



Radio-Diagnosis

ROLE OF ULTRASOUND IN STROKE PATIENTS : FOR THE EVALUATION OF CAROTID ARTERIES.

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ABSTRACT

Introduction- A neurological condition that poses a serious risk of death and disability is atherosclerotic cerebral vascular disease. According to studies, carotid artery stenosis and ischemic cerebral vascular disease are closely related. **Aim-** In this study, carotid arteries are evaluated using color Doppler and B mode imaging, and the state of the extracranial carotid arteries is correlated with cerebral vascular accidents. **Methodology:** From January 2022 to December 2022, 30 patients at Darbhanga Medical College and Hospital participated in the study. A thorough clinical history was obtained, and the results of the clinical examination were noted. Risk factors such as ischemic heart disease, smoking, diabetes mellitus, and hypertension were identified. **Results:** The extracranial carotid artery system in the population that presented with stroke was assessed in the current investigation. Of the 30 individuals evaluated, 12 had strokes on their right side and 11 had strokes on their left side. 6 individuals experienced transitory ischemia attacks, whereas 1 case experienced bilateral involvement. Another risk factor for atherosclerosis is diabetes mellitus. In their investigation, Lindberg Pertu and Roine Risto found that diabetes mellitus was present in two thirds of all ischemic stroke types at the time of admission. In this investigation, 6 patients had diabetes mellitus out of which 3 patients had significant stenosis. **Conclusion:** Our study concludes that colour Doppler examination is noninvasive, economic, safe, reproducible and less time consuming method of demonstrating the cause of cerebrovascular insufficiency in the extracranial carotid artery system and will guide in instituting treatment modalities.

KEYWORDS :**INTRODUCTION :**

Atherosclerotic cerebral vascular disease is a neurological condition that can be fatal and severely handicapping. It is the third leading cause of death in the world, behind heart disease and cancer. According to studies, carotid artery stenosis and ischemic cerebral vascular disease are closely related. The most accurate diagnosis must be made before stroke treatment can begin. A precise diagnosis can help to establish a treatment plan and prognosis as well as better understand the natural history of this ailment. To ascertain the condition of the carotid artery, various investigational techniques are available. Popular noninvasive techniques exist.

AIMS:

1. To evaluate the carotid arteries in patients with carotid artery disease using color Doppler and B mode imaging.
2. To assess the state of the extracranial carotid arteries and correlate cerebrovascular events. Review of literature:

Analysis of The Carotid Arteries Using Doppler : When evaluating an artery stenosis using Doppler, the prestenotic zone, the stenosis itself, and the post-stenotic region are three crucial locations to take into account. In the stenotic zone, the most significant Doppler measurements are taken. Doppler stenosis assessment is based on the idea that the flow velocity in the stenotic lumen is increased in proportion to the degree of luminal narrowing. Up until the lumen diameter is lowered to around 50% of its initial size, the increase in stenotic zone velocity is negligible. Following that, as stenosis severity grows, the velocity climbs quickly.

The diagnosis of carotid stenosis depends on three stenotic zone velocity measurements: peak systolic velocity, end diastolic velocity, and systolic velocity ratio. Cardinal Doppler parameters are the name given to these measurements. Internal carotid stenosis can be graded using Doppler ultrasound using the two parameters of spectral analysis and the internal carotid to common carotid artery peak systolic velocity ratio.

Peak Systolic Velocity: The stenotic zone peak systolic velocity is the most well-documented Doppler measure for carotid stenosis. The length of the stenosis and a variety of physiological parameters that vary from patient to patient have an impact on the peak systolic velocity at any level of arterial narrowing.

Diastolic End Velocity : Because there is no discernible pressure gradient across the stenosis during diastole, the diastolic velocity is unaffected by artery stenosis with less than a 50% reduction in diameter. A pressure gradient across the stenosis is present in diastole when stenosis progresses beyond 50%, and diastolic velocities rise according to the severity of the gradient. High grade carotid stenosis can be found using this measure.

Ratio of systolic velocity :To prevent errors brought on by collateralization or physiological causes, the systolic velocity ratio is advised. Peak systolic velocity in the stenotic ICA divided by peak systolic velocity in the ipsilateral CCA results in this ratio.

Methodology:

From January 2022 to December 2022, 30 patients at Darbhanga Medical College and Hospital participated in the study. A thorough clinical history was obtained, and the results of the clinical examination were noted. Risk factors such as ischemic heart disease, smoking, diabetes mellitus, and hypertension were identified.

Selection Criteria: Clinical signs and symptoms in stroke victims. PSV of Common Carotid Artery, PSV of Internal Carotid Artery, Velocity Ratios between Internal Carotid Artery and Common Carotid Artery, comprised the data acquired from the color Doppler test. Plaque Characteristics as seen on Real Time Image.

RESULTS:

Sex Distribution -Eight patients (26.6%) were female and 22 patients (73.4%) were male of the 30 individuals investigated.

Relationship Between Age Groups- In this study, 9 patients (30% of the total) with strokes were found to be in the 50–59 year age group. 6 patients (or 20%) belonged to the 60–69 age range. 6 patients (20%) were between the ages of 40 and 49. 5 patients (16.6%) were between the ages of 70 and 79. 4 patients (13.4%) belonged to the over 80-year-old age group.

Age Group And Stenosis : Out of 11 patients with significant stenosis (>60% stenosis), 5 patients were between the ages of 50 and 59. Between the age range of 70 to 79 years, there were 2 cases. There were 2 patients in the age groups of >80 years and one patient in each of age groups 60-69 years and 40 and 49 years.

Plaque Visible - Side Involved : 7 patients (or 39%) of the 18 patients with plaque in the extracranial carotid system had bilateral involvement. Plaques were present on the right side of 6 patients (33.3%) and the left side of 5 patients (27.7%) respectively.

DISTRIBUTION OF PLAQUES With 7 individuals having plaques in the right internal carotid artery and 8 patients in the left internal carotid artery, the internal carotid artery was the most frequently involved location. In the right common carotid artery, 3 patients had plaques, while 2 patients in left common carotid artery. 3 individuals had carotid bulb plaque on the right side, and 2 had it on the left carotid bulb.

Side Of Stroke : 12 of the 30 individuals who participated in the study suffered right-sided strokes. Left-sided stroke affected 11 people. 6 patients experienced transient ischemia attack, and 1 patients displayed bilateral involvement.

DISCUSSION:

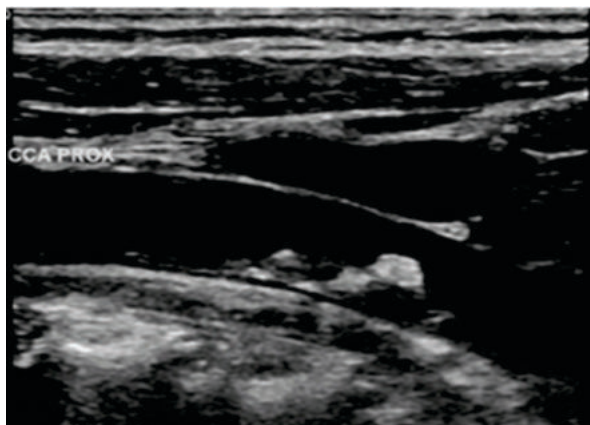
After heart disease and cancer, cerebrovascular disease is the third greatest cause of death in developed nations. The extracranial carotid arteries, usually within 2 cm of the carotid bifurcation, are affected by atherosclerosis disease, which accounts for about 30-60% of stroke cases. Although expensive and invasive, angiography is the gold standard and comes with a high risk for the patients. Sonography is distinct from other vascular imaging techniques in that it can determine the makeup of plaque. The characteristics of a plaque that can be seen on an ultrasound may be predictive and helpful in choosing between medicinal and surgical treatment.

The extracranial carotid artery system in the population that presented with stroke was assessed in the current investigation. Of the 30 individuals evaluated, 12 had strokes on their right side and 11 had strokes on their left side. 6 individuals experienced transitory ischemia attacks, whereas 1 cases experienced bilateral involvement. Another risk factor for atherosclerosis is diabetes mellitus. In their investigation, Lindberg Pertu and Roine Risto found that diabetes mellitus was present in two thirds of all ischemic stroke types at the time of admission. In this investigation, 6 patients had diabetes mellitus out of which 3 patients had significant stenosis.

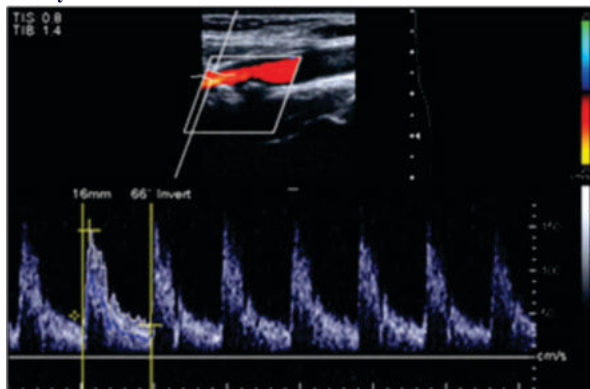
Cardiovascular issues, which would have interfered with the carotid system's velocity profiles, were ruled out in the study participants. Both systolic and diastolic velocities will decrease with a decreased cardiac output. In this investigation, homogeneous plaques were detected on the right side of 4 individuals, non-homogeneous plaques on 2, and calcified plaques on 7 patients. 5 patients had homogenous plaques, 3 had non-homogenous plaques, and 4 had calcified plaques on the left side.

CONCLUSION:

Our study concludes that colour Doppler examination is noninvasive, economic, safe, reproducible and less time consuming method of demonstrating the cause of cerebrovascular insufficiency in the extracranial carotid artery system and will guide in instituting treatment modalities.



B- mode- Heterogeneous Plaque In Proximal Common Carotid Artery.



Colour doppler imaging - Increased PSV noted.

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