Study of correlation between the increase in carotid artery intimal medial thickness & dyslipidaemia in patients with ischemic stroke proven by computed tomography or MRI.

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Abstract:
Introduction: Early detection of dyslipidemia reduces the risk of stroke & decreases the morbidity & mortality. It is proposed to study the association of an increase in carotid artery intimal medial thickness as well as dyslipidemia in patients with ischemic stroke proven by computed tomography or MRI.

Materials and Methods: We screened 94 patients out of which 44 patients were excluded. CT scan showed hemorrhage in 20 patients and were excluded. CT scan was not feasible in 5 patients and 19 patients were too ill to be transported to Radiology department for carotid Doppler study and they were also excluded. A total of 50 patients were studied. Social and demographic variables

Observations: A total of 94 patients were screened between August 2010 and August 2012. Of these, 50 patients who fulfilled the inclusion criteria were included in the study. CT scan showed hemorrhage in 20 patients and were excluded. CT scan was not feasible in 5 patients and 19 patients were too ill to be transported to the Radiology department for Doppler study and they were also excluded. A total 44 patients were excluded. A total of 50 patients were studied.

Conclusions: We found statistically significant correlation of low serum HDL with increased intimal-medial-thickness.

Introduction: Atherosclerosis afflicts multiple vascular beds, accounting for nearly all of coronary heart disease and some proportion of ischemic strokes. An increased cross-sectional carotid intimal-medial thickness, a measure of carotid artery atherosclerosis, has been associated with unfavorable levels of cardiovascular risk factors, prevalent cardiovascular disease, and atherosclerosis elsewhere in the arterial system. There is a growing belief that carotid intimal medial thickness can be regarded as an indicator of generalized atherosclerosis.
Early detection of dyslipidemia reduces the risk of stroke & decreases the morbidity & mortality. It is proposed to study the association of an increase in carotid artery intimal medial thickness as well as dyslipidemia in patients with ischemic stroke proven by computed tomography or MRI.

**Materials and Methods:**

Institute ethics committee clearance was obtained before start of study. 50 patients of Ischemic stroke presenting to Medicine Ward and ICU of Dr. D.Y. Patil Hospital, Pirnpri, Pune. CT Brain / MRI Brain in patients of Ischemic stroke.

- Blood collection for fasting Lipid profile e.g. Sr.Cholesterol, TG, HDL, LDL,
- Carotid Doppler study in patients of ischemic stroke.
- Patients who fulfill the inclusion criteria will be included in the study.

**Inclusion Criteria:**

1. Onset of symptoms within 30 days of presentation to the hospital.
2. CT Brain / MRI Brain proven infarct.

**Exclusion Criteria:**

1. Patients in whom CT Brain / MRI Brain scan is not feasible
2. Patients in whom CT Brain/ MRI Brain scan showed hemorrhage
3. Patients in whom CT Brain / MRI Brain scan was normal
4. Patient too ill to be transported to the Radiology department for carotid Doppler study.

We screened 94 patients out of which 44 patients were excluded. CT scan showed hemorrhage in 20 patients and were excluded. CT scan was not feasible in 5 patients and 19 patients were too ill to be transported to Radiology department for carotid Doppler study and they were also excluded. A total of 50 patients were studied. Social and demographic variables

All patients enrolled were questioned with a detailed proforma.

Complete postal address with name and telephone number of near relative, occupation, educational status and financial status was noted.

**History and Physical examination:**

Detailed questioning regarding time of onset of symptoms, time to presentation to hospital, activity at the time of onset of symptoms was recorded. Patients were questioned with respect to symptoms suggestive of raised intracranial tension, side of weakness of limb, associated sensory or cranial nerve palsies, aphasia, brainstem or cerebellar signs were noted.

Vitals of all patients including pulse, blood pressure were recorded. All patients were carefully auscultated for carotid bruit.

**Intimal medial thickness:**

All patients were examined in supine position with neck extended with a pillow under the shoulder. Ultrasonography of the common carotid artery, carotid bifurcation, and internal carotid artery of the left and right carotid arteries was performed with a 7.5-MHz linear-array transducer (Siemens Acuson x300).

On a longitudinal, two-dimensional ultrasound image of the carotid artery, the anterior (near) and posterior (far) walls of the carotid artery are displayed as two bright white lines separated by a hypoechochogenic space.
The distance between the leading edge of the first bright line of the far wall (lumen-intima interface) and the leading edge of the second bright line (media-adventitia interface) indicates the intima-media thickness. For the near wall, the distance between the trailing edge of the first bright line and the trailing edge of the second bright line at the near wall provides the best estimate of the near-wall intima-media thickness. Left carotid was examined first and then the right. Three sites were selected in each carotid artery. The carotid artery bulb was traced and the first reading is taken 1 cm proximal to the carotid bulb. The second reading is taken within the bulb and the site with maximum diameter recorded. The third reading is taken 1 cm distal to the carotid bulb along the internal carotid artery. For all three sites both near wall and far wall measurements are taken. The recordings are taken up to 2 decimal points. An average of each artery is computed taking into account all six readings.

MT measured on the frozen frame of a suitable longitudinal image with the image magnified to achieve a higher resolution of detail. The IMT measurement obtained

**Observations:**
A total of 94 patients were screened between August 2010 and August 2012. Of these, 50 patients who fulfilled the inclusion criteria were included in the study. CT scan showed hemorrhage in 20 patients and were excluded. CT scan was not feasible in 5 patients and were excluded and 19 patients were too ill to be transported to the Radiology department for Doppler study and they were also excluded. A total 44 patients were excluded. A total of 50 patients were studied.

**Table 1: Correlation between Sr. total cholesterol and Carotid Intima thickness (IMT) in study group**

<table>
<thead>
<tr>
<th>Sr. Cholesterol</th>
<th>IMT (mm) (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥200</td>
<td>≤0.9 (Normal)</td>
<td>4 (8)</td>
</tr>
<tr>
<td></td>
<td>≥ 0.9 (Abnormal)</td>
<td>6 (12)</td>
</tr>
<tr>
<td>&lt;200</td>
<td>20 (40)</td>
<td>20 (40)</td>
</tr>
<tr>
<td>Total</td>
<td>24 (48)</td>
<td>26 (52)</td>
</tr>
</tbody>
</table>

Chi-square = 0.32, P>0.05

**Table 2: Correlation between Sr. LDL and Carotid Intima thickness (IMT) in study group**

<table>
<thead>
<tr>
<th>Sr. LDL</th>
<th>IMT (mm) (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥130</td>
<td>≤0.9 (Normal)</td>
<td>2 (2)</td>
</tr>
<tr>
<td></td>
<td>≥ 0.9 (Abnormal)</td>
<td>5 (10)</td>
</tr>
<tr>
<td>&lt;130</td>
<td>23 (46)</td>
<td>21 (42)</td>
</tr>
<tr>
<td>Total</td>
<td>24 (48)</td>
<td>26 (52)</td>
</tr>
</tbody>
</table>

The cut off value for HDL as abnormal was taken as < 40 mg/dl and for normal IMT < 0.9mm. Out of 50 patients, 26(52%) patients had abnormal IMT & out of 14(28%) patients had abnormal HDL & 12(24%) patients had normal HDL. 24(48%) patients had normal IMT & out of those 20(40%) patients had normal HDL & 4(8%) patients had abnormal HDL. The relation is statistically significant with p< 0.01 as shown in Table: 8.
Discussion:
Our study was carried out in 50 patients fulfilling inclusion criteria in Padmashree Dr.D.Y.Patil hospital. pimpri. pune from August 2010 to August 2012. The mean age of our study population was 57.06 years with minimum of 24 years and maximum of 85 years. Males comprised 64% and females 36% of the study population. Uncontrolled hypertension was found to be the single most important risk factor for the development of strokes in the MONICA report published in 1993. In our study, also the single most common risk factor was hypertension with 80% of patients having a blood pressure recording of>= 140/90 mm Hg. In our study, the mean IMT of the common carotid-internal carotid artery measured by carotid artery Doppler in patients of ischemic stroke was 0.82 mm with a minimum of 0.5 mm and maximum of 1.2 mm. Thus, we surmise that in patients of ischemic stroke there is an increase in the intimal-medial thickness of the common carotid-internal carotid artery.

The uniform standard cut off value of carotid IMT has not been defined with values in different studies. Sun, Y et al have taken the cut off value as 0.68 mm. Taking this cut off value, asymptomatic individuals with carotid IMT >0.68 mm had increased risk of carotid atherosclerosis. Geroulakos, G et al took IMT > or= 0.85 mm as a criterion for the prediction of coronary artery dis-ase. Lemne, C et al have found 0.72 mm of carotid IMT to be significant in their studies of carotid intima-media thickness and plaque in borderline hypertension. Lacroix, P et al have demonstrated that carotid IMT > 0.7 mm was a predictor of secondary events after coronary angioplasty (p=0.03) in univariate analysis. In our study, the cut off value for normal total cholesterol is taken as < 200 mg/dl and for normal IMT as < 0.9 mm. Out of 50 patients, 10(20%) patients had abnormal total cholesterol. Out of those 10(20%) patients, 6(12%) patients had abnormal IMT & 4(8%) patients had normal IMT. 40(80%) patients had normal total cholesterol & out of those 40(80%) patients, 20(40%) patients had abnormal IMT & 20(40%) patients had normal IMT. This relation is statistically not significant with p > 0.05, as shown.

In our study, the cut off value for normal LDL was taken as < 130 mg/dl and for normal IMT as < 0.9 mm. Out of 50 patients, 26(52%) patients had abnormal IMT. Out of those 26(52%) patients, 5(10%) patients had abnormal LDL & 21(42%) patients had normal LDL. 24(48%) patients had normal IMT. Out of those 24(48%) patients, 1(2%) patient had abnormal LDL & 23(46%) patients had normal LDL.

In our study, The cut off value for HDL as abnormal was taken as < 40 mg/dl and for normal IMT < 0.9 mm. Out of 50 patients, 26(52%) patients had abnormal IMT & out of those 14(28%) patients had abnormal HDL & 12(24%) patients had normal HDL. 24(48%) patients had normal IMT & out of those 20(40%) patients had normal HDL.

Conclusions:
We found statistically significant correlation of low serum HDL with increased intimal-medial thickness.

References:


