Serum adipokine profile and adiponectin gene expression in neck adipose tissue in premenopausal and postmenopausal women

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OBJECTIVES

Adipokines are an important contributor to the circulatory milieu of the body. Their secretion changes as dysfunctional features of adipose tissue develop and the menopause is a time when an impairment of metabolic balance appears.

The aim of this study was to examine several serum adipokines and adiponectin gene expression in subcutaneous and deep neck adipose tissue of premenopausal and postmenopausal women.

METHODS

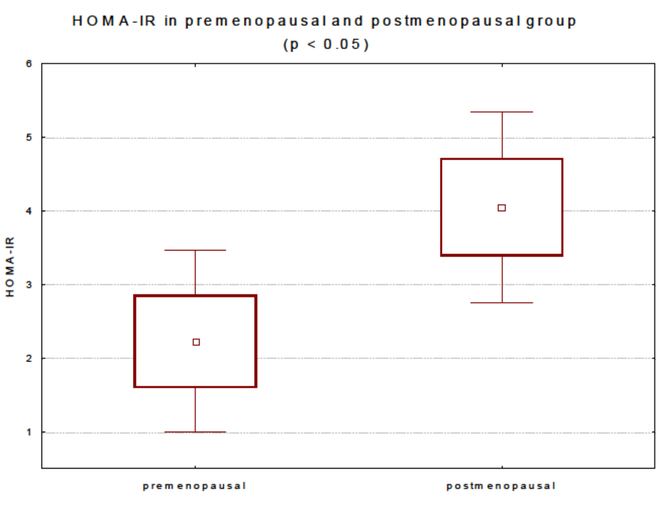
Samples of serum, subcutaneous and deep neck adipose tissue were taken in 41 (12 premenopausal and 29 postmenopausal) women undergoing routine thyroid or vascular surgery.

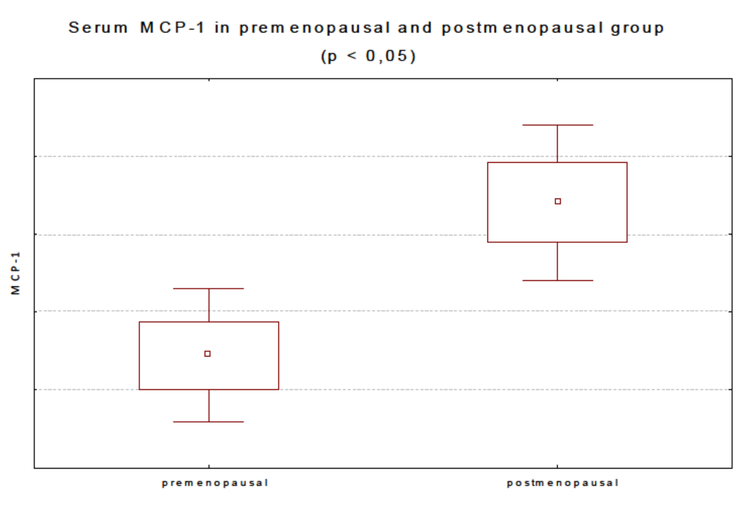
Serum adiponectin, leptin, omentin-1, monocyte chemoattractant protein-1 (MCP-1), fibroblast growth factor 21 (FGF21), retinol binding protein 4 (RBP4), insulin, glucose, triglycerides, HDL-cholesterol and C-reactive protein were determined. Homeostasis model assessment of insulin resistance (HOMA-IR) was calculated and anthropometric measurements like body weight and height, body mass index, waist and neck circumferences were performed.

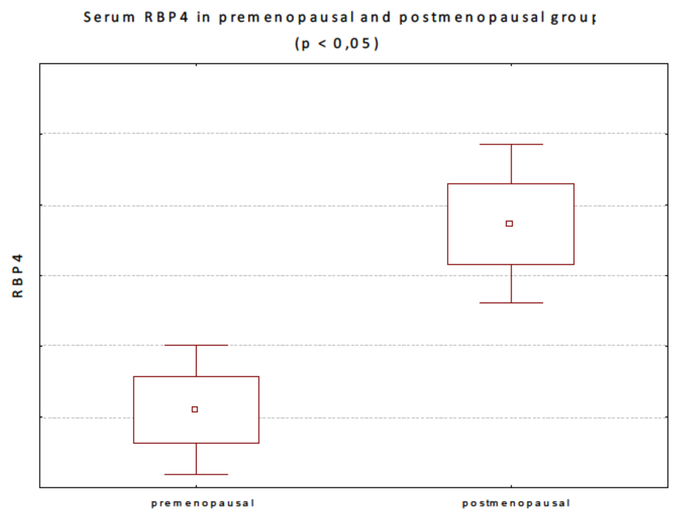
Adiponectin gene expressions in subcutaneous and deep neck adipose tissue samples were analysed by RQ-PCR method.

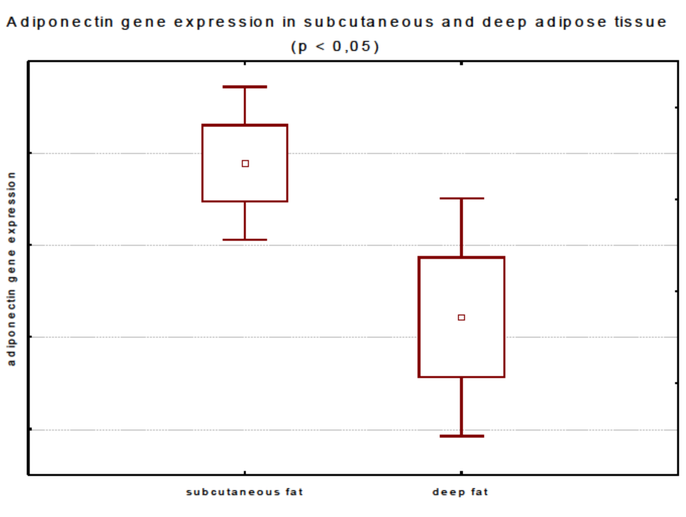
Study participants did not have any inflammatory or malignant diseases. They also did not have any thyroid or other specific neck mass that could particularly enlarge neck circumference.

RESULTS









In the whole sample of participants serum adiponectin and omentin-1 were significantly negatively and leptin was positively associated with body weight, body mass index and waist and neck circumference.

RBP4 correlated with waist circumference and triglycerides. Leptin also was associated positively and omentin-1 negatively with triglycerides. FGF21 correlated with glucose and HDL-cholesterol. Omentin-1 negatively correlated with RBP4 and positively with serum adiponectin. Both serum adiponectin and omentin-1 were negatively associated with leptin. MCP-1 correlated only with RBP4. FGF21 didn't correlate with other adipokines.

The postmenopausal group yielded significantly higher levels of serum insulin, HOMA-IR, MCP-1 and RBP4 than premenopausal group.

Adiponectin expression in the whole sample was higher in subcutaneous than in deep neck adipose tissue. These results did not reach statistical significance when patients were grouped by menopausal status. Adiponectin gene expressions of premenopausal women in both neck adipose tissue depots were not associated with metabolic variables and adipokines. In postmenopausal women subcutaneous adiponectin gene expression was negatively associated with insulin, HOMA-IR and RBP4 but positively with omentin-1.

CONCLUSIONS

Our results confirm multiple associations of various adipokines with metabolic parameters and suggest that some adipokines cluster in specific profiles with potential biologic functions that should be further elucidated.(1) The particular spectrum of adipokines reflect a heterogeneous nature of adipose tissue depots which metabolic impact varies in different anatomic locations. In neck adipose tissue depot higher subcutaneous than deep adiponectin gene expression seems to follow the same pattern as in layers of abdominal adipose tissue.(2) Subcutaneous adipose tissue shows some metabolically healthy functional features, but they happen to be impaired by age, hormonal and environmental influences.(3) Adiponectin expression in neck adipose tissue of our premenopausal women small sample seems to be spared from associations with systemic metabolic variables and adipokines. However, in postmenopausal group adverse metabolic variables show typical negative correlations with adiponectin expression in subcutaneous neck adipose tissue and that might correspond with dysfunctional alterations after menopause.

Adipose tissue is unique by its capability of large transformations, not only in its quantity but also in functional plasticity. Possible interventions to restore metabolically healthy adipose tissue are still an unexplored opportunity for action against metabolic disorders.

References

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