

Associations between neck circumference and markers of dysglycaemia, non-alcoholic fatty liver disease (NAFLD) and the metabolic syndrome (MetS) independent of body mass index (BMI) in an outpatient cohort

AJ Buckley, EG Fojas, N Lessan

Research Department, Imperial College London Diabetes Centre, Abu Dhabi, United Arab Emirates

Aim: Waist:Hip ratio measurement is time-consuming and anatomical landmarks can be obscured in obesity. We investigated neck circumference (NC) as a potential marker of dysglycaemia, MetS and NAFLD.

Methods: Five hundred and seventy-four individuals (age 45.4 ± 11.7 years, BMI 31.1 ± 6 kg/m², 277 (48.3%) female, 124 normal glucose tolerance (NGT), 120 Prediabetes, 330 Type 2 diabetes (T2DM)) were recruited at Imperial College London Diabetes Centre in a study of sleep apnoea prevalence. NC was measured at the thyroid cartilage, and collar size was recorded. Simultaneously-measured liver function tests were available from the electronic medical record in 389 and lipid profile in 168 individuals. Analysis was performed using univariate and multivariate linear regression.

Results: Corrected for BMI, sex and age, NC was 0.62 ± 0.29 cm greater in prediabetes ($p=0.035$), and 1.07 ± 0.28 cm greater in T2DM, than in NGT ($p<0.001$). Correcting for BMI, sex, and glycaemic status, 1 cm increase in NC was associated with 0.48 ± 0.23 mmHg increase in mean arterial pressure ($p=0.039$, $n=428$), 1.05 ± 1.01 U/L increase in ALT ($p<0.001$, $n=389$), and additionally correcting for statin use, a 0.04 ± 0.01 mmol/L reduction in HDL ($p=0.002$, $n=168$). A 1 cm increase in NC was associated with a 0.14 ± 0.02 increase in NAFLD fibrosis score ($p<0.001$, $n=323$) and, excluding effects of smoking and antihypertensive treatment, a 1.2 ± 1.03 % increase in 10 year AHA cardiovascular risk ($p<0.001$, $n=156$). Collar size was neither well correlated with NC nor significantly associated with outcome measures.

Conclusion: NC was associated with dysglycaemia and features of the MetS and NAFLD.