THE ROLE OF PROSTAGLANDIN E2 IN THE MECHANISMS OF MINERAL METABOLISM DISORDERS IN MEN WITH ANDROGEN DEFICIENCY

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Abstract. Relevance of the issue. Osteoporosis in men is one of the most important medical and social problems. According to statistical data, cases of disability and death due to osteoporosis are 2 times higher in men than in women. In the process of aging, the body begins to experience androgen deficiency. About 20 years ago, a new field in medicine appeared - osteoimmunology, which studies the interaction of the immune system and bone systems in normal and pathological conditions. Advances in osteoimmunology have fundamentally changed our understanding of the pathogenesis of human skeletal diseases, including osteoporosis. In this work, we studied the role of cytokines in the processes of mineral metabolism disorders in men with androgen deficiency.

Material and methods. The study was conducted in the multidisciplinary clinic of the Tashkent Medical Academy. 49 men were involved in the study. 8 of them were taken as a control group. The men who participated in the study were divided into two groups according to their age. Group 1 is men aged 22-35; Group 2 is men aged 36-60. Each group was divided into groups according to body mass index.

Conclusion. Androgen deficiency through the progressive development of visceral obesity, which exacerbates the impact on the imbalance in the immunological response system, acts as a high risk factor for the formation of mineral metabolism disorders in obese men. Visceral obesity in men contributes to the development of non-specific systemic inflammation, activation of the cytotoxic link of the immune system, increased synthesis of interleukin-1 and prostaglandin E2 y, which is clearly manifested in men in the 2nd period of maturity. Hyperproduction of pro-inflammatory cytokines and, consequently, prostaglandin E2, which increases significantly against the background of androgen deficiency, contributes to an imbalance in mineral metabolism.

Key words: Prostaglandin E2, Il-6, androgen deficiency

Абстракт. Актуальность. Остеопороз у мужчин является одной из важнейших медико-социальных проблем. По статистическим данным, случаи инвалидности и смерти от остеопороза у мужчин в 2 раза выше,

чем у женщин. В процессе старения организм начинает испытывать дефицит андрогенов. Около 20 лет назад появилось новое направление в медицине - остеоиммунология, изучающая взаимодействие иммунной и костной систем в норме и при патологии. Успехи остеоиммунологии в корне изменили наши представления о патогенезе заболеваний скелета человека, включая остеопороз. В данной работе изучена роль цитокинов в процессах нарушения минерального обмена у мужчин с андрогенным дефицитом.

Материал и методы. Исследование проводилось в многопрофильной клинике Ташкентской медицинской академии. В исследовании приняли участие 49 мужчин. 8 из них были взяты за контрольную группу. Мужчины, принявшие участие в исследовании, были разделены на две группы в зависимости от их возраста. 1 группа – мужчины 22-35 лет; 2 группа – мужчины 36-60 лет. Каждая группа была разделена на группы в соответствии с индексом массы тела.

Заключение. Андрогенная недостаточность за счет прогрессирующего развития висцерального ожирения, усугубляющего влияние дисбаланса в системе иммунологического ответа, выступает фактором высокого риска формирования нарушений минерального обмена у мужчин с ожирением. Висцеральное ожирение у мужчин способствует развитию неспецифического системного воспаления, активации цитотоксического звена иммунной системы, усилению синтеза интерлейкина-1 и простагландина Е2 у, что отчетливо проявляется у мужчин во 2-м периоде зрелости. Гиперпродукция провоспалительных цитокинов и, следовательно, простагландина Е2, значительно возрастающая на фоне дефицита андрогенов, способствует дисбалансу минерального обмена.

Ключевые слова: простагландин Е2, ИЛ-6, дефицит андрогенов.

Abstrakt. Dolzarblik. Erkaklarda osteoporoz eng muhim tibbiy va ijtimoiy muammolardan biridir. Statistik ma'lumotlarga ko'ra, erkaklarda osteoporozdan nogironlik va o'lim holatlari ayollarga qaraganda 2 barobar yuqori. Taxminan 20 yil oldin tibbiyotda yangi yo'nalish paydo bo'ldi - normal va patologik sharoitlarda immunitet va suyak tizimlarining o'zaro ta'sirini o'rganadigan osteoimmunologiya. Osteoimmunologiya sohasidagi yutuqlar inson skeletlari kasalliklari jumladan, osteoporoz patogenezi haqidagi tushunchamizni tubdan o'zgartirdi. Ushbu tadqiqotda androgen yetishmovchiligi bo'lgan erkaklarda mineral almashinuvining buzilishi jarayonlarida sitokinlarning roli o'rganildi.

Materiallar va metodlar. Tadqiqot Toshkent tibbiyot akademiyasining ko‘p tarmoqli klinikasida o‘tkazildi. Tadqiqotda 49 erkak ishtirok etdi. Ulardan 8 nafari nazorat guruhi sifatida qabul qilindi. Tadqiqotda ishtirok etgan erkaklar yoshiga qarab ikki guruhga bo'lingan. 1-guruh - 22-35 yoshdagi

erkaklar; 2-guruh - 36-60 yoshdagi erkaklar. Har bir guruh tana massasi indeksiga ko'ra guruhlarga bo'lingan.

Xulosa. Semizlik tufayli kelib chiqadigan androgen defitsiti immun sistemasining skelet buzilishlariga negativ ta`sirini kuchaytirish orqali mineral buzilishlar xavfini oshiradi.

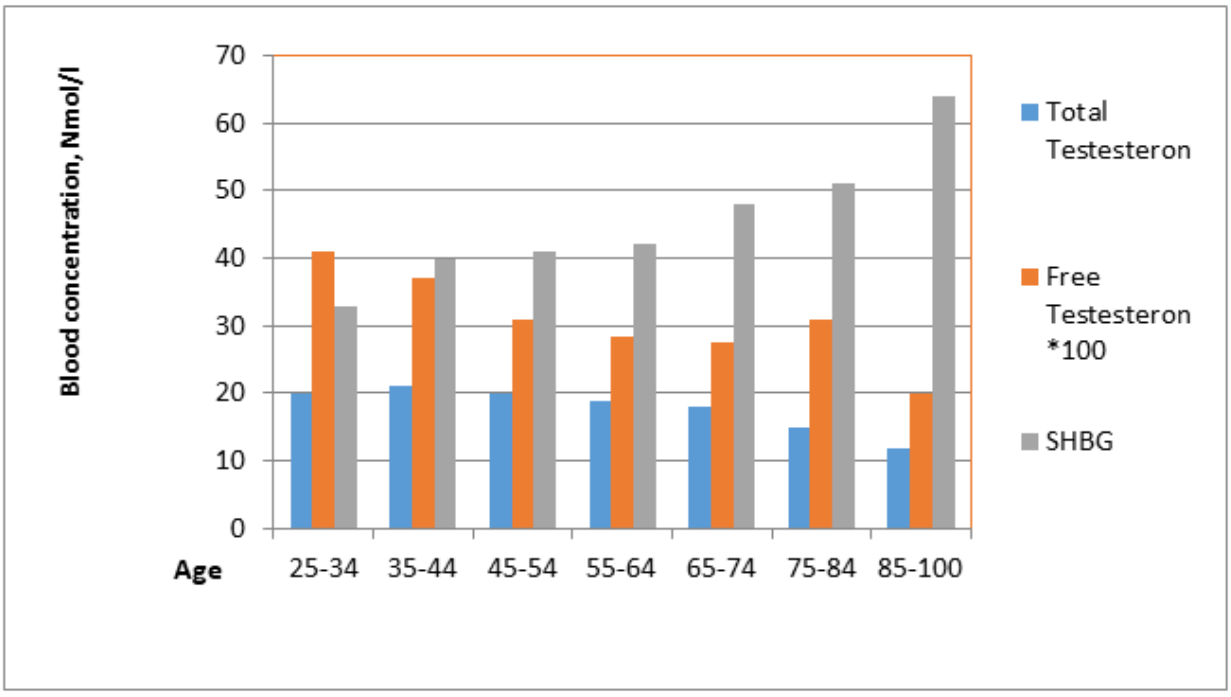
Semizlik noseptsefik yallig`lanish markeri Il-1 sintezini oshiradi, bu o'z navbatida PGE2 miqdorini oshiradi va bu yetuklikning 2 –davrida yaqqol namoyon bo'ladi.

Androgen defitsitlik fonida Il-1 va PGE2 ning sintezi kuchayib, mineral moddalar almashinuvini buzish orqali, turli kasalliklar osteoporoz kelib chiqish xavfini oshiradi, Il-1, PGE2 va osteoporoz orasidagi aniq korrelyatsiyani aniqlash qo'shimcha tadqiqotlarni talab etadi.

Kalit so'zlar: prostaglandin E2, IL-6, androgen yetishmovchiligi.

Introduction. Although a lot of research is being conducted in modern medicine on the bone system and its diseases and prevention, the problem of osteoporosis in men seems to be secondary. Osteoporosis in men is one of the most important medical and social problems. According to statistical data, cases of disability and death due to osteoporosis are 2 times higher in men than in women. In the process of aging, the body begins to experience androgen deficiency.

Androgen deficiency through aging

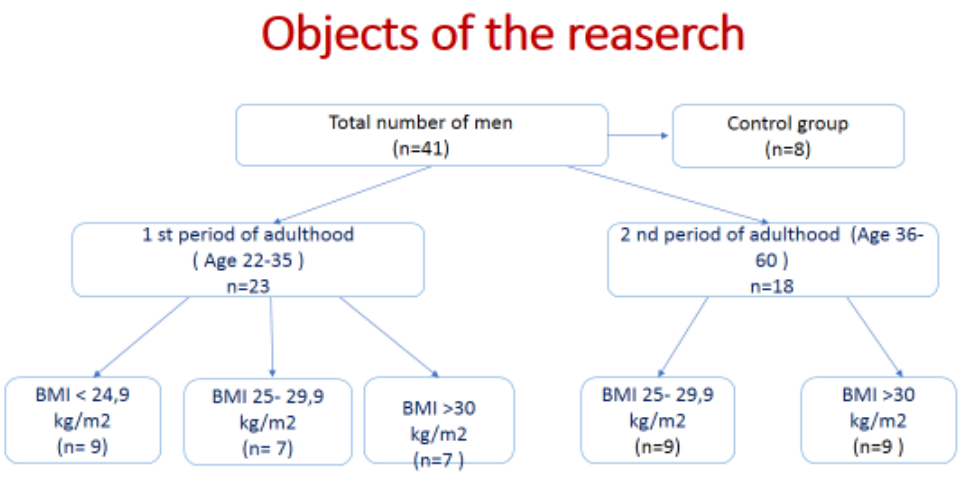


Due to the frequent occurrence of mineral metabolism disorders in men with androgen deficiency, it is urgent to study the molecular mechanisms of this pathological process and search for new pathogenetic links. Because it increases the chances of treatment.

About 20 years ago, a new field in medicine appeared - osteoimmunology, which studies the interaction of the immune system and bone systems in normal and pathological conditions. Advances in osteoimmunology have fundamentally changed our understanding of the pathogenesis of human skeletal diseases, including osteoporosis. In this work, we studied the role of cytokines in the processes of mineral metabolism disorders in men with androgen deficiency.

The purpose of the study: to study the importance of Prostaglandin E2 in mineral metabolism disorders in androgen deficient men. Studying the effect of inflammatory processes, body mass increase on the state of androgen content in this process.

Materials and methods. The study was conducted in the multidisciplinary clinic of the Tashkent Medical Academy. 49 men were involved in the study. 8 of them were taken as a control group. The men who participated in the study were divided into two groups according to their age. Group 1 is men aged 22-35; Group 2 is men aged 36-60. Each group was divided into groups according to body mass index.



Patients with diseases such as gastrointestinal diseases, kidney diseases, primary osteoporosis and men taking glucocorticoids were not included in the study.

Results and their analysis. According to the results obtained from the patients, free testosterone decreased with age and the amount of sex hormone-binding globulin increased. In addition, in the 2nd period of maturity, the amount of FSG increases and the amount of triglycerides in the blood also increases (Table 1).

Table-1

Indicators	Control n=8	Periods of adulthood	
		1 st period (Age 22-35) n=23	2 nd period (Age 36-60) n=18
Free testesteron nmol/l	21,14±1,75	17,38±0,04	9,25±0,12
Sex hormone-binding globulin, nmol/l	56,71±3,41	34,53±2,90	37,16±2,92
Prolactin, ng/ml	7,43± 0,51	8,15±0,45	8,33+0,34
FSH, mIU / ml	5,58±0,23	9,72±0,41	14,13±0,19
TSH, IU d/l	1,28±0,11	1,66±0,15	1,68±0,12
Triglycerides, mmol/l	1,63±0,09	1,42±0,10	2,29±0,17
Insulin, μIU/ml	9,41±0,71	10,15±0,33	17,24±1,67
Glucose, mmol/l	5,24±0,72	4,83±0,10	5,68±0,16

In addition, bone metabolism markers were analyzed depending on age. According to him, in the 2nd period of maturity, the amount of parathyroid hormone and alkaline phosphatase in the blood increased, and the amount of ionized calcium in the blood decreased (Table 2).

Table-2

Indicators	Control n=8	1 st period of adulthood (Age 22-35) n=23	2 nd period (Age 36-60) n=26
Parathyroid hormone, pg/ml	42,81±2,74	78,6±3,44	102,23±4,31
Osteocalcin, ng/ml	22,53±1,47	36,27±2,15	51,62±2,73
Alkaline phosphatase, U/l	109,43±4,22	158,29±3,73	177,42±4,06
Ionized lcium, mmol/l	1,25±0,13	0,94±0,10	0,63±0,11

In the next analysis, indicators were analyzed depending on the body mass index. According to this, as the body mass increases, the amount of testosterone in the body decreases. In addition, in men in the 2nd period of maturity, the decrease

of testosterone in the body mass index is clearly manifested, because it depends on age and the increase in body mass (Table 3).

Table-3

Indicators	1 st period of adulthood (Age 22-35) n=23			2 nd period of adulthood (Age 36-60) n=26		Control n=8
	BMI < 24,9 kg/m2 (n= 9)	BMI 25- 29,9 kg/m2 (n= 7)	BMI>30 kg/m2 (n=7)	BMI 25-29,9 kg/m2 (n=11)	BMI>30 kg/m2 (n=15)	BMI < 24,9 kg/m2
Free testesteron nmol/l	21,84±1,75	21,1±1,59	11,3±1,03	17,38±0,04	9,25±0,12	21,14±1,75
SHBG nmol/l	56,71±3,41	47,36±2,63	46,72±2,21	34,53±2,90	27,16±2,92	56,71±3,41
Interleukin -1 normal <5 Pg/ml	2,50±0,66	4,94±1,18	6,01±1,18	5,5±1,12	6,6±1,08	2,48±0,6
Prostaglandin, pg/ml	80,15±3,28	167,62±3,71	185,66±4,4	351,4±4,36	380,66±3,6	78,15±3,28

Conclusion. Androgen deficiency through the progressive development of visceral obesity, which exacerbates the impact on the imbalance in the immunological response system, acts as a high risk factor for the formation of mineral metabolism disorders in obese men. Visceral obesity in men contributes to the development of non-specific systemic inflammation, activation of the cytotoxic link of the immune system, increased synthesis of interleukin-1 and prostaglandin E2 y, which is clearly manifested in men in the 2nd period of maturity. Hyperproduction of pro-inflammatory cytokines and, consequently, prostaglandin E2, which increases significantly against the background of androgen deficiency, contributes to an imbalance in mineral metabolism.

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