

Childhood obesity, renal injury and future disease risk

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Background

Evidence associates obesity with glomerular hyperperfusion. Concurrent low-grade inflammation, hypertension, dyslipidemia, and insulin resistance represent further established risks to renal health in both children and adults.

Objectives

To investigate the association between childhood obesity and risk of renal impairment.

Methods

In 2013 obese (IOTF reference) but otherwise healthy children were investigated:

- 114 children (38.6% boys), mean age 11.5 ± 3.6 years;

Measurements using standard procedures:

- Anthropometry (body weight, height, waist circumference (WC) and blood pressure (BP));
- Pubertal status (by Tanner scale);
- Blood and urine samples (collected after an overnight fast);
- Kidney size (by abdominal ultrasound);
- Calculation of kidney volume (KV);
- Estimation of glomerular filtration rate (eGFR) (Schwartz formula, adjusted to $\text{ml}/\text{min}/1.73 \text{ m}^2$).

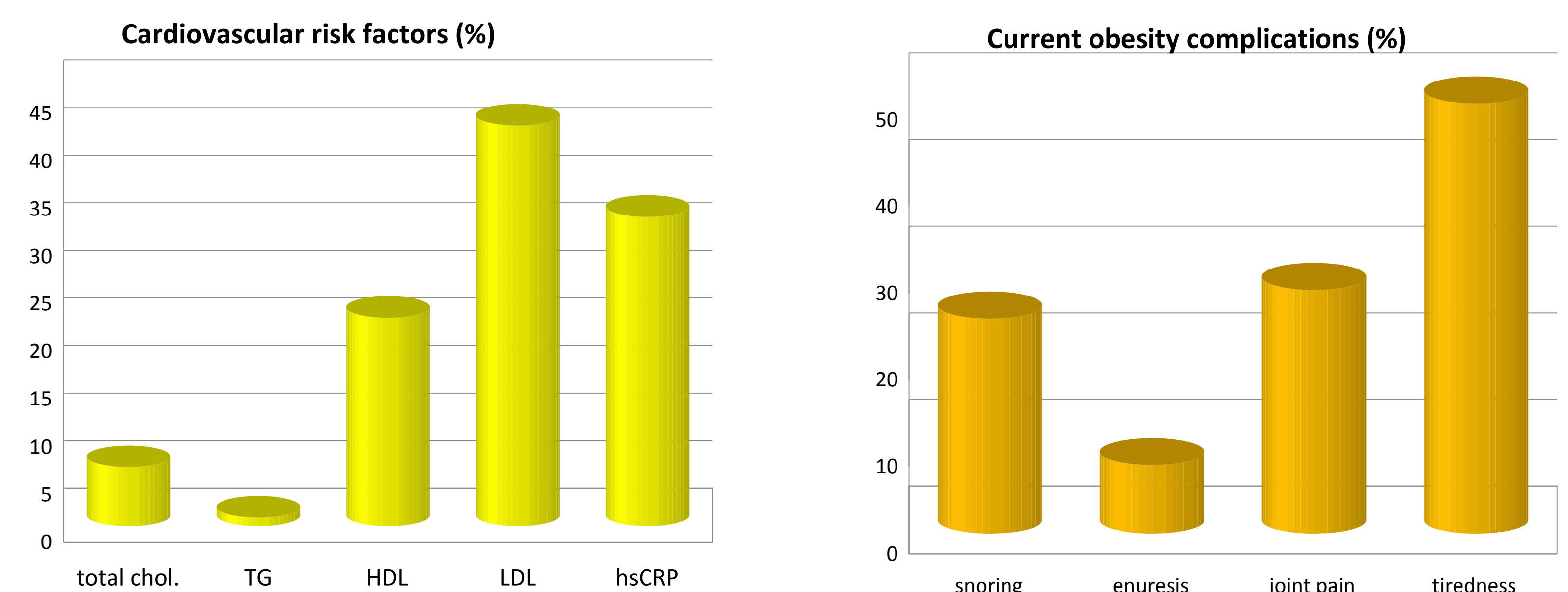
Conclusion

To summarize, childhood obesity showed association with established risk factors for renal toxicity. Whether kidney volume in obese children has an independent predictive value of future chronic kidney disease remains to be investigated.

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Conflict of interests: none

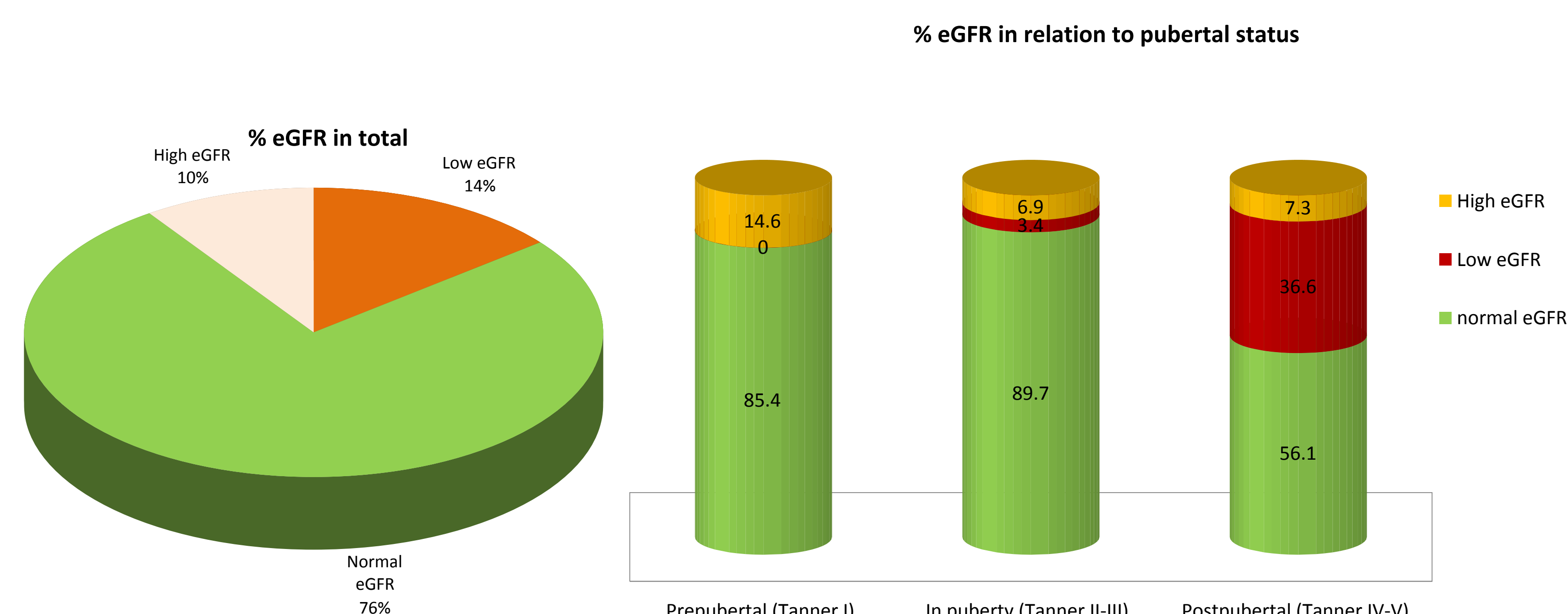
Results



Close to half of the children (**43.4%**) showed insulin resistance (assessed by HOMA-IR) and **95.4%** displayed hyperinsulinism.

Microalbuminuria (MAU) was detected in **8.5%** of the children, and **40.2%** of all were with high systolic BP.

Kidney volume correlated with WC (left KV - $r=0.488$, $p<0.001$; right KV - $r=0.292$, $p=0.021$), as well as with weight and elevated systolic BP.



Children with hyperfiltration (**9.6%** of all) are booked for poor metabolic health as at this stage they all had elevated total cholesterol and triglycerides.

Furthermore, **14.3%** of the children (all pubertal) were with hypofiltration (low eGFR).

Children with low eGFR had significantly larger kidney volume (left KV - $p<0.001$; right KV - $p=0.004$), higher HOMA-IR ($p=0.001$), WC and BMI ($p<0.001$), compared to those with normal and hyperfiltration rate.