Kardiologia Polska 2018; 76, 5: 917–919; DOI: 10.5603/KP.2018.0099 ISSN 0022–9032

SHORT COMMUNICATION

Selected adipokines and thickness of the intima-media complex in patients with systemic lupus erythematosus

Eugeniusz Hrycek[1], Iwona Banasiewicz-Szkróbka[1], Aleksander Żurakowski[1], Justyna Dworak[2], Edward Błaszczak[3], Andrzej Franek[3], Paweł Buszman[1, 2]

[1]American Heart of Poland, Ustron, Poland
[2]Department of Internal, Autoimmune, and Metabolic Diseases, Medical University of Silesia, Katowice, Poland
[3]Department of Medical Biophysics, Medical University of Silesia, Katowice, Poland

INTRODUCTION

It is believed that patients with systemic lupus erythematosus (SLE) are at higher risk of developing accelerated atherosclerosis [1]. Recently, several adipokines have been implicated in the development of atherosclerosis, inflammation, and immune processes [2, 3]. Further investigations are needed regarding adipokine concentrations and their association with the results of arterial imaging, which led us to conduct this study.

METHODS

Study population

This study was carried out in 41 women with SLE (age, 47 ± 29 years) admitted to hospital for a routine checkup. The patients were with mild-to-moderate disease activity and had already been placed on medical therapy (for an average of 32 months). None of the subjects had clinical symptoms of coronary artery disease or congestive heart failure. In all patients and the controls the ejection fraction was ≥ 55%. The control group consisted of 38 healthy medication-free women who were matched for age (age, 44 ± 26 years) and place of residence. The study was approved by the bioethics committee, and the participants provided written, informed consent. (Details are inserted as **Supplementary Appendix S1 — see journal website**).

Clinical measurements

Serum levels of the adipokines (adiponectin, leptin, chemerin, resistin). The tests were performed in the patients and the controls using commercially available enzyme-linked immunoassay kits (ELISA, TECOmedical Group/Sissach, Switzerland, BioVendor/Heidelberg, Germany and Mediagnost/Reutilingen, Germany).

Thickness of the intima-media complex (IMT). The patients underwent bilateral B-mode ultrasound to evaluate IMT of the common carotid arteries (measured 1 cm before the bifurcation) and common femoral arteries. The examination was performed using the General Electric Vivid 3 (Boston, MA, USA) ultrasound system with a linear probe (4.0–11.0 MHz). Initially, IMT values were presented as the arithmetic means of measurements in all examined arteries. The measurements were repeated three times, and values < 0.8 mm were defined as cut-off point of the normal values. The measurements were performed by the same examiner, who was blind to the patients' medical history or laboratory results. The reproducibility of the IMT measurements was examined by conducting another scan one week later in 15 patients. The intra-observer variability was below 10%.

The mean IMT was also determined separately for the common carotid arteries and common femoral arteries. Moreover, the maximum IMT was calculated based on separate measurements of the left and right common carotid and left and right femoral arteries. Separate carotid and femoral artery subgroups were formed with IMT > 0.6 mm, > 0.7 mm, and ≥ 0.8 mm.

Investigation scheme

The following scheme was adopted: (a) the comparison of serum levels of the adipokines between patients (n = 41) and controls (n = 38); (b) the relationships between levels of the adipokines in the SLE group and separately in the control group; and (c) the relationships in the SLE group:

— between the concentrations of the adipokines and the mean IMT of all examined arteries in the total SLE group and separately in subgroups with IMT < 0.8 mm (23 patients) and ≥ 0.8 mm (18 patients);

Address for correspondence:
Eugeniusz Hrycek, MD, American Heart of Poland, ul. Sanatoryjna 1, 43–450 Ustroń, Poland, e-mail: ehrycek@gmail.com
Received: 24.09.2017 **Accepted:** 12.02.2018

Table 1. Spearman's rank correlation coefficient (r) between serum concentrations of the examined adipokines and maximum intima-media thickness (IMT) values of common carotid arteries in systemic lupus erythematosus (SLE) patients

Adipokines/IMT	Whole SLE group (n = 41)		Subgroup of SLE patients with IMT > 0.6 mm (n = 29)		Subgroup of SLE patients with IMT > 0.7 mm (n = 21)		Subgroup of SLE patients with IMT ≥ 0.8 mm (n = 16)	
	r	p	r	p	r	p	r	p
Leptin	0.04	0.82	–0.05	0.82	–0.15	0.51	0.30	0.25
Chemerin	0.18	0.25	0.03	0.87	0.14	0.55	0.05	0.86
Resistin	**–0.31**	**0.049**	**–0.38**	**0.04**	0.11	0.63	–0.28	0.30
Adiponectin	0.25	0.11	**0.39**	**0.04**	**0.46**	**0.035**	0.33	0.21

Statistically significant results are marked in bold. n — group or subgroup size; p — significance level

— between the common carotid and common femoral arteries IMT in the total SLE group and analogous relationships regarding the maximum IMT;
— between carotid IMT and separately femoral IMT and the concentrations of the adipokines considering the three IMT cut-off points (> 0.6 mm, > 0.7 mm, and ≥ 0.8 mm) and analogous relationships regarding the maximum IMT.

Statistical analysis

The results were analysed statistically by calculating the arithmetic mean ± standard deviation and were subject to comparative and relationship analyses (Spearman's rank correlation coefficient; r). The differences between arithmetic means were considered statistically significant at $p \leq 0.05$ and highly statistically significant at $p \leq 0.001$.

RESULTS AND DISCUSSION

Compared to the controls, patients with SLE exhibited significantly higher serum adiponectin (10.79 ± 6.45 μg/mL vs. 7.42 ±4.31 μg/mL) and serum leptin concentrations (38.82 ± 34.92 ng/mL vs. 10.76 ± 5.82 ng/mL).

A positive and significant correlation between leptin and chemerin concentrations was observed in SLE patients ($r = 0.30$, $p = 0.05$). In the controls, adiponectin was negatively and significantly correlated with leptin ($r = –0.34$, $p = 0.03$).

In the whole SLE group, the mean initial IMT (arithmetic mean of all arteries measurement) was 0.78 ± 0.16 mm (the IMT subgroup < 0.8 mm: 0.66 ± 0.07 mm; the subgroup ≥ 0.8 mm: 0.93 ± 0.10 mm). In five patients within the subgroup with IMT ≥ 0.8 mm, insignificant carotid plaques were seen in the internal carotid artery.

Separately analysed carotid and femoral IMT in the whole SLE group was 0.75 ± 0.17 mm and 0.82 ± 0.18 mm, respectively, and a positive correlation was revealed ($r = 0.74$, $p < 0.001$). The IMT values in subgroups < 0.8 mm and separately ≥ 0.8 mm were comparable between carotid and femoral arteries.

No statistically significant correlations were noted in the whole SLE group with respect to adipokine concentrations and the mean of the IMT measurements of all examined arteries. Similarly, no such correlations were noted in the IMT ≥ 0.8 mm and < 0.8 mm subgroups.

The maximum carotid and femoral IMT values in the whole SLE group were as follows: 0.80 ± 0.20 mm and 0.87 ± 0.20 mm, respectively, exhibiting a positive correlation ($r = 0.68$, $p < 0.001$). The IMT values in the subgroups < 0.8 mm and separately ≥ 0.8 mm were comparable between carotid and femoral arteries.

In relation to the common carotid arteries, in the patient subgroup with IMT > 0.6 mm a positive and significant correlation was noted between the IMT and serum adiponectin level ($r = 0.42$, $p < 0.022$). This correlation persisted in the subgroup with IMT > 0.7 mm ($r = 0.45$, $p < 0.04$) but not in the subgroup with IMT ≥ 0.8 mm.

The maximum IMT obtained upon measuring both common carotid arteries was negatively and significantly correlated with serum resistin level in the whole group of SLE patients and in the subgroup with IMT > 0.6 mm, but not in the subgroups with IMT > 0.7 mm and ≥ 0.8 mm. A positive correlation between the maximum IMT and serum adiponectin level was revealed in the subgroups with IMT > 0.6 mm and > 0.7 mm (Table 1).

No similar correlations were found with respect to the common femoral arteries in the whole SLE group and the separated subgroups with IMT > 0.6 mm, > 0.7 mm, and ≥ 0.8 mm.

Despite higher serum levels of adiponectin, SLE patients showed less advantageous metabolic conditions compared to the controls, as demonstrated by the relationship between adiponectin and leptin concentrations. Curative attempts in SLE patients should focus on increases in serum adiponectin

and decreases in leptin [4]. The present study revealed a positive correlation between leptin and chemerin levels in SLE patients, but this was not observed in the controls. A similar positive and statistically significant correlation had been found earlier in metabolic syndrome [5]. Scant data on the role of chemerin in the atheromatous process in SLE do not allow us to explain this relationship in our study.

The lack of correlation between the adipokines and IMT ≥ 0.8 mm seems to indicate that these analytical parameters cannot be considered as valuable biomarkers of subclinical atherosclerosis and consequently are not helpful in the assessment of cardiovascular risk [6] in treated SLE patients. These data are consistent with the previously described lack of significant correlation between adiponectin concentrations and the development of atherosclerotic plaques in SLE patients [7], as well as with the relationship between serum levels of adiponectin, leptin, and visfatin, and atherosclerosis in these patients [8].

Conversely, IMT < 0.8 mm exhibited a correlation with adiponectin and resistin concentrations, particularly when the maximum values of IMT for common carotid arteries were considered. These correlations suggest a need for further research based on larger groups of patients.

The limitations of this study are shown in **Supplementary Appendix S2 (see journal website)**. We acknowledge that this report is preliminary and further studies are needed.

Conflict of interest: *none declared*

References

1. Teixeira V, Tam LS. Novel Insights in Systemic Lupus Erythematosus and Atherosclerosis. Front Med (Lausanne). 2017; 4: 262, doi:10.3389/fmed.2017.00262, indexed in Pubmed: 29435447.
2. Liberale L, Bonaventura A, Vecchiè A, et al. The role of adipocytokines in coronary atherosclerosis. Curr Atheroscler Rep. 2017; 19(2): 10, doi:10.1007/s11883-017-0644-3, indexed in Pubmed: 28185154.
3. Hrycek E, Banasiewicz-Szkróbka I, Żurakowski A. et.al. Accelerated Atherosclerosis in Patients with Systemic Lupus Erythematosus and the Role of Selected Adipocytokines in This Process. Chapter in LUPUS, Edited by Wahid Ali Khan, Publisher InTech. 2017: 157–170, doi: 10.5772/65819.
4. Lozovoy MA, Simão AN, Morimoto HK, et al. Fish oil N-3 fatty acids increase adiponectin and decrease leptin levels in patients with systemic lupus erythematosus. Mar Drugs. 2015; 13(2): 1071–1083, doi: 10.3390/md13021071, indexed in Pubmed: 25690094.
5. Lehrke M, Becker A, Greif M, et al. Chemerin is associated with markers of inflammation and components of the metabolic syndrome but does not predict coronary atherosclerosis. Eur J Endocrinol. 2009; 161(2): 339–344, doi: 10.1530/EJE-09-0380, indexed in Pubmed: 19497986.
6. Podolec P, Jankowski P, Zdrojewski T, et al. Polish Forum for Prevention Guidelines on Cardiovascular Risk Assessment: update 2016. Kardiol Pol. 2017; 75(1): 84–86, doi: 10.5603/KP.2017.0009, indexed in Pubmed: 28124785.
7. McMahon M, Skaggs BJ, Sahakian L, et al. High plasma leptin levels confer increased risk of atherosclerosis in women with systemic lupus erythematosus, and are associated with inflammatory oxidised lipids. Ann Rheum Dis. 2011; 70(9): 1619–1624, doi: 10.1136/ard.2010.142737, indexed in Pubmed: 21670088.
8. Chung CP, Long AG, Solus JF, et al. Adipocytokines in systemic lupus erythematosus: relationship to inflammation, insulin resistance and coronary atherosclerosis. Lupus. 2009; 18(9): 799–806, doi: 10.1177/0961203309103582, indexed in Pubmed: 19578104.

Cite this article as: Hrycek E, Banasiewicz-Szkróbka I, Żurakowski A, et al. Selected adipokines and thickness of the intima-media complex in patients with systemic lupus erythematosus. Kardiol Pol. 2018; 76(5): 917–919, doi: 10.5603/KP.2018.0099.