THE EFFECT OF METFORMIN AND LIRAGLUTIDE ON THE PRECLINICAL MARKERS OF ATHEROSCLEROSIS IN WOMEN WITH POLYCYSTIC OVARY SYNDROME

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OBJECTIVES

Subclinical atherosclerosis is frequently present in women with polycystic ovary syndrome (PCOS). Metformin and liraglutide both improve metabolic control in PCOS, however they may possess different anti-atherosclerotic properties. We investigated the effects of these medications on the subclinical atherosclerotic deterioration of the arterial wall in PCOS patients.

METHODS

We enrolled 65 obese women with PCOS (aged 28.6 ± 6.3 years, BMI 38.4 ± 5.0 kg/m^2, mean ± SD) participating in the two randomized clinical trials at the Outpatient Clinics of Department of Endocrinology, Diabetes and Metabolic Diseases at the University Medical Centre Ljubljana from November 2011 to December 2014 (1,2). The patients were assigned to liraglutide at a dose of 0.6 mg injected sc once per day and increased to 1.2 mg/day after 1 week for 12 weeks or metformin 1000 mg BID. Markers of subclinical atherosclerosis including intima-media thickness (IMT), flow-mediated dilation (FMD), low-flow-mediated constriction (L-FMC), and peripheral tonometry (PAT) with pulse wave amplitude (PWA) were measured. Arterial stiffness was investigated through pulse walve velocity (PWV) and the augmentation index (AI). All measurements were obtained at baseline and at study end.

RESULTS

25 patients were treated with metformin and 40 with liraglutide. At baseline there were no statistically significant differences in the investigated anthropometric, hormonal, metabolic and vascular parameters between the two groups. Table 1 and 2 shows changes of the investigated functional and morphological parameters of the peripheral arteries. Furthermore, there was a significant inverse relationship between FMD and HOMA index before and after treatment in both arms (r=0.61, p<0.05).

Table 1: Changes of the functional and morphologic indicators of preclinical atherosclerosis in PCOS women at the end of 3 months treatment with metformin (MET)

	Before MET treatment		After MET treatment		
Parameter	Average	SD (±)	Average	SD (±)	p
FMD (%)	7.33	3.11	9.12	2.75	0.04
NMD (%)	19.50	6.12	20.9	6.89	0.66
PWA (PAT) (%)	2.34	1.22	2.42	0.82	0.30
AI (%)	27.6	5.3	29.5	6.7	0.67
PWV (m/s)	7.31	1.90	8.17	1.34	0.42
IMT (mm)	0.50	0.05	0.51	0.06	0.80

Table 2: Changes of the functional and morphologic indicators of preclinical atherosclerosis in PCOS women at the end of 3 months treatment with liraglutide (LIRA)

	Before LIRA treatment		After LIRA treatment		
Parameter	Average	SD (±)	average	SD (±)	p
FMD (%)	6.83	3.33	8.12	2.78	0.08
NMD (%)	18.13	5.14	19.14	4.67	0.32
PWA (PAT) (%)	2.42	0.82	2.83	0.92	0.07
AI (%)	31.4	7.82	39.6	13.10	0.03
PWV (m/s)	7.34	1.90	7.57	1.28	0.65
IMT (mm)	0.53	0.06	0.50	0.50	0.04

FMD – flow-mediated dilation of the brachial artery, NMD – nitro-glycerine mediated dilation, PWA – pulse wave amplitude, AI – augmentation index, PWV – pulse wave amplitude, IMT – intima-media thickness

CONCLUSIONS

Short term intervention with metformin and liraglutide have beneficial effect on markers of subclinical atherosclerosis in obese women with PCOS. Interestingly, the effects of metformin therapy resulted only in functional improvement, whereas liraglutide also improved morphological deterioration of arterial wall.

References: Jensterle Sever, M., et al. Eur J Endocrinol. 2014;170(3):451-9 .
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