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EPIDEMIOLOGY OF AGE-RELATED ANDROGEN DEFICIENCY IN PATIENTS WITH BENIGN PROSTATIC HYPERPLASIA

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Abstract. Every fourth patient at the age of 50 years, every third patient at the age of 60 years, every second man at the age of 70 years and almost everyone (90%) older than 80 years have Benign prostatic hyperplasia (BPH). Lower urinary tract symptoms developing against the background of BPH are often connected both with manifestations of the hyperplasia of a prostate, and with the age androgenic deficiency (AAD). Aim: To determine the frequency of emergence of age androgenic deficiency of patients with Benign prostatic hyperplasia (BPH). Materials and Methods: 180 patients with clinical signs of Benign prostatic hyperplasia have been examined. All patients were conducted with standard clinical examination: survey, measurement of International prostate symptom score (IPSS), assessment of quality of life (QOL). The research of the androgenic status of patients included clinical assessment of deficiency of androgens with the use of the standard international questionnaire: "The questionnaire of Aging Males' Symptoms" (AMS) and hormonal blood test with determination of level of the general testosterone, follicle-stimulating and luteinizing hormones. Results: There were 118 patients with the low level of the general testosterone (T_{gen}) (67,7%) of all people. An average level of T_{gen} was 8,74 ± 0,9 nmol/l. In group of patients with low testosterone the GPA (grade point average) on a scale of AMS was 47,3 ± 9,1. Patients with BPH and AAD frequently have the accompanying pathology which is generally presented in such diseases as arterial hypertension, a metabolic syndrome, coronary heart disease, diabetes of the II type, anurolithic disease. Conclusions: Monitoring of the T_{gen} level is necessary for patients with BPH. Considering the high risk of a combination of BPH with the deficiency of testosterone it is necessary to include in the standard scheme of inspection the hormonal blood test with determination of the T_{gen} level.

Key words: benign prostatic hyperplasia, testosterone, age, androgen deficiency, metabolic syndrome

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Benign prostatic hyperplasia (BPH) is the most widespread urological disease of men of the advanced age [1—3]. According to modern writers every fourth patient at the age of 50 years, every third patient at the age of 60 years, every second man at the age of 70 years and almost everyone (90%) older than 80 years have BPH [2, 4—6]. BPH isn't a threat of life of the patient, but its clinical manifestations considerably reduce quality of life [4, 6—8]. As a rule, BPH is clinically shown in the form of disorder of quality of urination [1, 2, 9]. Despite the medical importance of BPH, pathogenesis of this disease up to the end remains not clear [1, 4—6, 10]. Many urologists specify in the researches that BPH is a multiple-factor disease: violation of balance of estrogen and androgens, chronic inflammation, metabolic syndrome, oxidative stress, etc. [7, 11—14].

Lower urinary tract symptoms developing against the background of BPH are often connected both with manifestations of the hyperplasia of a prostate, and with an age androgen deficiency (AAD), being at the same time compensatory reaction which is directed to increase the production of 5α-DHT, against the background of the reduced level of testosterone [15—17]. According to H.Y. Ngai et al. AAD meets in 26.5% of cases of men with clinical manifestations of lower urinary tract symptoms (LUTS) during BPH [18].

Not always drug treatment of patients with BPH yields satisfactory results [1, 6, 13, 19, 20]. Influence of age decrease of androgens on a clinical process of BPH is not well- studied now.

The aim of the study wasto determine the frequency of emergence of age androgenic deficiency of patients with benign prostatic hyperplasia (BPH).

MATERIALS AND METHODS

180 patients with clinical symptoms of benign prostatic hyperplasia (BPH) have been examined. The protocol of the real research has been approved by the decision of local ethical committee and also corresponds to the Helsinki declaration [21]. Consent of Patients to a Research has been received.

All patients were conducted with standard clinical examination: survey, measurement of International prostate symptom score on a 35-ball scale (IPSS), assessment of quality of life on a 6-ball scale (QOL), a manual rectal research. We carried out laboratory methods of research: the general blood test with a haemo syndrome, the general analysis of urine, the biochemical blood test including determination of level of glucose of blood, electrolytes, urea, creatinine, the general protein, cholesterol, triglycerides, determination of level of the prostates of specific antigen (PSA).

The research of the androgenic status of patients included clinical assessment of deficiency of androgens with the use of the standard international questionnaire: "The questionnaire of Aging Males' Symptoms" (AMS) and hormonal blood test. Hormonal blood test included determination of level of the general testosterone (T_{gen}), an estradiol, Prolactinum and the level of gonadotropic hormones of a hypophysis: follicle-stimulating (FSG) and luteinizing (LG) hormones and for differential diagnostics of character of the available gipogonadizm.

Ultrasound investigation of nephros, prostate gland, urinary bladder, with evaluation of amount of residual urine was carried out by a standard technique on the device "VolusonE 8" GE with the convex sensor with a frequency of 3,5 MHz [22, 23].

Results of the research have been subjected to statistical processing (Statistics program 6,0) with respect for criterion Mann-Whitney. The reliable difference was 95% ($p < 0,05$).

RESULTS AND DISCUSSION

All examined patients were older than 50 years. Average age of patients was 64 ± 8 years. Distribution of patients on age is presented in Table 1.

For the purpose of AAD identification biochemical blood test with definition of a hormonal profile was made to patients. Thus, there were 118 patients with the low level of the general testosterone (67,7%) that we have regarded as AAD. Other patients with BPH — 62 (32,3%) have been estimated as normogonadotropic and became group of control. Results of hormonal blood test of patients with BPH And AAD are presented in Table 2.

Table 1 / Таблица 1

Distribution of the examined patients on age (N = 180) / Распределение обследуемых пациентов по возрасту (N = 180)

Number	Age					
	50—54 years	55—59 years	60—64 years	65—69 years	70—74 years	75—80 years
n	7	24	35	39	46	29
%	3,8	13,3	19,4	21,6	25,5	16,1

Table 2 / Таблица 2

Results of hormonal blood test /
Результаты гормонального исследования крови

	T_{oen} nmol/l	LG nmol/l	FSG ME/ml	estradiol ME/ml	Prolactinum pg/ml
Normal indicators	19,2 ± 1,1	8,6 ± 1,2	6,3 ± 0, 7	58,9 ± 17	5,0 ± 1,2
BPH + AAD	8,74 ± 0,9	9,3 ± 1,8	7,0 ± 0,4	51,4 ± 12	4,8 ± 0,7
P	p < 0,05	p > 0,05	p > 0,05	p > 0,05	p > 0,05

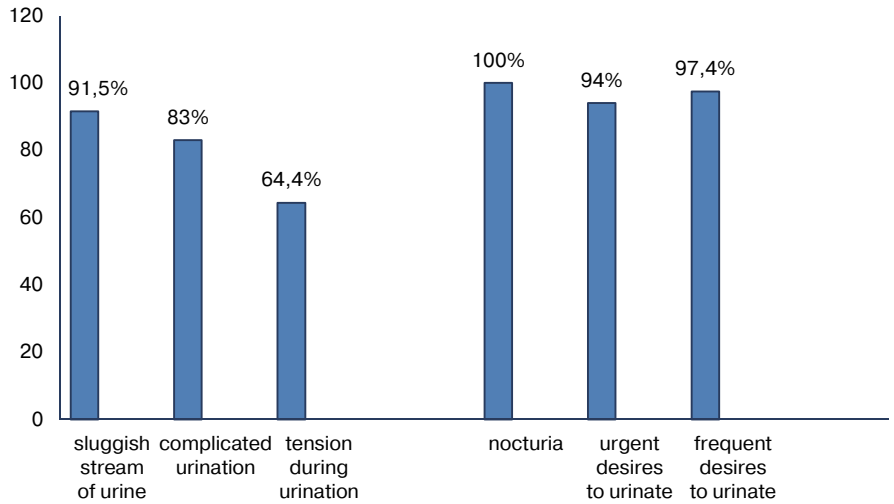

Fig. 1. Clinical manifestations of BPH against the background of age androgenic deficiency (Irritant symptoms of abnormality of urination of patients with BPH in combination with AAD prevailed over obstructive (p < 0,05)) /

Рис. 1. Клинические проявления ДГПЖ на фоне возрастного андрогенного дефицита (у пациентов с ДГПЖ в сочетании в ВАД преобладали ирритативные симптомы нарушения мочеиспускания над обструктивными (p < 0,05))

The GPA of group of patients with BPH and normal level of testosterone according to the questionnaire of AMS was 28,0 ± 6,3. In the group of patients with low testosterone the GPA on a scale of AMSwas 47,3 ± 9,1 (p < 0,05).

Further we represent results of clinical trial of group of patients with BPH against the background of age androgenic deficiency. The average level of PSA was 2,8 ± 0,6 ng/ml. The GPA on a scale of IPSS was 17,4 ± 4,2. All men estimated the quality of life, on Qol scale as unsatisfactory, an average value — 4,2 ± 0,6 points. Clinical manifestations of BPH against the background of age androgenic deficiency are presented in the figure 1.

Irritant symptoms of abnormality of urination of patients with BPH in combination with AAD prevailed over obstructive.

According to ultrasonography the Volume of prostate gland was 62,7 ± 12,6 cm^3, the size of adenomatous knots — 14,9 ± 2,1 cm^3, the volume of residual urine — 48,6 ± 23,4 cm^3.

In group of patients with BPH and deficiency of testosterone 109(92,3%) violations of an erection have been revealed. The GPA on a scale of MIEF-5 was 12 ± 5 points.

Among patients with BPH and low level of testosterone the following associated diseases occurred more often: the arterial hypertension (AH) — 59 people (43,7%) diabetes of the II type (SD) — 19 (14%) men, the metabolic syndrome (MS) is revealed at 75 (5%). Frequency of associated diseases of patients with BPH and ADD is presented in table 3.

Table 3 / Таблица 3

**Frequency of associated diseases of patients with AAD /
Частота заболеваний, ассоциированных с возрастным андрогенным дефицитом (ВАД)**

Number of patients	Diseases						
	CHD	AH	Diabetes of the II type	MS	Chronic prostatitis	USD	Chronic bronchitis
n	17	64	32	96	45	28	5
%	14,4	54,2	27,1	81,3	38,1	23,7	4,2

Influence of low level of testosterone on progressing of BPH can be explained with the fact that AAD leads to violation of mechanisms of regulation in the system of a gonad — a hypophysis — a hypothalamus.

It is known that besides age decrease in level of testosterone in blood, men with BPH have a decreasing number of androgen receptors. The last, in turn, strengthens the clinical manifestations of AAD and the related processes in an organism.

Multifactorial effect of testosterone is characterized by the range of the metabolic violations developing owing to its deficiency. A variety of a clinical picture of age androgenic deficiency is explained by structurally functional changes in many bodies and systems (a reproductive system, the central nervous system, bones and muscles). Therefore decrease of testosterone leads not only to sexual, but also to other somatic violations which potentially impact on quality of life of patients.

The most of modern writers agrees in opinion that progression of BPH is a consequence of an imbalance of the circulating sex hormones in the course of aging of a male body.

CONCLUSION

Men with Benign prostatic hyperplasia and age androgenic deficiency meet in 67,7% of cases. Therefore, monitoring of the level of testosterone is necessary for patients with BPH. Considering the high risk of a combination of BPH with deficiency of testosterone it is necessary to include in the standard scheme of inspection hormonal blood test with determination of level of the general testosterone. Patients with BPH and AAD have the accompanying pathology which is generally presented by such diseases as arterial hypertension, metabolic syndrome, coronary heart disease, diabetes of the II type, urinary stone disease more often.

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ЭПИДЕМИОЛОГИЯ ВОЗРАСТНОГО АНДРОГЕННОГО ДЕФИЦИТА У ПАЦИЕНТОВ С ДОБРОКАЧЕСТВЕННОЙ ГИПЕРПЛАЗИЕЙ ПРЕДСТАТЕЛЬНОЙ ЖЕЛЕЗЫ

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Доброкачественная гиперплазия предстательной железы (ДГПЖ) встречается у каждого четвертого пациента в возрасте 50 лет, у каждого третьего пациента в возрасте 60 лет, у каждого второго мужчины в возрасте 70 лет и почти у каждого (90%) старше 80 лет. Симптомы заболеваний нижних мочевыводящих путей, развивающиеся на фоне ДГПЖ, зачастую связаны как с проявлениями самой гиперплазии простаты, так и с возрастным андрогенным дефицитом (ВАД). Цель. Определить частоту возникновения возрастного андрогенного дефицита у пациентов с доброкачественной гиперплазией предстательной железы. Материалы и методы. Были обследованы 180 пациентов с клиническими

признаками доброкачественной гиперплазии предстательной железы. Всем пациентам проводилось стандартное клиническое обследование: осмотр, измерение суммарного балла по международной системе суммарной оценки симптомов при заболеваниях предстательной железы (IPSS), оценка качества жизни (QoL). Исследование андрогенного статуса пациентов включало клиническую оценку дефицита андрогенов с использованием стандартной международной анкеты: «Опросник возрастных симптомов мужчины» (AMS — AgingMales' Symptoms) и гормональное исследование крови с определением уровня общего тестостерона, фолликулостимулирующего и лютеинизирующего гормонов. Результаты. Пациентов с низким уровнем общего тестостерона ($T_{общ}$) было 118 (67,7%) человек. Средний уровень $T_{общ}$ у них был 8,74 ± 0,9 нмоль/л. В группе пациентов с низким тестостероном средний балл по шкале AMS составил 47,3 ± 9,1. У пациентов с ДГПЖ и ВАД чаще встречается сопутствующая патология, в основном представленная такими заболеваниями, как артериальная гипертензия, метаболический синдром, ишемическая болезнь сердца, сахарный диабет II типа, мочекаменная болезнь. Заключение. Для пациентов с ДГПЖ необходим мониторинг уровня $T_{общ}$. Учитывая высокий риск сочетания ДГПЖ с дефицитом тестостерона необходимо в общепринятую схему обследования включать гормональное исследование крови с определением уровня $T_{общ}$.

Ключевые слова: доброкачественная гиперплазия предстательной железы, тестостерон, возраст, андрогенный дефицит, метаболический синдром

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