

## Prevalence of Carotid Atherosclerosis and its Association with Lipid Abnormalities and Ten-Year Predicted Atherosclerotic Cardiovascular Disease Risk in Diabetes Mellitus: A Cross-Sectional Study in Southwestern Uganda

Saasita PK

Kabale University, Kabale, Uganda. Email: patricksaasita@gmail.com

### Abstract

**Background:** Type 2 Diabetes Mellitus (T2DM) poses an increased risk for Cardiovascular Disease (CVD) through atherosclerosis. The apolipoprotein B (apoB) / apolipoprotein A-I (apoA-I) ratio is a powerful predictor of atherosclerotic CVD and is associated with Carotid Atherosclerosis (CA) in T2DM; however, this association has never been studied in our setting.

**Objective:** This study set out to determine the prevalence and factors associated with CA, including but not limited to apoB/apoA-I and non-high-density lipoprotein cholesterol (non-HDL-c) / high-density lipoprotein cholesterol (non-HDL-c/HDL-c) ratios among patients with T2DM in Southwestern Uganda.

**Methods:** A cross-sectional study conducted at Mbarara Regional Referral Hospital included 212 patients with T2DM aged  $\geq 40$  years. Socio-demographic, clinical, and behavioural characteristics were determined. Carotid Intima-Media Thickness (CIMT) was measured bilaterally at three points by high-resolution B-mode ultrasound. A mean value of six measurements from the right and left carotid arteries was used as a measure of the mean CIMT. CA was defined as a mean CIMT  $\geq 1.0$  mm. A stepwise multivariate logistic regression analysis, and Pearson's correlation were

used to find the association between factors with CA and/or CIMT.

**Results:** The prevalence of CA was 35.9%. Age  $\geq 55$  years (OR 3.1; 95% CI: 1.4 – 7.1;  $p < 0.007$ ), being on antiretroviral treatment (OR 3.8; 95% CI: 1.1–12.5;  $p$ -value = 0.030), high waist circumference (OR 2.7; 95% CI: 1.2 – 6.5;  $p$ -value = 0.022) and non-HDL-c/HDL-c ratio  $\geq 4$  (OR 3.0; 95% CI 1.0–8.5;  $p$  = 0.045) were associated with CA. ApoB/apoA-I ratio was not significantly associated with CA. The different lipid ratios (TC/HDL, non-HDL-c/HDL-c, apoB/apoA-I) except for atherogenic index plasma correlated positively with CIMT. There was a positive correlation between lipid ratios and the 10-year predicted Atherosclerotic Cardiovascular Disease (ASCVD) risk. However, the correlation between traditional lipid ratios including TC/HDL-c, non-HDL/HDL-c with the 10-year predicted ASCVD risk was stronger than that of apoB/apoA-I ratio.

**Conclusion:** There is a high prevalence of CA among patients with T2DM. The non-HDL-c/HDL-c ratio seems to correlate better with both the CIMT and the 10-year predicted ASCVD risk than the apoB/apoA-I ratio among patients with T2DM in southwestern Uganda.

**Key words:** Carotid atherosclerosis, Apolipoproteins, Type 2 diabetes mellitus