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RISK FACTORS FOR THE DEVELOPMENT OF PATHOLOGICAL PROCESSES IN THE STRUCTURES OF THE HIP JOINT

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The study included 160 patients with coxarthrosis of the III-IV radiological stages aimed at a total hip replacement for the period 2015–2018. Several variants of the course of the disease were identified, taking into account the age factor (group I), the post-traumatic factor (group II), the metabolic factor (group III) and the polyethological nature of the process (group IV). The number of patients in each group was 40 people. Upon admission to the hospital, all patients underwent a comprehensive examination using instrumental, physical, clinical, functional and laboratory research methods. The presence of excess body weight was determined based on BMI. In the presence of an age-related risk factor, coxarthrosis manifested much later than with the development of joint pathology of post-traumatic, metabolic and poly etiological genesis. Of the somatic diseases, arterial hypertension was most often found in patients with coxarthrosis, chronic heart failure, diabetes mellitus and varicose veins of the lower extremities were somewhat less common. When analyzing the incidence of diseases of the genitourinary system, chronic pyelonephritis was diagnosed in most cases. Hyperglycemia of 17.5 %and 37.5 %, respectively, were often diagnosed in these two groups, and the fasting glucose level was 5.3±0.06 mmol/l. It should be noted that there were no disorders in the functional state of the thyroid gland in patients of the second group.

Key words: corsarthrosis, prevalence, age, etiology, risk factors

Д.А. Насірлі

ФАКТОРИ РИЗИКУ РОЗВИТКУ ПАТОЛОГІЧНИХ ПРОЦЕСІВ У СТРУКТУРАХ ТАЗОСТЕГНОВОГО СУГЛОБУ

До дослідження було включено 160 пацієнтів із коксартрозом III-IV рентгенологічних стадій, спрямованих на тотальне ендопротезування кульшового суглоба за період 2015–2018 років. Було виділено кілька варіантів перебігу захворювання з урахуванням вікового фактора (I група), посттравматичного фактора (II група), метаболічного фактора (III група) та поліетиологічного характеру процесу (IV група). Кількість пацієнтів у кожній групі становила 40 осіб. Всім хворим під час вступу до стаціонару проводили комплексне обстеження із застосуванням інструментальних, фізикальних, клініко-функціональних та лабораторних методів дослідження. Наявність надлишкової маси тіла визначалося на підставі індексу ІМТ. За наявності вікового фактора ризику коксартроз маніфестував значно пізніше, ніж при розвитку суглобової патології посттравматичного, метаболічного та поліетіологічного генезу. З соматичних захворювань найчастіше у пацієнтів з коксартрозом виявлялися артеріальна гіпертонія, дещо рідше – хронічна серцева недостатність, цукровий діабет та варикозне розширення вен нижніх кінцівок. При аналізі частоти захворювання сечостатевої системи, в більшості випадків діагностувався хронічний пієлонефрит. У хворих з віковим та посттравматичним типом суглобової хвороби нерідко діагностувалася гіперглікемія 17,5% та 37,5%, відповідно, а рівень глюкози натще склав 5,3±0,06 ммоль/л.

Ключові слова: корсартроз, поширеність, вік, етіологія, фактори ризику

Diseases of the musculoskeletal system that have a negative impact on the health indicators of the population, an increase in their prevalence, an increase in the level of disability and disability over the past decade in almost all age and gender groups, as well as significant losses in socio-economic and psychological spheres, all this indicates the relevance of this problem for practical and scientific medicine. Analyzing world statistics, it can be argued that more than half of the world's population represent risk groups for diseases of the musculoskeletal system, in particular joint diseases with a clear tendency to increase epidemiological indicators [8]. The reason for the lack of sometimes due attention from public health specialists to this issue can be considered insufficient data on the prevalence of the pathology under study in each population in most countries of the world and the lack of comparable data obtained in different regions on the degree of influence of diseases of the musculoskeletal system on the main indicators of the quality of life of patients [10]. At the same time, the implementation of regular examinations makes it possible to identify the incidence of the disease among various groups and strata of the population and to

determine the etiopathogenetic role of various exo- and endogenous risk factors in the occurrence and development of pathology [2, 7]. Thus, the conducted epidemiological population studies provided reliable information and determined significant fluctuations and excellent indicators of morbidity in different countries of the world [4, 9, 14]. This, in our opinion, can be explained by the presence of many different genetic and environmental factors in each region. When assessing the prevalence of severe forms of pathology of the musculoskeletal system, it was found that hip arthrosis occupies one of the first places in the structure of pathology of large joints. It is also important to note here an increase in the frequency of disability depending on age and gender indicators, that is, the degree of disability increased with age [13]. Coxarthrosis occupies a leading place in the general structure of joint diseases in terms of incidence and terms of disability. In its occurrence, various causes are important, among which one can note a congenital violation of the normal anatomical shape, inflammatory diseases of the joint, dysplasia, post-traumatic factor represented by intra-articular fractures, dislocations, excessive loads with overload of the joint areas, as a result of which the cartilage loses hydrophilicity, becomes fibrous and loses its functional properties, that is, degeneration of cartilage, subchondral bone occurs [5, 11]. When studying the causes of the occurrence and development of the pathology understudy, an opinion was formed about the multifactorial etiology. Some scientists have grouped causal factors and singled out as a number of the most important risk factors that determine the nosological characteristics of the disease, metabolic disorders, hereditary diseases of bones and joints, old age, overweight, professional activity, joint injury and systemic diseases [2, 12].

The purpose of the study was a clinical assessment of the influence of risk factors on the manifestations of coxarthrosis.

Materials and methods. The work was carried out on the basis of the AMU Surgical Clinic, Baku. The study included 160 patients with coxarthrosis of the III–IV radiological stages (according to Kellgren and Lawrence, 1957), aimed at a total hip replacement for the period 2015–2018. The classification criteria of R.D. Althman et al. were used to make the diagnosis. (1991). The study was carried out in strict accordance with the bioethical norms recommended by the International Committee on Bioethics (UNESCO). Indications for total endoprosthetics were: poorly relieved joint pain, stiffness and significant restriction of motor activity, radiologically – III–IV stages of coxarthrosis. Criteria for inclusion of patients in the study: the presence of coxarthrosis and voluntary written informed consent to participate in the study.

When studying the most common risk factors for the development of coxarthrosis, we identified several variants of the course of the disease, taking into account the age factor (group I), post-traumatic factor (group II), metabolic factor (group III) and the polyethological nature of the process (group IV). The number of patients in each group was 40 people. There were more female representatives in the study groups than men. Upon admission to the hospital, all patients underwent a comprehensive examination using instrumental, physical, clinical, functional and laboratory research methods.

Table 1

Criteria for inclusion of patients in groups

Groups of patients	Associative connection of possible etiological factors with real-life situations			Distribution of patients by gender		
	Age Older 50 years	Obesity (BMI ≤30 m/kg 2) and/or MS	Prior knee injury	Males	Females	Total
Group I (n=40)	+	-	-	15 (37.5 %)	25 (62.5 %)	40 (25 %)
Group II (n=40)	+	-	+	12 (30 %)	28 (70 %)	40 (25 %)
Group III (n=40)	+	+	-	7 (17.5 %)	33 (82.5 %)	40 (25 %)
Group IV (n=40)	+	+	+	8 (18 %)	32 (82 %)	40 (25 %)
Total				42 (26.3 %)	118 (73.7 %)	160 (100 %)

The presence of excess body weight was determined on the basis of BMI in accordance with the recommendations of the World Health Organization (WHO) by the ratio of the patient's body weight (kg) to the square of his height (m). At the same time, an index equal to 16 or less kg/m2 was interpreted as a pronounced body weight deficit; 16-18.5 kg/m2 – insufficient body weight; 18.5–24.9 kg/m2 – norm; 25–30 kg/m2 – overweight, 30–35 kg/m2 – obesity of the first degree, 35–40 kg/m2 – obesity of the second degree, 40 or more kg /m2 – obesity of the third degree.

Statistical data processing was carried out using the Statistica 7.0 application software package and the Excel 2013 standard statistical analysis package. Statistical methods included the estimation of the

arithmetic mean (M), the standard error of the mean (± m). Fisher's exact criterion was used to select the most informative features. The critical level of reliability of the null statistical hypothesis (about the absence of significant differences or factor influences) was assumed to be 0.05 ($p \leq 0.05$).

Results of the study and their discussion. When analyzing the main complaints of patients with coxarthrosis, the most characteristic clinical manifestations are more often revealed, in particular, the presence of pain, limited movement and a decrease in the main indicators of quality of life. The main criteria for the inclusion of patients in this study are presented in table 1.

The first group, taking into account the age factor, included patients with coxarthrosis older than 50 years without signs of obesity, that is, with normal weight and who had no history of a knee injury. By gender, 62.5 % of the total number of subjects in this group were female and 37.5 % were men. The average age of the patient at which the pathological process was detected for the first time in the first group was 57.5±0.65 years. In 30 (75.0 %) patients without previous surgical treatment and with an age-related etiological risk factor, for the development of a pathological process in the hip joint, there was an III radiological stage of coxarthrosis, in 10 (25.0 %) – stage IV. Clinical studies in this group revealed the presence of signs of inflammation of the inner layer of the joint capsule, that is, the synovial membrane, in 16 people (40.0 %). The average body mass index in this group was 28.3±0.15 [26–30] kg/m2, which corresponded to overweight, but with no signs of obesity. Almost similar data were recorded in the II group of prosthetic patients. In addition, with age-related and post-traumatic types of coxarthrosis, the indicators corresponded to excess body weight. More pronounced disorders in this aspect – the first degree of obesity, were observed in metabolic disorders and in group IV against the background of the presence of polyethological risk factors for the occurrence and development of the studied joint pathology – in both groups, obese patients prevailed (33.6±0.23 %and 34.2±0.24 %, respectively).

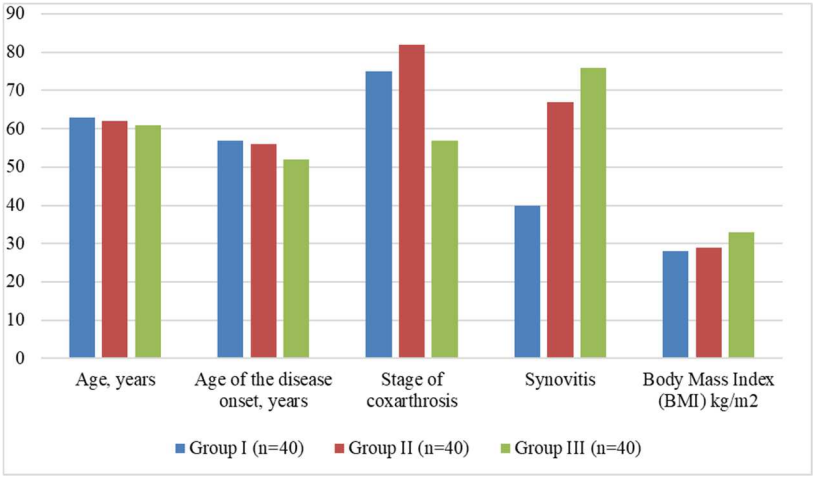

Fig. 1. Comparative analysis of anamnestic and clinical manifestations

Thus, a comparative assessment of the clinical features of coxarthrosis and a comparison of patients for each of the above signs revealed a number of trends and differences between the study groups, where certain differences were recorded in the following characteristics: gender, radiological stage, synovitis, body weight, as well as the frequency and structure of concomitant general somatic diseases. Thus, when analyzing the gender factor, it was revealed that women prevailed in all the studied groups.

Among cardiovascular diseases, coronary heart disease (CHD) among the examined patients of the first group was detected in 42.5 %of cases, that is, in 17 individuals. In a similar number of cases, patients with age-related coxarthrosis developed venous insufficiency of the lower extremities (table 2).

Diabetes mellitus was not observed in almost all patients with an age-related and post-traumatic type of joint disease, but, at the same time, hyperglycemia of 17.5 %and 37.5 %, respectively, were often diagnosed in these two groups, and the fasting glucose level was 5.3±0.06 mmol/L. It should be noted that there are no disorders in the functional state of the thyroid gland in patients of the second group.

In the course of the studies, the incidence of diseases in the bronchopulmonary system was estimated. At the same time, a comparative analysis of the data obtained did not reveal any sharp distinctive features in the indicators between all groups. Thus, against the background of an age-related risk factor for the development of coxarthrosis in the examined patients, pathology of the respiratory system in the form of chronic bronchitis was detected in 14 patients (35.0 %), which could not be said about cases of bronchial asthma diagnosis, which was not observed in the first group. Among the diseases of the gastrointestinal tract, chronic gastritis was detected in 23 prosthetic patients, that is, in more than half of the total number of examined persons. Almost half of the patients in the above group developed osteoporosis.

More than half of the patients with metabolic disorders, as one of the considered risk factors for the development of diseases of the hip joint, according to anamnesis and data from physical studies of internal organs, suffered from chronic diseases of the cardiovascular system and gastrointestinal tract. Thus, chronic gastritis in this group was much more common – 77.5 %, against 57.5 %, of the indices,

recorded in the first group (p<0.05). Clinical and instrumental signs of chronic cholecystitis were observed more often in patients of the second group with a history of metabolic disorders – 55.0 %. In the same group, hyperglycemia was diagnosed more often than the others. Chronic pyelonephritis and urolithiasis related to pathologies of the genitourinary system were most often found in the first and third groups of examined patients with coxarthrosis.

Table 2

Comparative analysis of the somatic background of patients with coxarthrosis

Index	Group I (n=40)	Group II (n=40)	Group III (n=40)	group IV (n=40)
Coronary heart disease	17 (42.5 %)	7 (17.5 %) *	23 (57.5 %)	12 (30.0 %)
Arterial hypertension	35 (87.5 %)	28 (70.0 %)	37 (92.5 %)	33 (82.5 %)
Chronic heart failure, stage	I – 9 (22.5 %) II – 5 (12.5 %)	I – 9 (22.5 %) II – 0 (0.0 %)	I – 18 (45.0 %) II – 9 (22.5 %)	I – 15 (37.5 %) II – 3 (7.5 %)
Pathology of veins	17 (42.5 %)	13 (32.5 %)	21 (52.5 %)	18 (45.0 %)
Glucose, mmol/l	5.3±0.06 (4.55–5.73)	5.5±0.05 (4.80–6.25) *	5.7±0.04 (4.93–6.00) *	5.3±0.06 (4.80–6.30)
Hyperglycemia	7 (17.5 %)	15 (37.5 %)	7 (17.5 %)	8 (20.0 %)
Diabetes mellitus	0 (0.0 %)	0 (0.0 %)	9 (22.5 %) *	10 (25.0 %) *
Hypothyroidism	11 (27.5 %)	0 (0.0 %)	5 (12.5 %)	11 (27.5 %)
Osteoporosis	20 (50.0 %)	6 (15.0 %)	9 (22.5 %) *	8 (20.0 %) *
Chronic bronchitis	14 (35.0 %)	13 (32.5 %)	14 (35.0 %)	14 (35.0 %)
Bronchial asthma	0 (0.0 %)	0 (0.0 %)	3 (7.5 %)	3 (7.5 %)
Chronic gastritis	23 (57.5 %)	22 (55.0 %)	31 (77.5 %)	31 (77.5 %)
Cholelithiasis	12 (30.0 %)	7 (17.5 %)	21 (52.5 %)	13 (32.5 %)
Chronic cholecystitis	11 (27.5 %)	22 (55.0 %) *	14 (35.0 %)	12 (30.0 %)
Chronic pancreatitis	18 (45.0 %)	13 (32.5 %)	25 (62.5 %)	17 (42.5 %)
Chronic pyelonephritis	17 (42.5 %)	12 (30.0 %)	21 (52.5 %)	11 (27.5 %)
Urolithiasis	9 (22.5 %)	5 (12.5 %)	7 (17.5 %)	5 (12.5 %)

Note: * – the difference in the indicator is statistically significant relative to the first group, p <0.05 (according to the exact Fischer test)

In a group-by-group comparative assessment of concomitant diseases of the cardiovascular system, a statistically significant difference in the indicators of coronary heart disease was found. Thus, lower rates were recorded in the second group of patients with posttraumatic coxarthrosis compared to both the first group and the other groups of patients – 17.5 %, versus 42.5 % of patients in the first group (p<0.05). Pathological changes in the veins of the lower extremities (varicose veins) were more often detected in patients with coxarthrosis developing against the background of metabolic disorders.

When assessing the gender factor, the predominance of women over men was revealed, which is consistent with the literature data that the hip joint is more often affected in women [6]. The average age of patients with an age-related risk factor for the development of joint disease, as well as the age of its initial clinical manifestations, exceeded those in the other three groups, that is, in the presence of an age-related risk factor, the disease manifested much later than with the development of joint pathology of post-traumatic, metabolic and poly etiological genesis. When determining the frequency of diagnosis of various radiological signs, stage IV coxarthrosis was detected more often in patients with metabolic disorders and with polyethological coxarthrosis. Analysis of the frequency of the inflammatory process in periarticular tissues revealed its high level in groups of elderly patients [1]. As in the works of foreign rheumatologists, in our work, one of the important evaluation criteria was BMI, according to which, in age-related and post-traumatic coxarthrosis, the indicators corresponded to overweight, with metabolic disorders and the presence of polyethological risk factors – the first degree of obesity [15].

Among the concomitant diseases, it is necessary to single out cardiovascular pathology, which occurs in the vast majority of patients and which clearly demonstrated the aggravation of clinical and functional manifestations with joint damage [3]. Cardiovascular diseases were less common in people with post-traumatic coxarthrosis. Arterial hypertension occurs most often in articular pathology, the risk factor for the development of which was metabolic disorders and age-related indicators. When assessing the phenomena of chronic heart failure, it was found that its signs were more common in patients of the third group. It should be noted that patients with post-traumatic risk factors (group III) were distinguished by the absence of persons burdened with diabetes mellitus among them, while in group IV, almost every fourth patient was ill with this somatic pathology.

When analyzing the state of the vascular venous bed of the lower extremities, varicose veins of the lower extremities were observed in all groups of patients, but relatively more often than others, this pathology was recorded in patients with metabolic disorders. The distribution of glucose on an empty stomach was relatively uniform, whereas when assessing hyperglycemia, the highest indicators were recorded in post-traumatic coxarthrosis. In the age-related etiological aspect, osteoporosis was more often observed, detected radiologically and by the presence of pathological fractures in the anamnesis. Pathological changes in the thyroid gland, accompanied by its hypofunction, were not detected in the second group of examined patients and were more often diagnosed in patients with polyethological variants of the development of the underlying pathology. Diseases of the respiratory system, in particular chronic bronchitis, were distributed in terms of occurrence relatively evenly between all groups of prosthetic patients.

Conclusion

Hip injuries and metabolic disorders are the main risk factors for the development and progression of coxarthrosis. With metabolic disorders and the presence of polyethological risk factors for the occurrence and development of the studied joint pathology, obese patients prevailed (33.6±0.23 % and 34.2±0.24 %, respectively).

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