

A CROSS-SECTIONAL STUDY OF COMMON CAROTID INTIMA MEDIAL THICKNESS AS A INDICATOR OF MACRO-VASCULAR COMPLICATIONS IN TYPE 2 DIABETES MELLITUS

1. FIRST AUTHOR: DR DUSHYANT SHANTILAL PATEL

DESIGNATION- ASSISTANT PROFESSOR DEPT OF MEDICINE, B J MEDICAL COLLEGE, AHMEDABAD, GUJARAT, INDIA.

ADDRESS - B/17, SHANTMANI APARTMENT, OPP PARIVAR SOCIETY, NEAR GALLERIA TULIP, PREMCHANDNAGAR ROAD, BODAKDEV, AHMEDABAD-380015, GUJARAT,INDIA., MOBILE NO. 9925003334,

EMAIL ID- DRDUSHYANT511@GMAIL.COM

2. SECOND AUTHOR: DR NIRAV RASIKLAL PATEL

DESIGNATION- ASSISTANT PROFESSOR DEPT OF MEDICINE, B J MEDICAL COLLEGE, AHMEDABAD, GUJARAT, INDIA,

ADDRESS- 10, VANRAJ SOCIETY, RADHA SWAMI ROAD, RANIP, AHMEDABAD – 382480, GUJARAT,INDIA., MOBILE - 9712940021

EMAIL ID – NIRAV25NHL@GMAIL.COM

3. THIRD AUTHOR : DR JAGDISHKUMAR VIRABHAI PATEL

DESIGNATION- ASSISTANT PROFESSOR DEPT OF MEDICINE, B J MEDICAL COLLEGE, AHMEDABAD, GUJARAT,INDIA.,

ADDRESS- B/35 HARIOMNAGAR SOCIETY, OPP JIVIBA SCHOOL,GHODASAR,AHMEDABAD-380050, GUJARAT,INDIA., MOBILE – 9825866291

EMAIL ID – DRJAGDISHVPATEL@GMAIL.COM

4. CORRESPONDING AUTHOR: DR AVANI BIPINCHANDRA CHAVDA

DESIGNATION- ASSOCIATE PROFESSOR IN MEDICINE, NHL MUNICIPAL MEDICAL COLLEGE, AHMEDABAD, GUJARAT,INDIA.

ADDRESS- B/17, SHANTMANI APARTMENT, OPP PARIVAR SOCIETY, NEAR GALLERIA TULIP, PREMCHANDNAGAR ROAD, BODAKDEV, AHMEDABAD-380015, GUJARAT,INDIA., MOBILE- 9925888872

EMAIL ID- LUCKYCHAVDA86@GMAIL.COM

Abstract:

Introduction: Carotid intima media thickness (CIMT) is used as a indicator of atherosclerosis, which causes Macro-vascular diseases. with risk factors like age, HTN, Raised BMI, duration of uncontrolled DM, may actually have a correlation with CIMT either directly or indirectly influencing the disease process and causes atherosclerosis⁽¹⁾.

Materials and Methods: cross sectional study of 100 patients with type 2 DM admitted in civil hospital over a period of 1 year, age group between 35 to 75 years selected through simple random sampling. Macro vascular complications like CAD/CVD/PVD are diagnosed with the

help of echocardiography, CT scan and with the help of history and clinical examination. CIMT is measured with B mode ultrasound.

Result : 73 percent patients have macrovascular complications who have raised value of CIMT and 68 percent patients with macrovascular diseases have raised value of CIMT.

Conclusion: increased value of CIMT in diabetic patients has more chances of macrovascular complication hence early detection of atherosclerosis and early life style modification can prevent macro vascular complication⁽²⁾.

Keywords: Carotid intima media thickness (CIMT), Diabetes mellitus, Macro-vascular diseases, Atherosclerosis.

Introduction:

Diabetes mellitus is a metabolic cum vascular syndrome of multiple etiology characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin action or insulin secretion or combined, that causes atherosclerotic cardiovascular diseases. Macrovascular Complications occurs due to atherosclerosis. Macrovascular complications are cerebrovascular diseases, coronary artery disease and peripheral vascular disease. Cerebrovascular diseases includes stroke and transient ischemic attacks⁽³⁾. Strokes are ischaemic or hemorrhagic. Ischaemic strokes are thrombotic or embolic in nature. Coronary artery diseases are ST elevation myocardial infarction, Non ST elevation myocardial infarction, unstable angina and chronic stable angina. Carotid intima media thickness (CIMT) is used as a marker of atherosclerosis that is considered to be an important pathogenic mechanism of macrovascular diseases. CIMT is measured by B mode ultrasound, It is simple reproducible and non invasive test for vascular disease⁽⁴⁾. Recent study shows CIMT is early marker of atherosclerosis. It can give inputs in medical therapies of atherosclerosis. Findings of B mode ultrasound well corresponds to histology of carotid intima media thickness.

Aim of the study:

1. To analyse the carotid intima media thickness in type 2 diabetics with macrovascular diseases like CAD/CVA/PVD.
2. To establish the usefulness of carotid intima media thickness as a early marker of macro vascular complications in type 2 DM.

Objectives:

1. Prevalance of macrovascular complications in patients with raised value of CIMT compared to normal value of CIMT.
2. Prevalance of raised value of CIMT in type 2 DM patients with macrovascular complications compared to type 2 DM patients without macrovascular complications.

Materials and method:

The present study was done in patients admitted to Civil hospital Ahmedabad, Gujarat over a period of 1 year.

Selection criteria and Target population:

Patient aged 35 to 75 years with type 2 diabetes mellitus.

Investigations: macrovascular complications like CAD/CVD/PVD diagnosed through medical history, clinical examination and investigations like echocardiogram and computed tomography scan.

Sampling method:

100 patients selected by Simple random sampling methods.

Discussion:

This study was carried out in 100 type 2 diabetes mellitus patients admitted in medicine department of civil hospital Ahmedabad, between January to December 2020. They were divided into patients with macro-vascular complications and without macrovascular complications. In the present study out of 50 patients with complications, 20 patients were coronary atherosclerotic heart disease, 24 patients were cerebrovascular stroke and 6 patients were of peripheral vascular disease.

(Table -1 Age distribution of case and control group)

Age group	Type 2 DM with macrovascular diseases.	Type 2 DM without macrovascular diseases.
UP TO 50 YRS	10	13
51 TO 60 YRS	13	14
61 TO 70 YRS	21	5
ABOVE 70 YRS	6	8
TOTAL	50	50

In this study we can observe that macrovascular diseases are more common in the age group of 61 to 70 years.

(Table 2 prevalence of complications in type 2 DM patients)

	TYPE 2 DM WITH MACROVASCULAR DISEASES	TYPE 2 DM WITHOUT MACROVASCULAR DISEASES
CIMT >0.8	34 (a)	12 (b)
CIMT <0.8	16 (c)	38 (d)

CIMT= COMMON CAROTID INTIMAL MEDIAL THICKNESS.

Prevalence of macrovascular complications in patients with raised value of CIMT compared to normal value of CIMT.

$$a/a+b=0.73 \text{ VS } c/c+d=0.29$$

so, 73 percent patients have macrovascular complications who have raised value of CIMT compared to normal CIMT which is 29 percent.

Prevalence of raised value of CIMT in type 2 DM patients with macrovascular complications compared to type 2 DM patients without macrovascular complications.

$$a/a+c=0.68 \text{ VS } b/b+d=0.24$$

so, 68 percent patients with macrovascular diseases have raised value of CIMT as compared to type 2 DM without macrovascular diseases which is 24 percent.

Result:

- 100 diabetic patients were included in this study as per inclusion criteria. CIMT is measured with the help of ultrasound doppler.
- This study was done to assess the value of carotid intima media thickness in type 2 DM patients with and without macrovascular complication and to understand the correlation with atherosclerosis.
- This study states that as duration of diabetes increases there is progression of CIMT.
- The normal intima - media thickness of common carotid artery as evaluated by B mode ultrasound imaging was 0.8 mm approximately.
- Out of 50 DM patient with macrovascular complication had CIMT more than 0.8 mm.
- Out of 50 DM patient without macrovascular complications only 12 had CIMT more than 0.8 mm.
- On comparing carotid intima media thickness in both DM patients with and without macrovascular complications, patients with complications had mean CIMT as 0.99 mm and patient without complications had mean CIMT as 0.76 mm.
- CIMT was significantly increased in DM type 2 patients with macrovascular complications than patients without complications and it is statistically justified as 73 percent patients have macrovascular complications who have raised value of CIMT.
- This study has demonstrated the role of traditional risk factors like total cholesterol, LDL Cholesterol and triglycerides in the progression of atherosclerosis.
- Type 2 DM patients with macrovascular complications had low level of HDL as compared to patients without macrovascular complications.
- FBS, RBS and PPBS were elevated in DM patients with macrovascular complications compared to those without complications. HbA1c level elevated in DM patients with macrovascular complications than without complications.
- High resolution B mode ultrasonography Doppler is non invasive and validated method to assess early markers of atherosclerosis and indicator of CAD/PVD/CVA by measuring carotid intima thickness in asymptomatic or patients with dyslipidemia, DM, HTN and cigarette smoking.

Conclusion:

- This study showed raised values of CIMT in type 2 DM patients with macrovascular complications than Diabetic patients without complications.
- risk factors like age, HTN, raised BMI, duration of uncontrolled DM, may actually have a correlation with CIMT and promotes the disease process and contributing for macrovascular complications⁽⁵⁾.
- Uncontrolled DM and dyslipidemia both causes the Carotid intima media thickness and can be labeled as accelerating factor for atherosclerosis in patients with type 2 DM.
- Ultrasound guided CIMT measurement is noninvasive method for detecting of early adverse arterial structural changes associated with atherosclerosis and macro-vascular complications.
- carotid intima media thickness by ultrasound Doppler is reliable and helpful method for early detection of atherosclerosis and early life style modification can reduce incidence of macrovascular complications. So early life style modification in diabetic patient can be very helpful and prevents dependence on other and prevents restriction in quality of life⁽⁶⁾.

References:

1. Harrison 396.2850 Diabetes Mellitus: Diagnosis, Classification, and Pathophysiology Alvin C. Powers, Kevin D. Niswender, Carmella Evans-Molina.
2. WHO Consultation Group. Definition, diagnosis and classification of diabetes mellitus and its complications, 2 ed. Part 1: Diagnosis and classification of diabetes mellitus WHO/NCD/NCS/99. Geneva: World Health Organisation, 1999:1– 59.
3. Sakkinen PA, Wahl P, Cushman M, et al. Clustering of procoagulation, inflammation, and fibrinolysis variables with metabolic factors in insulin resistance syndrome. *Am J Epidemiol* 2000;152:897–907
4. Stumvoll M et al: Type 2 diabetes: Principles of pathogenesis and therapy. *Lancet* 365:1333, 2005 [PMID: 15823385]
5. SchaeferAJ : Vascular endothelium : in defense of blood fluidity, *J Clin Invest* 99 : 1143-1144, 1997
6. Rosenberg RD, Aied WC : Vascular bed specific hemostasis and hypercoagulable states *NEngl J Med* 341:7. 1564, 1999
7. MurrayCJ, lopez AD: Alternative projections of mortality and disability by cause, 1990-2020,: Global burden of disease study, *Lancet* 349: 1498-1504, 1997.