In cerebral infarction patients Carotid Doppler ultrasonography was performed but without cardiac embolization. By a radiologist; the Doppler study was done using a 7.5MHz linear transducer Toshiba Ecocce. A longitudinal study of the cervical carotid arteries was initiated in the lateral position with the transducer. After the longitudinal study completion, the plaque formation area was examined in detail. Plaque elongation, morphological features, and especially narrowing of lumen degree was observed. After a posterolateral and lateral examination, from the anterior position of the transducer the carotid arteries were re-evaluated. The residual lumen diameter and the artery outer diameter were measured at the same level and the stricture degree was determined using the following ratio: percentage of stenosis =  $Dd.100 / D$ , where D is the diameter of the vessel D in the wall. The open diameter of vessel D is the standard Oz Gold angiography, and the data provided by angiography are diameter stenosis; For this reason, we use diameter stenosis on ultrasound. The results of the analysis were analyzed with SPSS version 18.0. Since this analysis was aimed at the frequency distribution of only a few factors, no significance tests were performed.

**RESULTS:**

100 total patients were selected for the study for six months following the aforementioned protocol. Of these, brain infarction was noted in 66%. Male were Sixty-two (62%) patients and female were thirty-eight (38%).  $55 \pm 8$  years was the mean age. 2 subjects were between 30 and 40 years, 5% were 30 and 40 years of age approximately, 21% were between 40 and 50 years and twenty (28%) were between 50 and 50 years. year. In 28% were between 60 and 70 years and 16% were older than seventy years.

**Table No 01: Risk Factors of Stroke in the 100 study patients**

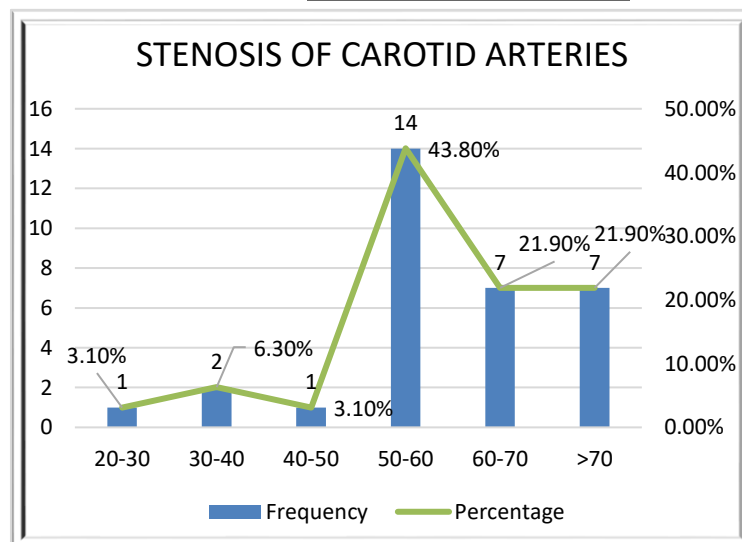
<i>Risk Factors</i>	<i>Quantity</i>	<i>Percentage</i>
<i>Previous CVA</i>	06	6%
<i>Valvular Heart Disease</i>	06	6%
<i>Obesity</i>	11	11%
<i>Smoking</i>	29	29%
<i>Diabetes</i>	35	35%
<i>Hypertension</i>	72	72%



During the presentation, 28% patients were conscious, 22% were sleepy, 26% tended to awaken, and twenty-four (24%) were in deep coma. Thirty-five (35%) patients were found to have left weakness, fifty-eight (58%) patients were on the right and seven (7%) patients did not show weakness or were deeply comatose. The brain involved was different from the motor region. The hypertension was in Seventy-two (72%) patients, diabetes in thirty-five (35%), smokers were twenty-nine (29%), obese twenty (20%) and history of seizures was in sixteen (16%). The heart valve disease was in Six patients (6%) (especially mitral valve replacement) and Takayasu's arteritis in one patient.

**Table No 02: Stenosis of Carotid Arteries**

Stenosis (%)	Frequency	Percentage
20-30	01	3.1%
30-40	02	6.3%
40-50	1	3.1%
50-60	14	43.8%
60-70	07	21.9%
>70	07	21.9%



The carotid murmur were noted in Ten (10%) patients; left ventricular hypertrophy in Sixty (60%) patients, chest X-ray and cardiomegaly findings as seen on ECG. Computed tomography of these patients revealed cerebral infarction in sixty-six (66%) patients, and intracerebral or ventricular hemorrhage in thirty-four (34%) patients. In all these patients, the area where the brain was located was the left temporoparietal region. When carotid Doppler ultrasound was performed in cerebral infarction cases, 32 of 66 patients (49.05%) had carotid atherosclerosis some evidence to some extent. 10 patients had infection of the right carotid artery, left sided in 13 patients (40.6%) and (28.1%) nine patients had carotid artery infection.

**DISCUSSION:**

Patients with stroke admitted to our unit did not represent a specific area or socioeconomic class, particularly in the middle or low socioeconomic class. Patients with consecutive stroke (including both ischemic and hemorrhagic stroke) were included in the study<sup>10</sup>. Men's superiority (62 out of 100) is consistent with most local and international work. M Siddiqi et al. In Lahore, there was a 1.5: 1 ratio between men and women. Numan et al. 1.6: 1 male: showed the female ratio. Piravej K and his colleagues documented the proportion of males in their study in Thailand as 1.2: 1<sup>11</sup>. This is again in accordance with the data already available. Ansari et al., Vohra E et al., Intiso D et al. Piravej K also documented that there is a higher incidence and poor outcome in the elderly in their studies<sup>10-13</sup> due to diabetes mellitus (35%), smoking (29%), obesity (20%), 16% stroke history, 6% had heart valve disease (mostly mitral valve replacement)<sup>12-13</sup>. In our study, the incidence of hypertension in Pakistan (72%) was higher than other studies in the world. Numan A et al., Zaidi K et al., Ansari AK et al and others, showed the same high incidence of hypertension in our society<sup>14</sup>. The reason behind this may be the lifestyle combined with malnutrition. Baena Diez et al. Intiso D et al. They demonstrated the frequency of these risk factors in their studies in the West. Razzaq A et al<sup>15</sup>. Severe stenosis was seen in 25%. Bogousslavsky et al. (20%), Pessin et al. (39%), Balow et al. (33%) and Colin P Derdeyn (30%) showed 30% severe stenosis in the study of symptomatic populations. All these studies were performed in patients with symptoms of carotid artery involvement, such as stroke.

**CONCLUSION:**

It was supposed that carotid atherosclerosis is the major predictor of ischemic stroke development and an independent risk factor. Hypertension can be controlled or prevented by providing better control of other important risk factors such as dyslipidemia, diabetes, obesity and smoking. Doppler ultrasound is a accurate, non-invasive, cost-effective and safe method to evaluate carotid veins.

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