Follow-up evaluation of clinical markers and inflammatory, biochemical and hormonal profiles in children with bodyweight problems

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1 Introduction

The morbidity in obese patients is alarmingly elevated (1). The activation of inflammatory pathways, hormonal abnormalities (i.e., the onset of insulin-resistance (IR) and hypothalamic-pituitary-adrenal axis dysregulation) in obesity are well evidenced (2,3). Expert recommendations upon laboratory testing and screening of comorbidities in pediatric obesity have not reached a consensus (4). A longitudinal approach might be more useful than cross-sectional studies to describe changes in clinical and blood parameters.

Aim: ***to evaluate the relationship between changes in clinical parameters and the inflammatory, biochemical and hormonal profiles of obese and overweight children over a 4 to 12-month period.***

2 Method

- observational retrospective study on obese and overweight children evaluated from January 2017 to March 2019 in the First Pediatric Clinic from Cluj-Napoca, Romania;
- minimum follow-up period : 4 months;
- clinical examination data and blood analysis: inflammatory, biochemical and hormonal (Fig.1).

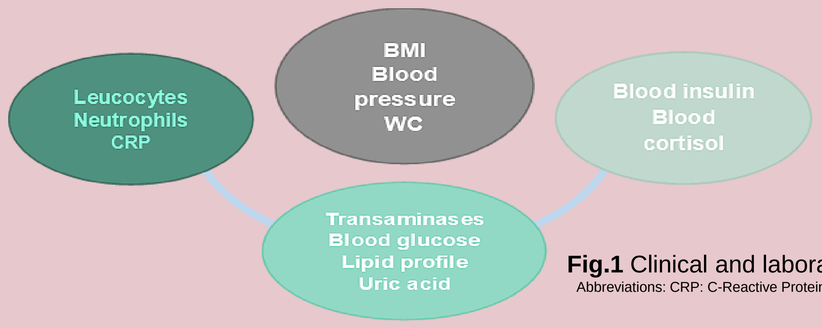

Fig.1 Clinical and laboratory parameters
Abbreviations: CRP: C-Reactive Protein; WC: waist circumference

3 Results

✓ 22 children aged 2 years - 17 years (17 girls and 5 boys);
✓ **baseline:** 20 obese (≥ 95th WHO percentile) and 2 overweight (≥85th WHO percentile) ➡ **follow-up:** 16 obese and 4 overweight;
✓ a trend of decreasing the percentile, but without reaching statistical significance (P-value=0.459, Fig. 2);

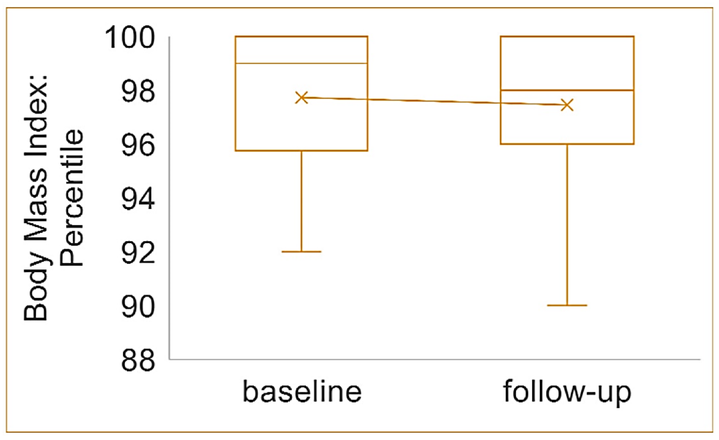

Fig. 2. Changes in BMI-for-age percentiles.

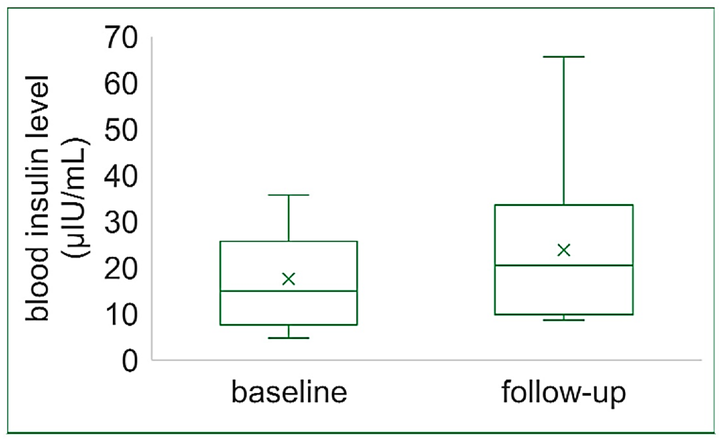

Fig. 3. Changes in blood insulin level.

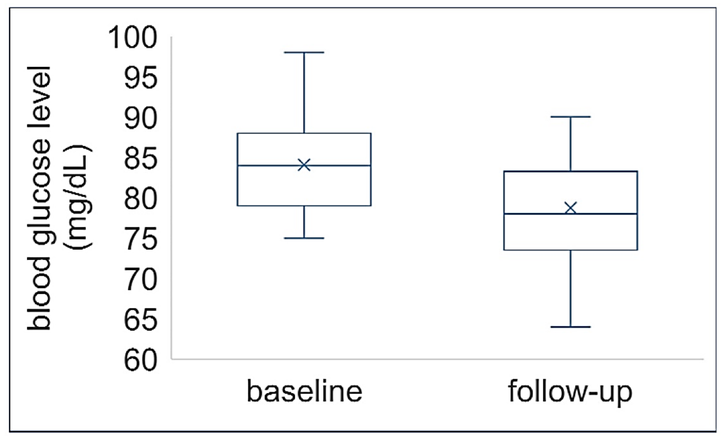

Fig. 4. Changes in blood glucose level.

✓ blood insulin level increased: baseline mean was 17.6 ± 9. 8 µIU/ml and follow-up mean was 25.1 ± 17.1 µIU/ml (P-value=0.050, Fig. 3);
✓ bodyweight and insulin levels were positively correlated at baseline (ρ=0.60, P-value= 0.051, n=11) and at follow-up (ρ=0.53, P-value= 0.028, n=17);
✓ one patient had hyperinsulinemia at the baseline evaluation and 5 patients developed it at follow-up;

✓ blood glucose level significantly reduced: baseline mean = 84.1 ±6.1 mg/dl and follow-up mean = 79.0 ±7.0 mg/dl (P-value=0.010, Fig. 4);
✓ neither the change in blood glucose, nor in the insulinemia or HOMA-ir value were correlated to changes in BMI or BMI-for-age percentiles (P-values > 0.05).

4 Conclusions

Changes in glucose homeostasis occur independently of bodyweight modifications during the early stage of obesity.
Euglycemic hyperinsulinemia may reflect the mechanisms leading to insulin resistance, which plays a key role in obesity-associated comorbidities.
Future prospective clinical and fundamental studies could bring a more detailed insight into these early subclinical changes.

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