

Study Of Correlation Between Carotid Intima –Media Thickness And Dyslipidemia In Patient With Ischemic Stroke.

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Abstract:

Background: stroke is a major cause of mortality and morbidity worldwide.combined carotid intima –media thickness(cimt) is a marker of atherosclerosis and is also a predictor for ischemic stroke.increased intima-media thickness is a non-invasive marker of arterial wall alteration, which can easily be assessed in carotid arteries by high resolution b-mode ultrasound.

Objectives:to determine cimt and serum lipid levels in patient of ischemic stroke.

Materials and methods:this study was conducted between january 2023 and january 2024 at department of radiodiagnosis in collaboration with department of medicine at medical college and hospital, kolkata.a total of 100 patients are enrolled in this study , in which 50 were clinically and ct proved cases of cva and 50 are age-sex matched healthy control group from medical outpatient department and indoor patient admitted to hospital.

Results: our study suggests that increased carotid intima-media thickness is more associated with infarct.our study showed that cholesterol,triglycerides,ldlcholesterol,ldl/hdl ratio have positive association with cimt .

Conclusion: we concluded that cimt and lipid profile can be useful screening test for all the person who are at highest risk to get stroke ,diabetes,hypertension,obesity.people with risk factor having cimt>0.7mm are more prone for ischemic cva ,so people with risk factor should undergo screening for cimt measured by carotid doppler and whom cimt is found >0.7 mm should undergo lifestyle modification and early medical intervention to take care of risk factor,so that they can be prevented from ischemic cva in future.

Keywords :atherosclerosis,diabetesmellitus,hypertension,smoking,age,carotid-intima media thickness.

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I. Introduction:

CVA or stroke is defined as abrupt onset of neurological deficit that is attributable to a focal vascular cause .Stroke both hemorrhagic and ischemic is leading cause of mortality and morbidity worldwide. The

incidence of stroke increase with age and with growing elderly population worldwide ,the number of patient with stroke are likely to increase. In most cases of ischemic stroke the underlying pathophysiology is atherosclerosis lesion causing stenosis with potential life threatening distal ischemia or can trigger thrombotic occlusion of major arteries of brain,heart ,lower limbs.There are several known risk factors which accelerates the process of atheromatous changes which are –smoking ,hypertension, diabetes and dyslipidemia(11,12,13).

Carotid intima –media thickness and dyslipidemia are markers of atherosclerosis and have been shown to reliably predict presence and extent of atherosclerosis vascular disease(7,8,9).However, studies examining their association with each other have shown inconsistent results.Hence it was sought to assess correlation between carotid intima-media thickness and dyslipidemia in patients with ischemic stroke. As a reflector of systemic atherosclerosis increased carotid-intima media thickness has been associated with a highest risk for stroke.Increased intima –media thickness(IMT) is a non-invasive marker of arterial wall alteration which can easily be assessed in the carotid arteries by high resolution B- MODE ultrasound.

II. Material And Methods:

This study was conducted between January 2023 and January 2024 at Department of Radiodiagnosis in collaboration with Department of Medicine at Medical college and Hospital, Kolkata.A total of 100 patients were enrolled in this study , in which 50 were clinically and CT proved cases of CVA and 50 were age-sex matched healthy control group from medical outpatient department and indoor patient admitted to hospital.The age group was between 5th -6th decade.

Study design:case control study.

Study duration:january 2023 to january 2024

Study location:department of radiodiagnosis in association with department of medicine at medical college and hospital ,kolkata.

Sample size: 100 patients

Ethical clearance:this study has the approval of the institute ethical committee of mck,kolkata.

Inclusion criteria:

- Age 50-70
- Both the sexes
- Clinical signs/symptoms of ischemic stroke
- Infarct proven by CT/MRI brain

Exclusion criteria:

- Hemorrhagic stroke
- Neurological deficit secondary to epilepsy.
- Patient with valvular heart disease.
- Patient with past history of connective tissue disorder/vasculitis.
- Head injury
- Intracranial neoplasm
- Aneurysm
- A-V malformations
- H/O intake of any lipid lowering agents.

Procedure Methodology

Detailed history and physical examination of nervous system was performed after taking informed consent.

Lipid profile (after 14 hrs overnight fasting) done by Beckman coulter AU-680 fully auto-analyser.

CAROTID ARTERY DOPPLER: Carotid Doppler study of carotid arteries was performed using high resolution B Mode 7.5-10 MHz linear transducers with patients in supine position.

CIMT is anechoic zone between two echogenic lines,first echo is lumen-intima surface, second echo is caused by media-adventia interface.

CIMT is measured at 3 levels in both the carotid arteries and in areas free of plaque-

- Common carotid artery
- Bifurcation of common carotid artery
- Internal carotid artery

Highest value in each carotid is taken and average of 2 measures is taken as CIMT.

Normal CIMT in our study was 0.7mm.



Figure1: ultrasound of common carotid artery showing CIMT.

Statistical Methods:

Datas were compiled in MS excel worksheet and analysis done in SSPS VERSION 17 statistical software (for windows).

Results were statistically analyzed using following statistical tests:

- Chi-square test
- Multiple regression analysis

-Mean and standard deviation were calculated from the results of individual parameters.

-P value of <0.05 was considered to be significant and P <0.001 as highly significant. The results were calculated within 95% confidence limits.

III. Results And Observations:

This study is a comparative study of 50 cases and 50 control in which we have studied the CIMT values and its correlation with the lipid parameters in patient with ischemic stroke. In present study we found that majority of the patient fall between 5th-6th decade with mean age of case 58 with SD 8.46 and that of control is 55.66 with SD 8.74

**Table:1
Basic characteristics of subjects**

Basic characteristics	Case(N=50) Mean±SD	Control(N=50) Mean ±SD	P value
Age(yrs)	58±8.46	55.66±8.74	>0.05
Systolic BP(mm of Hg)	156±14.22	146±12.14	>0.05
DiatolicBP(mm of Hg)	94.46±16.22	88.72±12.18	>0.05
Fasting blood sugar(mg/dl)	106.25±36.42	120.86±40	>0.05
Post pandial blood sugar(mg/dl)	138.42±60.40	150.32±52.81	>0.05

There is insignificant (P>0.05) difference of age,SBP,DBP,FBS,PPBS.so case and control are matched according to age,SBP,DBP,FBS,PPBS. Earlier studies of Bhattacharya S et al(2), sridharan S et al(3) and Debalina sengupta(4), showed that the mean age of onset of stroke for men in india ranges from 63-65 for men and 57-68 for women. Hence we have taken the same range of age as between 50-70 yrs of study population.

**Table:2
Case and Comparative study of lipid parameters between control**

Lipid parameters	Case(N=50)	Control(N=50)	P value
Cholesterol(mg/dl)	229.00±36.33	129.44±26.16	<0.05
Triglycerides(mg/dl)	153.30±11.63	139.42±9.20	<0.05
LDL(mg/dl)	142.76±11.94	105.96±16.45	<0.05
Ldl/hdl	3.77±0.43	2.79±0.45	<0.05

**Table:3
Comparative study of CIMT between case and control**

parameters	Case(N=50)	Control(N=50)	P value
Avg.CIMT(mm)	1.00±0.22	0.69±0.08	<0.05

Table:4
Correlation between lipid profile parameters and average CIMT

PARAMETERS	CASE(N=50)		CONTROL(N=50)	
	Pearsons correlation coefficient ,Avg CIMT(r)	Significance (2-tailed)	Pearsons correlation coefficient ,Avg CIMT(r)	Significance (2-tailed)
Cholesterol	0.653	P<0.001	0.621	P<0.001
Triglycerides(mg/dl)	0.524	P<0.001	0.485	P<0.001
Ldl(mg/dl)	0.541	P<0.001	0.537	P<0.001
Ldl/hdl	0.625	P<0.001	0.602	P<0.001

IV. Discussion:

Stroke is a major cause of mortality and morbidity worldwide. Combined carotid intima –media thickness(CIMT) is a marker of atherosclerosis and is also a predictor for ischemic stroke. CIMT was significantly more in patient with ischemic stroke as compared to control. We have demonstrated positive association in ischemic stroke between lipid profiles and CIMT. This study was similar as previous study(4,5).

Comparative study of lipid parameters between cases and control showed that the mean cholesterol of cases is 229.00mg/dl with SD 36.33 where as that of control is 129.44 with SD 26.16. Mean ldl/hdl of case is 3.77 with SD 0.43 and that of control is 2.79 with SD 0.45. Mean triglycerides of case is 153.30 with SD 11.63 and that of control is 139.42 with SD 9.20 and LDL of case is 142.76 with SD 11.94 and that of control is 105.96 with SD 16.45. There is significant difference (P<0.001) of lipid profiles (cholesterol, triglycerides, LDL, LDL:HDL) between case and control(Table-2)

Mean age of stroke patient in case were 58 yrs with SD 8.46 and control were 55 yrs with SD 8.74 and range is 50-70 yrs with almost equal number of male and female. There was strong positive correlation (P<0.001) of average CIMT(mm) with cholesterol(mg/dl) both in cases(r=0.653) and control(r=0.621). Average CIMT with LDL both in cases and (r=0.541) and control(r=0.537) showed moderate positive correlation , CIMT with triglyceride in case (r= 0.524) and control(r=0.485) showed moderate positive correlation and with LDL:HDL in case(r=0.625) and control (r=0.602) showed strong positive correlation in both. so our study concludes that dyslipidemia is an important risk factor for increasing CIMT in high risk population and cholesterol and LDL:HDL the most important factor for increasing average CIMT.

It is well documented that increasing levels of total plasma cholesterol ,ldl cholesterol and decreasing level of HDL cholesterol are strong risk factor for coronary artery disease, while the relation between risk of blood lipids and stroke is much weaker. However recent studies clarified the relationship between lipids and stroke(4,5,6) as well as showing that the risk of stroke and amount of carotid atheroma can be reduced with cholesterol lowering medications. On other hand an inverse association between total cholesterol and cerebral hemorrhage has been documented.

Our study shows a strong positive correlation (P<0.001) of average CIMT with cholesterol(mg/dl) both in case(r=0.653) and control (r=0.621). Average CIMT with LDL both in cases(r=0.541) and control(r=0.537) showed moderate positive correlation , CIMT with triglyceride in case (r=0.524) and control(r=0.485) showed moderate positive correlation and with LDL:HDL in case (r=0.625) and control(r=0.602) showed strong positive correlation in both (Table-4).

V. Conclusion:

People with risk factors having CIMT more than 0.7mm are more prone to ischemic vascular insult, so people with risk factor should undergo screening for CIMT measurement by carotid Doppler and should undergo early intervention and lifestyle modification, so that they can be prevented at early stage from ischemic stroke.

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