УДК 616.24:616-002.2:616-056.52:-055.1:616-08

INFLUENCE OF EXCESSIVE BODY MASS ON FORMATION OF SYSTEMIC PROINFLAMMATORY CYTOKINE POTENTIAL IN PATIENTS WITH PURULENT-DESTRUCTIVE FORMS OF CHRONIC NONSPECIFIC PULMONARY DISEASES

M. A. Mindrul

Phthisiology and pulmonology department (the head – ass. of prof. S. M. Lepshina) SE "Donetsk state medical university", Donetsk.

ВЛИЯНИЕ ИЗБЫТОЧНОЙ МАССЫ ТЕЛА НА ФОРМИРОВАНИЕ СИСТЕМНОГО ПРОВОСПАЛИТЕЛЬНОГО ЦИТОКИНОВОГО ПОТЕНЦИАЛА У БОЛЬНЫХ С ГНОЙНО-ДЕСТРУКТИВНЫМИ ФОРМАМИ ХРОНИЧЕСКИХ НЕСПЕЦИФИЧЕСКИХ ЗАБОЛЕВАНИЙ ЛЕГКИХ

М.А. Миндрул

РЕЗЮМЕ

У больных гнойно-деструктивными формами ХНЗЛ изучен системный уровень провоспалительных цитокинов IL-6 и TNF-α и установлено, что постоянным лабораторным признаком течения этой группы заболеваний у лиц мужского пола является их повышение в сыворотке крови. Течение гнойно-деструктивных форм ХНЗЛ при ожирении характеризуется глубоким нарушением цитокинового гомеостаза – повышение в сравнении с подобными больными с нормальным индексом массы тела уровня IL-6 и TNF-α. Включение в комплексную терапию гнойно-деструктивных форм ХНЗЛ у лиц мужского пола с ожирением курса акарбозы (глюкобай) оказывает модулирующее влияние на системный дисбаланс цитокинового гомеостаза – снижает уровень провоспалительных цитокинов IL-6 и TNF-α.

ВПЛИВ НАДЛИШКОВОЇ МАСИ ТІЛА НА ФОРМУВАННЯ СИСТЕМНОГО ПРОВОСПАЛИТЕЛЬНОГО ЦИТОКИНОВОГО ПОТЕНЦІАЛУ У ХВОРИХ ІЗ ГНІЙНО-ДЕСТРУКТИВНИМИ ФОРМАМИ ХРОНІЧНИХ НЕСПЕЦИФІЧНИХ ЗАХВОРЮВАНЬ ЛЕГЕНІВ

М.А. Міндрул

РЕЗЮМЕ

У хворих гнійно-деструктивними формами ХНЗЛ вивчений системний рівень провоспалительных цитокинов IL-6 і TNF- α і встановлено, що постійною лабораторною ознакою плину цієї групи захворювань в осіб чоловічої статі є їхнє підвищення в сироватці крові. Плин гнійно-деструктивних форм ХНЗЛ при ожирінні характеризується глибоким порушенням цитокинового гомеостазу - підвищення в порівнянні з подібними хворими з нормальним індексом маси тіла рівня IL-6 і TNF- α. Включення в комплексну терапію гнійно-деструктивних форм ХНЗЛ в осіб чоловічої статі з ожирінням курсу акарбозы (глюкобай) впливає на системний дисбаланс цитокинового гомеостазу - знижує рівень провоспалительных цитокинов IL-6 і TNF- α.

Key words: IL-6, TNF - α, chronic nonspecific diseases of lungs.

Development of subclinical systemic inflammatory reaction takes a powerful place in pathogenesis of chronic nonspecific pulmonary diseases (CNPD) including purulent-necrotic forms and it is the important pathogenetic mechanism of cytokine-mediated disease both regional (respiratory organs), and systemic manifestation of it [4, 5]. Obesity development forms the special pathogenetic conditions for progressing of chronic nonspecific inflammatory process in bronchopulmonary system at the expense of imbalance deepening of cytokine potential [6].

On the other hand, careful preoperational preparation and analysis of all factors, which could affect on carrying out of operation and flow of the postoperative period in patients with purulent-necrotic forms of CNPD (including diabetes mellitus, insulin-resistance, obesity, etc. presence) opens new perspectives of a problem decision of these diseases [1, 2].

In the light of the above-stated role studying of associated with obesity of imbalance of adipokine homeostasis in pathogenesis of purulent-destructive forms of CNPD is represented to us rather perspective direction because it is a basis for working out of new ways of the differentiated pathogenetic therapy of specified associative pathology.

Research main objective was the scientific substantiation of expediency of use and assessment of clinical efficacy of application of systemic therapy of obesity in complex treatment of purulent-destructive forms of chronic nonspecific pulmonary diseases including preoperative preparation. In the present work we introduce studying results of dynamics of cytokines level in blood plasma under the influence of systemic therapy of obesity in such patients.

MATERIAL AND METHODS

There were 98 male patients with purulent-

destructive forms of CNPD under observation, which were subjected to surgical treatment. In all examined persons at entering to a pulmonary-surgical hospital the disease exacerbation is registered including clinical-endoscopic signs of the secondary purulent bronchitis.

All examined patients have been subdivided into following groups: the 1st group – 36 patients with CNPD (19 patients with chronic pulmonary abscess, 9 patients with bronchoectatic disease, 8 patients with pulmonary cystic disease) and with a body mass index (BMI) 18,5-24,9; the 2nd group – 32 patients with CNPD (17 patients with chronic pulmonary abscess, 9 patients with bronchoectatic disease, 6 patients with pulmonary cystic disease) and with BMI ⩾30,0. For studying of complex influence on CNPD current of systemic therapy of obesity the 3rd group of patients has been selected, which have compounded 30 patients with CNPD (15 patients with chronic pulmonary abscess, 8 patients with bronchoectatic disease, 7 patients with pulmonary cystic disease) with BMI ⩾30,0, whom a 12-week course of inhibitor of alpha-glucosidase acarbose (glucobye) is included in the medical complex: within the 1st week – on 50 mg once a day before meal (during a supper), since the 2nd week – on 50 mg 2 times (during a breakfast and a supper) and since the 3rd week – on 50 mg 3 times a day before meal at good tolerance of treatment. At a choice of a dose of drug it was considered by us that according to multicenter research APRIL of essential difference in dynamics of all studied indexes between the groups of persons, who received acarbose 150 mg and 300 mg are not noted [2].

There were 19 healthy donors of male in the conforming age range (healthy persons) as a control group. Content of IL-6 and TNF-α in blood serum is defined by hard-phase immune-enzymatic method with use of test systems ProCon (Open Company "PROTEIN CONTOUR-TEST", St.-Petersburg). Optical density of a finished product of a fermentative reaction by photometric is defined.

RESULTS AND DISCUSSION

Results of investigation of IL-6 and TNF-α level in blood serum in patients of the 1st, 2nd and 3rd groups at entering to a hospital and after carried out treatment are introduced in a table 1.

Table 1

Level of IL-6 and TNF-α in blood serum in patients of the 1st, 2nd and 3rd groups at entering to a hospital and after carried out treatment, pg/ml

Groups	Statistical indexes	IL-6		TNF-α	
		at entering	after treatment	at entering	after treatment
1st group	M ± m	16,63 ± 0,64	17,73 ± 0,78	26,64 ± 1,17	24,05 ± 1,18
	n	36	31	36	31
	p	< 0,001	< 0,001	< 0,001	< 0,001
	p_1	–	< 0,5	–	< 0,2
	p_2	–	–	–	–
2nd group	M ± m	24,74 ± 0,92	23,15 ± 0,89	46,05 ± 2,12	43,83 ± 2,03
	n	32	29	32	29
	p	< 0,001	< 0,001	< 0,001	< 0,001
	p_1	–	< 0,5	–	< 0,5
	p_2	< 0,001	< 0,001	< 0,001	< 0,001
3rd group	M ± m	24,03 ± 0,94	18,93 ± 0,98	48,65 ± 1,95	36,60 ± 1,62
	n	30	30	30	30
	p	< 0,001	< 0,001	< 0,001	< 0,001
	p_1	–	< 0,001	–	< 0,001
	p_2	< 0,001	< 0,5	< 0,001	< 0,001
Healthy persons	M ± m	8,64 ± 0,33		17,01 ± 0,65	
	n	19		19	

Note: p – reliability of differences in comparison with an index in healthy persons, p_1 – reliability of differences in comparison with an index at entering in the same group of patients, p_2 – reliability of differences in comparison with an index in patients of the 1st group at the conforming research stage.

The scientific facts introduced in tab. testify that at entering to a hospital in patients of the 1st group increase of proinflammatory cytokine IL-6 in blood serum on 92,5 %, p <0,001), in patients of the 2nd and 3rd groups – accordingly on 186,3 % and 178,1 %, (p and p_2<0,001) is revealed. At the second research stage (after carried out treatment) the researched index in patients of the 1st and 2nd groups are not essentially changed, and in patients of the 3rd group – is reduced on 21,2 % (p_1<0,001).

The specified facts testify that including a course

of acarbose (glucobye) in complex therapy of purulent-destructive forms of CNPD at obesity in males with obesity allow essential increasing efficacy of proinflammatory anticytokine therapy (on level of proinflammatory cytokine IL-6).

At entering to a hospital in patients of the 1st group the level of proinflammatory cytokine TNF α in blood serum on 56,6 % ($p<0,001$), in patients of the 2nd and 3rd groups – on 170,7-186,0 % (p and $p_2<0,001$) is revealed also. At the second research stage (after carried out treatment) the researched index in patients of the 1st and 2nd groups is not essentially changed, and in patients of the 3rd group – is reduced on 24,8 % ($p_1<0,001$). The specified facts testify that including in complex therapy of purulent-destructive forms of CNPD at obesity in males with obesity of an acarbose (glucobye) course allows essentially increasing efficacy of anti-inflammatory anti-cytokine therapy (on level of proinflammatory cytokines IL-6 and TNF-α).

CONCLUSIONS

1. The constant laboratory sign of purulent-destructive forms of CNPD in males is increase of a systemic level of proinflammatory cytokines IL-6 and TNF-α in blood serum in comparison with group of healthy persons. Current of purulent-destructive forms of CNPD at obesity is characterized by deep disturbance of cytokine homeostasis – increase in comparison with similar patients with normal BMI level of proinflammatory cytokine IL-6 and TNF-α.

2. Including a course of acarbose (glucobye) in complex therapy of purulent-destructive forms of CNPD in males with obesity renders modulating influence on systemic imbalance of adipocytokine homeostasis: reduces a level of proinflammatory cytokines IL-6 and TNF-α in blood serum.

REFERENCES

1. Гришин М. Н. Реабилитация больных, оперированных по поводу хронических неспецифических заболеваний легких: дис... доктора мед. наук: спец. 14.01.27 / М. Н. Гришин. - Симферополь, 2000. – 324 с.

2. Михеев А. В. К вопросу оценки тяжести эндогенной интоксикации у больных с гнойно-деструктивными поражениями легких и плевры / А.В. Михеев, С. Н. Трушин // Фундаментальные исследования. – 2004. – № 4 – С. 75–76.

3. Чазова И. Е. Первые результаты Российской программы «Апрель» (Эффективность применения акарбозы у пациентов с нарушенной толерантностью к глюкозе и артериальной гипертонией) / И.Е. Чазова, В. Б. Мычка, Ю. Н. Беленков // Ожирение метаболическое. – 2005. – № 1 (3). – С. 13–21.

4. Черешнев В. А. Фундаментально-прикладные аспекты системного воспаления с позиции теории физиологических и типовых патологических процессов / В. А. Черешнев, Е. Ю. Гусев, Н. В. Зотова / / Российский физиологический журнал. – 2010. – Т. 96, № 7. – С. 696–707.

5. Agusti A. Neff lecture. Chronic obstructive pulmonary disease: a systemic disease / A. Agusti, A. Thomas // Proc. Am. Thorac. Soc. – 2006. – Vol. 3. – P. 478–481.http://erj.ersjournals.com/cgi/ijlink?linkType=FULL&journalCode=procats&resid=3/6/478

6. Fantuzzi G. Adipose tissue, adipokines, and inflammation / G. Fantuzzi // J. Allergy Clin. Immunol. – 2005. – Vol. 115. – P. 911–919.