Retinal vessel diameter, obesity and metabolic risk factors in school children (JuvenTUM 3).

Abstract:
The prevalence of childhood obesity is high and its association with future cardiovascular disease in adulthood is well established. The cross-sectional data presented analyze the prevalence of obesity and the association between metabolic risk factors, physical inactivity and retinal vessel diameter in young school children. The examination included 578 school children aged 11.1 ± 0.6 years from secondary schools in the District of Munich, Germany. Anthropometric measurements and blood sampling were conducted using standard protocols for children. Physical activity was evaluated by use of a questionnaire. Retinal microvascular diameters and the arteriolar to venular ratio (AVR) were assessed with a non-mydriatic vessel analyser (SVA-T) using a computer-based program. In our population, 128 (22.2%) children were overweight (ow) or obese (ob). The mean retinal arteriolar and venular calibres were 208.0 ± 15.6 μm and 236.2 ± 16.2 μm, respectively, with a mean AVR of 0.88 ± 0.01. Girls had significantly wider arteriolar and venular diameters compared to boys (p < 0.001). ow and ob children had a lower AVR compared to normal weight (nw) children (mean(95% CI)); nw: 0.89(0.88-0.89); ow: 0.87(0.86-0.88); ob: 0.85(0.83-0.87); p<0.05). Wider venular diameters were independently associated with higher BMI and higher hsCRP. Blood pressure was associated with retinal vessel
constriction. Higher physical inactivity and BMI were independently associated with a reduced AVR (p=0.032 and p<0.001, respectively). Cardiometabolic risk factors and physical inactivity are associated with retinal microvascular alterations in young children, comparable to associations in adults. Retinal vessel imaging seems to be a feasible assessment for the detection of microvascular impairments in children at risk of developing cardiovascular disease in adulthood.