Acta Biol. Univ. Daugavp. 11 (2) 2011
ISSN 1407 - 8953

THE EFFECT OF METABOLIC SYNDROME ON THE DEVELOPMENT OF AGE-DEPENDENT HYPOGONADISM IN MIDDLE-AGED MEN

Anatolijs Pozarskis, Jelena Pozarska, Juris Erenpreiss

Pozarskis A., Pozarska J., Erenpreiss J. 2011. The effect of metabolic syndrome on the development of age-dependent hypogonadism in middle-aged men. *Acta Biol. Universit. Daugavpil., 11 (2): 188-191.*

This article presents that metabolic syndrome in middle-aged men is associated with development of age-dependent hypogonadism, which is characterized by decrease of total and free testosterone level and expanded clinical symptomatology of hypogonadism in sub-scales of sexual symptoms, somatic and psychological states of AMS-data. These changes are developing in spite of correction of arterial pressure, glucose level and cholesterol exchange and prove the necessity of special measures on testosterone replacement therapy for this group of patients.

Key words: Metabolic syndrome, age-dependent hypogonadism.

Anatolijs Pozarskis, Daugavpils University, Vienibas 13, Daugavpils, LV 5401, Latvia, drpozarskis@inbox.lv

Jelena Pozarska, doctors private practice, Ventspils 31, Daugavpils, LV 5400, Latvia, jepozarska@inbox.lv

Juris Erenpreiss, Riga Stradina University, Andrology laboratory, Dzirzciema 16, Riga, LV 1007, Latvia, jerenpreiss@gmail.com

INTRODUCTION

Metabolic syndrome is a widespread symptom complex, including abdominal obesity (waist circumference for men more than 94 cm, for women – more than 80 cm), and at least two of the following symptoms (Carruthers 1996):

- high level of triglycerides, more than 150 mg/dl, or normal level in case of proper therapy;
- low level of high density lipoproteins, less than 40 mg/dl for men and 50 mg/dl for women or normal level in case of proper therapy;
- arterial hypertension or normal mean arterial pressure values if antihypertensive agents are administered;
- increased blood glucose level above 5.6 mmol/l or established diabetes mellitus diagnosis.

Incidence of metabolic syndrome is variable, according to data from different professionals it is estimated from 15% to 30% of the whole population. Topicality of the question is caused by the fact that metabolic syndrome is followed by hormonal changes, thus impacting the function of human body. Malfunction of

endocrine control of masculine sexual function is among them (Morley 1998).

The aim of research is to study the influence of the metabolic syndrome on the development of age-dependent hypogonadism in middle-aged men.

MATERIAL AND METHODS

This was an open label, prospective study with two groups of patients. The first group included 34 persons with moderately pronounced metabolic syndrome. The second group consisted of 32 patients with no symptoms of somatic pathology.

Criteria for inclusion into the study

The presence of moderate severity metabolic syndrome, middle age.

Criteria for exclusion from the study

Decompensated diseases, oncologic pathology and diseases leading to pronounced decrease of cognitive function and impeding the contact with patient.

Diagnosis verification

Metabolic syndrome was diagnosed in the following cases: detection of abdominal obesity with waist circumference more than 94 cm, normal levels of triglycerides, high density lipoproteins if hypolipidemic agents are administered, normal blood glucose level if blood glucose lowering drugs are administered and normal arterial pressure if antihypertensive therapy has been taken continuously. Characteristics of both groups of patients are represented in Table 1.

Both groups got an AMS-form to detect clinical signs of age-dependent hypogonadism; the level of total testosterone and free testosterone in blood serum was detected using immunofluorescence method. Comparison of AMS-form data and levels of free and bound testosterone in patients from both groups using non-parametric statistics methods allowed to detect different signs of age-dependent hypogonadism in middle-aged men with metabolic syndrome. Normal levels of total testosterone were considered as higher than 3.46 ng/ml, and free testosterone – above 72.0 pg/ml. Statistical analysis was performed using "Statistica" utilities.

RESULTS

It was revealed that patients with metabolic syndrome had significantly lower levels of total and free testosterone in comparison to healthy men. Moreover, levels of these hormones were significantly below normal level, $p<0.05$ (Table 2).

Table 1. Characteristics of the patients

Characteristic	Patients with metabolic syndrome* (n=34)	Healthy persons (n=32)
Average age	43.4±0.3	42.9±0.5
Weight, kg	107.6±4.5	84.8±3.7
Waist circumference (cm)	118.3±2.7	90.5±1.4
Cholesterol, mmol/l	5.0±1.3	4.9±1.6
High density lipoproteins, mmol/l	1.12±0.5	1.14±0.4
Triglycerides, mmol/l	1.6±0.2	1.5±0.1
Glucose, mmol/l	5.2±0.4	5.1±0.3
Systolic blood pressure, mm Hg	123.3±1.2	120.1±0.9
Diastolic blood pressure, mm Hg	87.6±1.5	86.4±0.9

*- values of metabolic characteristics were obtained on the background of appropriate treatment, values of arterial pressure were obtained on the background of antihypertensive therapy

Table 2. The testosterone levels in patients with metabolic syndrome and healthy persons

Characteristic	Patients with metabolic syndrome (n=34)	Healthy persons (n=32)
Total testosterone, ng/ml	2.01±0.1*, **	3.54±0.2
Free testosterone, pg/ml	61.21±3.6*, **	73.34±3.0

*- significant difference from values in normal persons
**- significant difference from values in healthy persons

Table 3. AMS-data from the questionnaire in middle-aged men with metabolic syndrome and healthy men

Item	Number of points	
	Metabolic syndrome (n=34)	Healthy (n=32)
General health evaluation	1.2±0.01*	2.7±0.02
Presence of musculo-articular pain, including pain in lower part of the back	0.5±0.02*	0.1±0.01
Hyperhidrosis, including cases of unreasonable perspiration	1.2±0.01*	0.05±0.01
Insomnia	2.4±0.01*	0.4±0.03
Presence of drowsiness, tiredness	2.1±0.001*	0.3±0.03
Irritability	2.2±0.001*	0.4±0.01
Fussiness, hyperreceptivity	1.2±0.001	1.3±0.002
Panic attacks	3.7±0.01*	0.5±0.03
Signs of exhaustion	2.1±0.001*	0.4±0.003
Muscle weakness	0.1±0.001	0.2±0.002
Episodes of depression	3.4±0.01*	1.2±0.02
Presence of feeling, that «Everything's gone by»	2.2±0.02*	0.4±0.03
Presence of spiritual bankruptcy	2.1±0.001*	0.9±0.002
Decrease of beard/moustache growth	1.3±0.01*	0.2±0.02
Decrease of quality and frequency of sexual contacts	2.4±0.01*	0.6±0.02
Decrease of amount and intensity of "pride of the morning"	2.4±0.02*	0.5±0.03
Decreased libido	2.5±0.01*	0.4±0.01

*- significant difference between values of different groups

Study of the clinical symptoms, associated with decreased levels of free and bound testosterone showed that hypogonadic men have significantly lower characteristics of sexual symptoms, somatic and psychological states in sub-scales (Table 3).

DISCUSSION

Age-dependent hypogonadism is considered to be a pathologic state, characterized by functional insufficiency of testicles, which becomes apparent on biochemical level by decrease of total and free testosterone levels in blood in association with development of respective clinical picture (Albert 2006). Testosterone deficit may develop due to malfunction of gonadotropic hormones production by hypophysis and hypothalamus as a result of inherent or acquired pathology of central nervous system and inherent or acquired pathology of testicles (Adashi et al. 1982). At the same time, development of hypogonadism is possible while aging with attendant somatic pathology of different degree of manifestation. It is shown in some works that age-dependent hypogonadism can develop on the background of isolated components of metabolic syndrome: obesity with waist circumference more than 102 cm; malfunction of lipid exchange. On the other

hand, there are new data appearing about the fact that low level of free testosterone itself may cause insulin resistance and diabetes mellitus of type 2 (Ebeling et al. 1995, Hak et al. 2002). The results of our research showed that in case of middle-aged men moderately pronounced metabolic syndrome is clearly associated with further development of age-dependent hypogonadism. At the same time healthy men of the same age from another group have gonadic function unchanged (Rolf et al. 2002). It is important to mention that hypogonadism was detected despite administration of special medical agents (antihypertensive, hypolipidemic, antihyperglycemic) by patients, and it didn't stop the development of pathologic decrease of testosterone level with expanded clinical symptomatology (Swerdloff et al. 1993).

CONCLUSION

Metabolic syndrome in middle-aged men is associated with development of age-dependent hypogonadism, which is characterized by decrease of total and free testosterone level and expanded clinical symptomatology of hypogonadism in sub-scales of sexual symptoms, somatic and psychological states of AMS-data. These changes are developing in spite of correction of arterial pressure, glucose level and cholesterol exchange and prove the necessity of special measures on testosterone replacement therapy for this group of patients.

REFERENCES

Adashi E.Y., Fabics C., Hsueh A. J. 1982. Insulin augmentation of testosterone production in a primary culture of rat testicular cells. Biol Reproci. 26(2): 270-80.

Albert O. 2006. Brinkmann Androgen Action in Health and Disease. Topical Endocrinology. Supplement 7: 25-56.

Carruthers M. 1996. The testosterone revolution, Harper Collins Publishers, London.

Ebeling P., Stenman U.H., Seppala M., Koivisto V.A. 1995. Androgens and insulin resistance in type 1 diabetic men. Clin Endocrinol (Oxf) 43(5): 601-607.

Hak A.E., Witteman J.C., deJong F.M., GeerlingsM.I., Hofeman A., Pols H.A. 2002. Low levels of endogenous androgens increase the risk of atherosclerosis in elderly men: the Rotterdam study. J Clin Endocrinol Metab. 87(8): 3632-3639.

Morley J.E. 1998. The elderly Type 2 diabetic patient: special considerations. Diabet Med. 15(4): 41-46.

Rolf C., von Eckardstein S., Koken U., Nieschlag E. 2002. Testosterone substitution of hypogonadal men prevents the age-dependent increases in body mass index, body fat and leptin seen in healthy ageing men: results of a cross-sectional study Eur J Endocrinol 146(4): 505-511.

Swerdloff R.S., Wang C. 1993. Androgen deficiency and aging in men. West J Med 159(5): 579-585.

Received: 05.09.2011.
Accepted: 05.12.2011.