Prediction Of Carotid Artery Intima-Media Thickness From Biomarkers In Persons With Spinal Cord Injury

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Cardiovascular disease (CVD) is more prevalent in persons with spinal cord injury (SCI) than in the general population. Cardiometabolic disorders and an increase in systemic inflammatory burden have been shown to be associated with increased carotid intima-media thickness (cIMT), which is a potent clinical marker of CVD. PURPOSE: To develop a prediction equation for cIMT in persons with SCI using clinical markers for lipid [high density lipoprotein cholesterol (HDL-C) and triglycerides (TG)], carbohydrate metabolism [fasting plasma glucose (FPG), fasting plasma insulin (FPI)] and inflammation [glycan *N*-acetylglucosamine (Glyc-A) and high-sensitivity C-reactive protein (hsCRP)]. A prospective observational study was performed of outpatients with chronic SCI (>1 year). METHODS: Carotid ultrasound and fasting blood samples were determined in 55 male subjects with SCI [31 with paraplegia (PARA) and 24 with tetraplegia (TETRA)]. Calculation of cIMT thickness was performed with a program to analyze cIMT on still images obtained during the sonographic study. The software provided an integrated area of cIMT along the length of the near wall where the border was automatically recognized identifying the distance between the lumen intima-media interface. Multiple regression models were performed to determine the best predictive variables for cIMT from serum HDL-C, TG, FPG, FPI, Glyc-A, and hsCRP. RESULTS: The a priori comparison for cIMT values between the TETRA and PARA groups failed to reach significance (0.91±0.29 vs. 1.1±0.41mm, respectively; P=0.09) and, as such, the groups were combined to predict cIMT in the statistical modeling. The best predictor variables that remained in the model to generate the final equation were: cIMT = 0.008(FPI) +0.002(Glyc-A) – 0.164; r^2=0.33, P<0.0001. The individual predictor variables both had unique significant contributions to the model (FPI: partial r= 0.30, P<0.05; Glyc-A: partial r= 0.40, P<0.01); all other variables were removed from the model. CONCLUSION: Our findings suggest that standard cardiometabolic and inflammatory biomarkers may be used to predict cIMT, information that can be used clinically to identify potential carotid atherosclerotic burden in persons with chronic SCI.