

Original article:

Study of Subclinical Vascular Disease in carotid arteries by using high resolution ultrasound & colour Doppler in asymptomatic individuals

Dr Vishal A Mhaske *

Department of Radio-diagnosis, Rural Medical College, Pravara Institute of Medical Sciences (DU) , Loni , Maharashtra , India

Corresponding author*

Abstract:

Introduction: Colour Doppler sonography became a mainstay in evaluation of the extra-cranial territory and its accuracy in comparison with angiography is well established. Carotid sonography has largely replaced angiography for suspected extra-cranial Carotid atherosclerosis

Material and methods: This was an observational study. The present study was carried out on 120 individuals in the department of Radio-diagnosis.

Inclusion criteria were -Age criteria for study are 40 years and above both sexes **and** All patients and volunteers, otherwise asymptomatic (**No** known H/O CVA, STROKE, IHD, MI) above 40 years of age.

Results: A thickening of the Intima-media complex not only reflects the local alterations, like that of common carotid artery (CCA), but also corresponds to generalized atherosclerosis.

Conclusion: The proportion plaque is significantly higher in asymptomatic individuals having both Hypertension & Diabetes.

Introduction:

Colour Doppler sonography became a mainstay in evaluation of the extra-cranial territory and its accuracy in comparison with angiography is well established. Carotid sonography has largely replaced angiography for suspected extra-cranial Carotid atherosclerosis.¹

The principal appealing points in favour of sonography are patient comfort, lack of risk and accuracy. In contrast the angiography is invasive and expensive. Moreover contrast related adverse effects also contribute to significant morbidity.² Multiple risk factors are associated with Stroke. The Non-modifiable risk factors are age, sex, family history, race and ethnicity and the modifiable risk factors include hypertension, cardiac disease, diabetes mellitus hyperlipidaemia, cigarette smoking, alcohol abuse, physical inactivity, carotid stenosis, and transient ischemic attack.³

The growth of a plaque could lead to the hardening of the wall of the vessels, but also to a stenosis, which can cause a lack of blood supply to the brain. Monitoring the carotid system is important in order to prevent stroke, one of the most serious cerebrovascular disease. In fact, over 60-70% of all ischemic cerebral infarctions are caused by arterial embolism typically arising from a carotid artery affected by atherosclerosis.¹

Material and methods:

This was an observational study. The present study was carried out on 120 individuals in the department of Radio-diagnosis.

Inclusion criteria

- Age criteria for study are 40 years and above both sexes.
- All patients and volunteers, otherwise asymptomatic (No known H/O CVA, STROKE, IHD, MI) above 40 years of age.

Exclusion criteria

- Patients below 40 years.
- Patients who have known history of CVA, STROKE, IHD, MI.
- Patients who have undergone Carotid procedures/surgery.

Appropriate consent from the **Institutional Ethical committee and Research Cell** was obtained for this study The ultrasound and colour Doppler being a non-invasive and safe method of the consent was taken orally as per approval by the Institutional Ethical committee and Research Cell.

Results:

This study included total of 120 subjects, Hypertensive & diabetics were the patients attending the outpatient of medicine department for follow-up and without any symptoms.

Table 1: Intima-Media thickness in asymptomatic individuals with no HT, DM, Smoking and Alcoholism.

Present study			
n = 19			
	MALES	FEMALES	TOTAL
Mean C-IMT, mm	0.86±0.008	0.81±0.047	0.82±0.08

The above table shows that mean –C-IMT was 0.82±0.08mm. In males it was 0.86±0.008 mm & 0.81±0.08 mm in females **in asymptomatic individuals with no HT, DM, Smoking and Alcoholism.**

Table 2: Plaque Characterization

Plaque characteristics	No of Patients	Percentage
Homogeneous	26	81.25%
Heterogeneous	6	18.82%
Total	32	100

The above table shows that maximum no. of plaques i.e. **81.25%** were of homogenous on ultrasound.

Table 3: Unilateral or Bilateral Plaque

	No. of Cases	Percentage
Unilateral Plaque	25	78.12%
Bilateral Plaque	7	21.8%
Total	32	100%

Above table shows that 78.12 % of the patients had a unilateral plaque.

Table 4: Degree of stenosis in ICA due to atherosclerotic plaque

Diameter reduction of ICA (%)	No. of patients	Percentage
0	15	46.87%
1-15	10	31.25 %
16-49	7	21.87 %

- In this study we found plaques in 32 individuals ,
 - a) 15 had no reduction in diameter of ICA,
 - b) 10 individuals had diameter reduction in ICA in 1-15% range &
 - c) 7 individuals had reduction in diameter of ICA in 16-49% range ,with the PSV in these individuals being >125cm/sec and there was spectral broadening throughout systole.

A thickening of the Intima-media complex not only reflects the local alterations,like that of common carotid artery (CCA), but also corresponds to generalized atherosclerosis.

Discussion:

In the present study in asymptomatic individuals with no HT, DM, Smoking and Alcoholism.(n=19) the percentage of males is 31.58% & that of females was 68.42%., while in the study conducted Raouf Rahim Merza et al⁴ in 2014 (n=30) the percentage of males was 26.6%& that of females was 73.4%.

The present study showed a comparable sex wise distribution as that of previous study conducted by Raouf Rahim Merza et al⁴ in 2014

In the present study in asymptomatic individuals with no HT, DM, Smoking and Alcoholism (n=19) showed mean carotid intima-media thickness of 0.86±0.008 mm in males & 0.81± 0.047 mm in females. While in the study conducted by Raouf Rahim Merza et al⁴in 2014 ,Mean carotid intima-media thickness was 0.59 mm in males & 0.58 mm in females.

Results obtained by both study groups are different.This may be due to different genetic and socio-environmental as well as eating habits of study groups.In the present study in asymptomatic individuals with no HT, DM, Smoking and Alcoholism.(n=19) the mean age was 52.01 years. While in the study conducted by Young Jin Youn et al⁵ in 2010 the mean age was 55.1 yrs (n=433) years.

The present study showed a comparable age wise distribution as that of previous study conducted by Young Jin Youn et al⁹⁸ in 2010.In the present study in asymptomatic individuals with no HT, DM, Smoking and Alcoholism(n=19) showed mean carotid intima-media thickness of 0.86±0.008 mm in males & 0.81± 0.047 mm in females. While in the study conducted by Mean carotid intima-media thickness was 0.60±0.12 mm in males & 0.53±0.10 mm in females, in study conducted by Young Jin Youn et al⁵ in 2010(n=433).

Results obtained in both study groups are different.

Conclusion:

The proportion plaque is significantly higher in asymptomatic individuals having both Hypertension & Diabetes.

References:

1. Carroll BA. Carotid Ultrasound. Neuroimaging clinics of North America 1996; 6:875-897.
2. Tahmasebpour HR, Buckley AR, Cooperberg PL. Sonographic Examination of the carotid arteries. Radiographics 2005; 25:1561-1575.
3. Basharat RA, Yousuf M, Iqbal J, Khan MM. Frequency of known risk factors for stroke in poor patients admitted to Lahore General Hospital in 2000. Pak J Med Sci 2002; 18: 280-3.
4. Merza R, Fateh S, Ehsan H. Measurement of the Common Carotid Arteries Intima-Media Thickness by Ultrasonography in Patients with Rheumatoid Arthritis. Cukurova Medical Journal 2014; 39 (2): 213-223.
5. Youn Y, Lee N, Kim J, Lee J, Sung J, Ahn S, You B, Lee S, Yoon J, Choe K, Koh S, and Park J. Normative Values and Correlates of Mean Common Carotid Intima-Media Thickness in the Korean Rural Middle-aged Population: The Atherosclerosis Risk of Rural Areas in Korea General Population (ARIRANG) Study. J Korean Med Sci 2011; 26: 365.