Original Research Article

Doppler evaluation of carotid arteries in patients with ischemic stroke in rural coastal region of Maharashtra

Deshpande Janhavi Jaywant[1], Kulkarni Pradeep[2], Maroo Suresh[3], Patil Netaji[4], Patil Chadrakant[5], Kulkarni Ashwini[6], Kulkarni Ujjwala Prabhakar[7*]

{[1,2]Professor, Professor, Department of General Medicine} {[3]Professor And Head, [4]Associate Professor, [5]SR Senior Consultant,[6,7]JR, Department of Radio Diagnosis} B.K.L. Walawalkar Rural Medical College Hospital & Research Centre, Dervan Pin 415606 A/P Sawarde, Taluka Chiplun, District Ratnagiri, Maharashtra, INDIA.
Email: jspjvd@gmail.com

Abstract

Background: Cerebral ischemic stroke is a major cause of death, ranking third behind only malignancies and cardiovascular disease. **Aims and Objectives:** To study Doppler evaluation of carotid arteries in patients with Ischemic Stroke in Rural coastal region of Maharashtra Methodology: This was a cross-sectional study carried out in the patents with Ischemic Stroke at Rural area Konkan during the one year period i.e. Sep 2017 to Aug 2018. In the one year period there were 201 patients enrolled into the study, all details of the patients like age, sex, clinical features, lipid profile etc. investigations were carried out. Patients were evaluated by colour Doppler for the atherosclerotic plaque, site and percentage of stenosis etc. All such information was entered to excel sheets analyzed by excel software for windows 10 **Result:** In our study we have seen that the majority of the patients were in the age group of 70-80Yrs. were 36.82%, followed by 60-70 Yrs. were 27.86%, 50-60 Yrs. were 19.40%, 80-90 Yrs. were 8.46%, 40-50 Yrs. were 3.48% and 30-40 were 1.49%. The majority of the patients were Male i.e. 55.72% and Female were 44. Plaque was absent in 16.92% of the patients, present on Rt. Side in 20.90% and in 22.89% to Lt. side, in 39.30% patients was present in Bilateral. In 33.33% it was present in CCA, in 30.08 was present in ICA Bulb, in 36.59 present at Bulb. In 86.18% of the patients the stenosis was present in < 50%, in 6.10% was 50-69%, in 4.07% was present in 70 But Less Than Near Occlusion, 20.03% was present in Near occlusion, Total occlusion was present in 1.63%. **Conclusion:** It can be concluded from our study that the majority of the patients were old and more common in males, the doppler evaluation is a safe and give detail of the features of vessels like Site, Stenosis of arteries etc. features

Key Word: Ischemic stroke, TIAs, Doppler study of CVA, CVA.

***Address for Correspondence:**
Dr. Kulkarni Ujjwala Prabhakar, Professor, Department of General Medicine B.K.L. Walawalkar Rural Medical College Hospital & Research Centre ,Dervan Pin 415606 A/P Sawarde, Taluka Chiplun, District Ratnagiri ,Maharashtra, INDIA.
Email: ujjwala769@gmail.com

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INTRODUCTION

Cerebral ischemic stroke is a major cause of death, ranking third behind only malignancies and cardiovascular disease. Atherosclerosis of the intra and extracranial carotid vessels, leading to cerebral infarction accounts for 80% of strokes. Intracranial hemorrhage and subarachnoid hemorrhage account for the remainder. It has been conclusively proven that the risk of major stroke is higher in the first 3 months after transient ischemic attack (TIA).[1] It has been seen that 20% or more of strokes have been heralded by a TIA.[2] The highest risk of large artery stroke appears to be among patients with the highest degree of carotid stenosis, a history of diabetes,

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presence of asymptomatic carotid plaques, or a combination of these factors.[3] Color Doppler sonography of carotid arteries forms an important part of the evaluation of extracranial insufficiency. Accurate diagnosis of hemodynamically significant stenosis is critical to identify patients who would benefit from surgical intervention. The value of a safe, noninvasive, and low-cost screening test is therefore of a great advantage. Duplex sonography combining high-resolution imaging and Doppler spectrum analysis has proved to be a popular, noninvasive, accurate, and cost-effective means of detecting and assessing carotid disease. Carotid sonography has largely replaced angiography for suspected extracranial carotid atherosclerosis.[4] If timely endarterectomy of the carotid arteries is performed, many stroke cases may be prevented. This necessitates an evaluation of the extracranial carotid artery system. Carotid conventional angiography is the gold standard for detecting the severity of carotid stenosis, but it has its own disadvantages such as it is an invasive and expensive procedure. It carries a risk from contrast medium to the patients and a certain amount of morbidity. Magnetic resonance angiography is currently developing rapidly and may ultimately give similar or better results, especially for flow quantification, though at a much higher cost. Besides estimating the degree of stenosis, the biggest advantage of sonography is its ability to characterize plaque and identify plaques with higher risk of embolization. With high-resolution ultrasound, plaque can be characterized into relative risk groups containing intraplaque hemorrhage which is thought to be a precursor for plaque ulceration.[5,6] The brain is supplied by four vessels: The two internal carotid arteries (ICAs) and the two vertebral arteries [7]

METHODOLOGY

This was a cross-sectional study carried out in the patents with Ischemic Stroke at Rural area Konkan during the one year period i.e. Sep 2017 to Aug 2018. In the one year period there were 201 patients enrolled into the study, all details of the patients like age, sex, clinical features, lipid profile etc. investigations were carried out. Patients were evaluated by colour Doppler for the atherosclerotic plaque, site and percentage of stenosis etc. All such information was entered to excel sheets analyzed by excel software for windows 10

RESULT

Table 1: Distribution of the patients as per the age

Age	No.	Percentage (%)
30-40	3	1.49
40-50	7	3.48
50-60	39	19.40
60-70	56	27.86
70-80	74	36.82
80-90	17	8.46
>90	5	2.49
Total	201	100.00

The majority of the patients were in the age group of 70-80Yrs. were 36.82%, followed by 60-70 Yrs. were 27.86%, 50-60 Yrs. were 19.40%, 80-90 Yrs. were 8.46%, 40-50 Yrs. were 3.48% and 30-40 were 1.49%.

Table 2: Distribution of the patients as per the sex

Sex	No.	Percentage (%)
Male	112	55.72
Female	89	44.28
Total	201	100.00

The majority of the patients were Male i.e. 55.72% and Female were 44.28%

Table 3: Distribution of the patients as per the site Atherosclerotic plaque

Site	Number Of Cases	Percentage (%)
No Plaque	34	16.92
Right	42	20.90
Left	46	22.89
Bilateral	79	39.30
Total	201	100.00

Plaque was absent in 16.92% of the patients, present on Rt. Side in 20.90% and in 22.89% to Lt. side, in 39.30% patients was present in Bilateral.

Table 4: Distribution of the Atherosclerotic plaque as per site

Site	Lt	Right	Total	Percentage (%)
CCA	52	30	82	33.33
ICA	32	42	74	30.08
Bulb	53	37	90	36.59

In 33.33% it was present in CCA, in 30.08 was present in ICA Bulb, in 36.59 present at Bulb

Table 5: Distribution of the patients as per the percentage of stenosis

Percentage	No. of Vessels	Percentage(%)
<50%	212	86.18
50-69	15	6.10
>70 But Less Than Near Occlusion	10	4.07
Near occlusion	5	2.03
Total occlusion	4	1.63

In 86.18% of the patients the stenosis was present in < 50%, in 6.10% was 50-69%, in 4.07% was present in 70 But Less Than Near Occlusion, 20.03% was present in Near occlusion, Total occlusion was present in 1.63%.

DISCUSSION

Cerebrovascular accident or stroke is the sudden onset of focal neurologic deficit from a vascular mechanism. It is one of the major causes leading to death after malignancy and cardiovascular pathologies, atherosclerosis of cranial

vessels leading to cerebral infarction being the main culprit. Greater risk of stroke is associated among patients with comorbidities like diabetes, asymptomatic lesions, higher degree of carotid artery stenosis or a combination of these parameters[8,9] . Colour Doppler study of carotid artery forms an essential task of assessing extra-cranial insufficiency. A non-invasive, economical screening tool is required to differentiate haemodynamically stable patients from those with higher degrees of stenosis. Duplex sonography combines high resolution imaging and Doppler spectrum analysis to yield effective means of detecting and assessing carotid disease, which has largely replaced angiography for suspected extra-cranial carotid atherosclerosis[10,11]. Incidence of stroke has been estimated as about 794 per million population per year in the world and there has been marked reduction in the frequency of CVA with effective treatment of hypertension[11]. Cerebrovascular disease effects predominantly the older and middle age group, its prevalence increases with the increase in age[12]. Of all the CVA, 85% occur by occlusion of the extracranial or intracranial cerebral vessels, 10% due to primary intracerebral haemorrhage, and 5% due to subarachnoid haemorrhage. It has been shown that 20% of strokes have been heralded by TIA. Asymptomatic carotid disease has annual stroke rate of 1.3%, while symptomatic accounts for 15%. In our study we have seen that The majority of the patients were in the age group of 70-80Yrs. were 36.82%, followed by 60-70 Yrs. were 27.86%, 50-60 Yrs. were 19.40%, 80-90 Yrs. were 8.46%, 40-50 Yrs. were 3.48% and 30-40 were 1.49%. The majority of the patients were Male i.e. 55.72% and Female were 44.28% Plaque was absent in 16.92% of the patients , present on Rt. Side in 20.90% and in 22.89% to Lt. side , in 39.30% patients was present in Bilateral. In 33.33% it was present in CCA, in 30.08 was present in ICA Bulb, in 36.59 present at Bulb In 86.18% of the patients the stenosis was present in < 50%, in 6.10% was 50-69%, in 4.07% was present in 70 But Less Than Near Occlusion, 20.03% was present in Near occlusion, Total occlusion was present in 1.63%. It was similar to Madhavi Chamarthi *et al*[13] The highest incidence of stroke was found in the male population in the age group of 60–69 years. Hypertension followed by smoking were considered as potent risk factors. Most of the plaques were located at the bifurcation and majority of them were echogenic. Out of 75 patients, 16 patients showed significant stenosis (>60%). Atherosclerotic plaques were seen in 57 patients (76%).

CONCLUSION

It can be concluded from our study that The majority of the patients were old and more common in males, the doppler evaluation is a safe and give detail of the features of vessels like Site , Stenosis of arteries etc. features

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