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Pancreatic exocrine insufficiency impact on the course of osteoarthritis in comorbidity

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Abstract. The relationship between chronic diseases and osteoarthritis is a common phenomenon, especially among the elderly. Patients with osteoarthritis require an integrated approach that includes the collaboration of various medical specialists, such as general practitioners, rheumatologists, orthopaedic surgeons, gastroenterologists and traumatologists. The study aims to investigate the impact of diseases associated with exocrine pancreatic insufficiency on the course of primary osteoarthritis in comorbidity. A total of 304 patients with primary osteoarthritis and exocrine pancreatic insufficiency were analysed. All patients were divided into five groups depending on the type of concomitant pathology. The study determined that in the group of patients with primary osteoarthritis, a statistically significant improvement in the course of the disease according to various indicators, such as the radiological stage of osteoarthritis, functional joint failure, Lequesne index, and NSAID index, compared with those in the groups with other comorbidities, was present ($p<0.05$). This confirms the significant impact of the studied comorbidities on the course of primary osteoarthritis. The post-hoc analysis determined the ranking of the impact of comorbidities accompanied by exocrine pancreatic insufficiency on the clinical course of primary osteoarthritis by various indicators, such as the radiological stage of osteoarthritis, functional joint failure, Lequesne index, and the index of non-steroidal anti-inflammatory drugs. Ranking results: type 2 diabetes mellitus > chronic pancreatitis > hepatobiliary diseases > gastro-duodenal diseases ($p<0.05$). The study highlighted a mild exocrine insufficiency of the pancreas according to faecal α-elastase in the group of patients with isolated primary osteoarthritis. The study also established the ranking of the impact of pathologies accompanied by exocrine pancreatic insufficiency on the course of primary osteoarthritis by the level of faecal α-elastase: chronic pancreatitis < type 2 diabetes mellitus < hepatobiliary diseases < gastro-duodenal diseases ($p<0.05$). The results can be used in the clinical practice of doctors of various specialities: general practitioners, rheumatologists, gastroenterologists

Keywords: joint syndrome; functional insufficiency of the pancreas; gastroenterological diseases; type 2 diabetes mellitus

INTRODUCTION

The American College of Rheumatology (ACR) [1] describes osteoarthritis (OA) as a disease caused by biological and mechanical factors. These factors disrupt the normal balance between the processes of destruction and restoration of chondrocytes, the extracellular matrix of articular cartilage and subchondral bone [2, 3].

L.A. Michener *et al.* [4], and V. Duong *et al.* [5] described OA as a serious destructive and dystrophic disease that can affect any human joint, regardless of its structure and function. This disease has a chronic course with a tendency to exacerbate and progression of articular cartilage, other joint tissues and those surrounding it. A common outcome of OA

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progression is a complete loss of joint shape and function, which leads to disability. Currently, OA treatment aims to reduce symptoms, slowing progression and improving the quality of life of patients. There are no drugs that would cure this disease, which is a substantial medical problem, especially in the context of comorbidity with other diseases.

M.N. Wanjau *et al.* [6], B. Conley *et al.* [7], C.G. Boer *et al.* [8] have studied that the comorbidity of chronic diseases with OA is widespread, especially in adulthood. Patients with OA require the attention of specialists from various fields of medicine, such as general practitioners, rheumatologists, gastroenterologists, orthopaedic traumatologists, and surgeons. This is determined by the high integrative risk of developing acute conditions with the simultaneous use of medications that can cause complications. L.S. Babinets *et al.* [9], B. Wang *et al.* [10] demonstrate that osteoarthritis and pathology of the upper gastrointestinal tract are included in several comorbidity scales, such as FCI (Functional Comorbidity Index), Kaplan-Feinstein index and Burden Index – an index of total pain burden, which creates a global problem of prescribing medications, especially if gastroenterological pathology is accompanied by functional pancreatic insufficiency.

D.C. Whitcomb *et al.* [11] demonstrated that the main causes of exocrine pancreatic insufficiency (Pancreatic Exocrine Insufficiency, exPEI) are a decrease in the volume of pancreatic parenchyma, obstruction of the main pancreatic duct, reduced stimulation of exocrine pancreatic tissue and inactivation of pancreatic enzymes. ExPEI is divided into primary and secondary forms, so the pathogenetic variant of pancreatic insufficiency significantly affects the treatment strategy. The pathogenesis of exPEI is complex and involves many components. For successful treatment, exPEI pathogenesis analysis should be performed in each patient not only to prescribe enzyme replacement therapy but also to address other necessary aspects of treatment, such as the use of antisecretory agents, correction of intestinal composition, regulation of the microbiota, etc [12].

There are currently insufficient studies on the development and progression of exPEI under the influence of pain treatment in patients with OA and comorbidities accompanied by exPEI. This problem requires further study to better understand the relationship between the treatment of pain syndrome, OA, and the development and progression of exPEI in these patients. The study aims to investigate the impact of diseases accompanied by exocrine insufficiency on the course of primary osteoarthritis in comorbidity.

MATERIALS AND METHODS

The study analysed 304 patients with primary osteoarthritis who had concomitant diseases with exocrine pancreatic insufficiency, outside the period of exacerbation. These patients were registered at the Primary Health Care Centre in Ternopil from 2019 to 2021. For comparison, a group of 30 healthy individuals with no clinical or anamnestic data on joint and gastrointestinal (GI) diseases and no instrumental signs of such diseases was used. All patients underwent a detailed analysis of their complaints and anamnesis and underwent objective, laboratory and instrumental examinations.

The criteria for inclusion of patients in the study were both genders with a confirmed diagnosis of primary osteoarthritis and the presence of diseases accompanied by pancreatogenic, gastrogenic, hepatogenic, endocrine or enterogenic exocrine pancreatic insufficiency. Patients were excluded from the study if the following conditions were present: peptic ulcer of the stomach and duodenum, gastric malignancies, condition after dumping syndrome, cholelithiasis, liver cirrhosis, gastric resection, malignant liver tumours, viral hepatitis, cystic fibrosis, history of pancreatic resection, large cysts or tumours of the pancreas, condition after cholecystectomy, type I diabetes mellitus, subcompensated and decompensated type II diabetes mellitus, use of systemic glucocorticosteroids, celiac disease, ulcerative colitis, acute myocardial infarction, decompensation of cardiopulmonary diseases, chronic renal failure of stages III-V, rhythm disturbances, surgical intervention within the last month, pregnancy, thyroid pathology, severe exhaustion, bleeding disorders, mental and behavioural disorders, diseases of the blood and hematopoietic organs, hypertension of II-III degree, and refusal to participate in the study.

The diagnoses of osteoarthritis, chronic pancreatitis, non-stone cholecystitis, functional diseases of the gallbladder and biliary system, chronic gastritis and chronic duodenitis, and type 2 diabetes mellitus were made following the standards. Patients ranged in age from 25 to 77 years, with an average age of (52.47 ± 5.37) years. All study participants were divided into five groups according to the nature of the concomitant pathology accompanied by exocrine pancreatic insufficiency. Groups were formed following clinical and gender characteristics, severity of primary osteoarthritis and treatment.

Group 1 (OA) (n = 62) consisted of patients with primary osteoarthritis unaccompanied by any other pathology with exocrine pancreatic insufficiency.

Group 2 (OA + CP) (n = 59) included patients with primary osteoarthritis who also had chronic pancreatitis (CP) as a comorbidity.

Group 3 (OA + HBD) (n = 60) included patients with primary osteoarthritis who had biliary system diseases, such as chronic non-calcific cholecystitis, functional gallbladder disorders and others, accompanied by exocrine pancreatic insufficiency (hepato-biliary disease (HBD)).

Group 4 (OA + GDD) (n = 61) included patients with primary osteoarthritis who had chronic gastritis and chronic duodenitis (gastro-duodenal disease (GDD)).

Group 5 (OA + T2DM) (nv= 62) included patients with primary osteoarthritis and type 2 diabetes mellitus (T2DM).

An accepted classification was used to assess the radiological stage of osteoarthritis. Functional joint failure (FJF) was also determined according to the relevant criteria.

The NSAID index was also determined for each patient with primary osteoarthritis in comorbidity with diseases accompanied by exocrine pancreatic insufficiency. This index was calculated by counting the number of days during the year when the patient took the average therapeutic dose of NSAIDs to reduce the symptoms of primary osteoarthritis. The average therapeutic daily dose of NSAIDs was the average therapeutic dose: paracetamol – 2000 mg, ibuprofen – 1800 mg, ketoprofen – 200 mg, indomethacin – 100 mg, piroxicam – 15 mg, diclofenac – 100 mg, meloxicam – 10 mg, nimesulide – 150 mg, celecoxib – 300 mg. One day on which the average therapeutic dose of NSAIDs was taken was considered as

one point. The previous year's NSAID index, determined retrospectively, was compared to the current year's NSAID index, determined prospectively.

An enzyme-linked immunosorbent assay was used to determine the level of faecal α-elastase using standard branded kits. To assess the severity of primary osteoarthritis in the studied patients, the Lequesne algo-functional index was used [13]. This index is a self-reported questionnaire that includes questions divided into three main categories: pain or discomfort, the maximum distance for walking and performing daily activities.

The Shapiro-Wilk test was used to test whether the data distribution conforms to the normal distribution law. The mean value and standard error (M ± m) were used to describe the data. To test statistical significance, a significance level (p) of less than 0.05 was used. To assess differences between the means of three or more independent samples with a normal distribution, a one-way ANOVA was used, followed by a Tukey's post hoc HSD (Honestly Significant Difference) test to identify statistical differences. In cases where the distribution of samples differed from the normal distribution, the Kruskal-Wallis H-test One-Way Analysis of Variance and Dunn's criterion were used, followed by the Holm method.

The study was an open-label retrospective cohort comparative controlled dynamic case-control clinical trial. All studies were carried out in compliance with the main provisions of the Council of Europe Convention on Human Rights and Biomedicine, performed following the World Medical Association Code of Ethics (Declaration of Helsinki) of the World Medical Association on the Ethical Principles for Research Involving Human Subjects (as amended) [14], Order of the Ministry of Health of Ukraine No. 690 of 23.09.2009. All patients gave informed consent to participate in the study. The study was approved by the decision of the Bioethics Commission of the I. Horbachevsky Ternopil National Medical University of the Ministry of Health of Ukraine No. 75 of 1 November 2023.

RESULTS

The characteristics of the course of primary osteoarthritis among the study groups were analysed. The assessment of the duration of primary osteoarthritis and the number of affected joints in different groups did not reveal a statistically significant difference between these parameters (p>0.05), which confirms the homogeneity and comparability of the groups in terms of these characteristics.

However, the analysis of the radiological stages of primary osteoarthritis revealed a statistically significant difference between the study groups (p<0.05). The study determined that the first group of patients with isolated primary osteoarthritis had the lowest radiological stage compared to other groups with comorbidity of primary osteoarthritis and diseases accompanied by exocrine pancreatic insufficiency (p<0.05).

This indicates the influence of comorbidities on the course of primary OA. The radiological stage of primary OA in the fifth group was 16.00% higher than in the second group, 11.94% higher than in the third group, 14.20% higher than in the fourth group, and 16.56% higher than in the first group. During the post hoc analysis of the radiological stage of primary OA in the study groups, the impact rating of comorbidity was determined and prioritised: T2DM > CP > HBD > GDD (p<0.05) (Fig. 1).

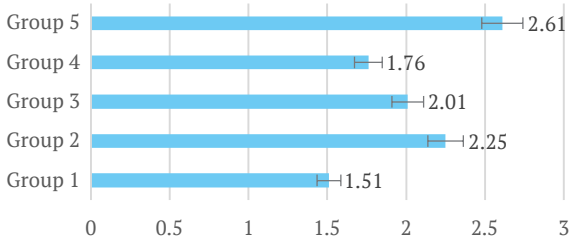

Figure 1. Radiological stage of OA in patients of the study groups
Source: compiled by the authors

The analysis of FJF in patients with primary OA revealed a statistically significant difference between these parameters in patients in different study groups (p<0.05), establishing that the lowest level of FJF was statistically significantly observed in patients of the first group who did not have concomitant pathology. This indicates a significant impact of comorbidities accompanied by exocrine pancreatic disease (ExPEI) on functional joint disability in patients with primary OA. The study also analysed the percentage difference between the groups of patients with comorbidity compared to the group with isolated primary OA in terms of FJF. FJF in patients of the fifth group was 22.37% higher compared to the second group, 24.59% higher compared to the third group, 24.49% higher compared to the fourth group, and 27.27% higher compared to the first group. The post hoc analysis showed that comorbidities accompanied by exPEI in primary OA had the following impact rating: T2DM > CP > HBD > GDD (p<0.05) (Fig. 2).

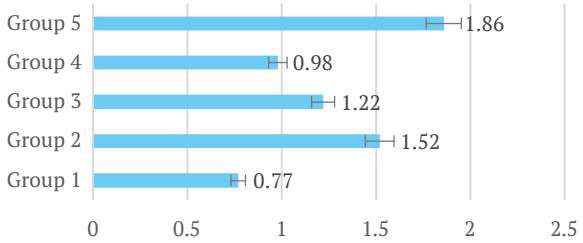

Figure 2. FJF in patients of the study groups
Source: compiled by the authors

In an analysis of the NSAID index, the study determined that in all study groups, this indicator was statistically significantly higher compared to the control group (p<0.001). In addition, the lowest statistically significant level of the NSAID index was observed in patients in the first group with isolated primary osteoarthritis compared with those with comorbidity, indicating a significant impact of comorbidity on the frequency of NSAID use. There was no statistically significant difference in the level of the NSAID index between the third and fourth groups (p>0.05). The percentage difference between the groups of patients with comorbidity and the group with isolated primary OA according to the NSAID index was also analysed.

It was also found that the NSAID index in the fifth group was 15.25% higher than in the second group, in the

second group it was 11.31% higher than in the third group, in the third group it was 2.35% higher than in the fourth group, and in the fourth group it was 12.94% higher than in the first group. As a result of the post hoc analysis, the rating of the impact of comorbid pathology accompanied by exocrine pancreatic insufficiency on the NSAID index was determined, addressing the priority: T2DM > CP > HBD >GDD ($p<0.05$) (Fig. 3).

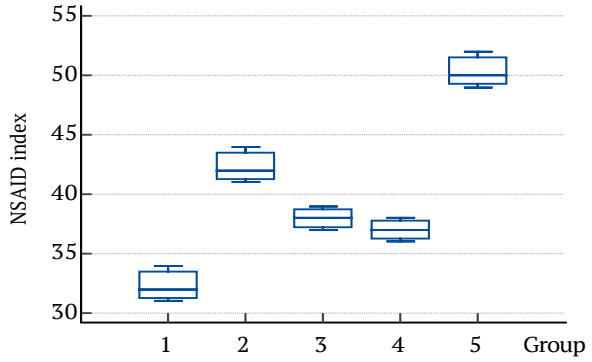

Figure 3. Confidence intervals of the NSAID index in the study groups of patients with primary OA
Source: compiled by the authors

The analysis of pancreatic exocrine insufficiency (ex-PEI) indices in groups of patients with primary osteoarthritis in the presence of comorbidities was performed. The study determined that the level of faecal α-elastase statistically significantly decreased in all study groups ($p<0.001$), indicating the presence of exocrine pancreatic insufficiency in all patients with primary osteoarthritis. A statistically significant decrease in faecal α-elastase levels was also found in the first group of patients with primary osteoarthritis without concomitant pathology compared to the control group. This decrease was consistent with a mild degree of exocrine pancreatic insufficiency, which can occur as a result of long-term use of medications for the treatment of osteoarthritis, such as NSAIDs, glucocorticoids, chondroprotectors and chondrostimulants. (Fig. 4).

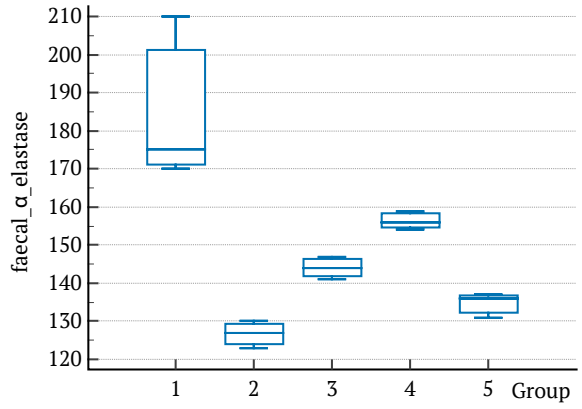

Figure 4. Confidence intervals of faecal α-elastase in patients of the study groups
Source: compiled by the authors

In the groups of patients with primary osteoarthritis in comorbidity with diseases accompanied by exocrine pancreatic insufficiency, a statistically significant difference between the levels of faecal α-elastase was found ($p<0.05$). The level of faecal α-elastase was 5.47% lower in the second group compared to the fifth group, 4.35% lower in the fifth group compared to the third group, 9.63% lower in the third group compared to the fourth group, and 12.82% lower in the fourth group compared to the first group. The rating of the influence of pathology accompanied by exocrine pancreatic insufficiency on the level of faecal α-elastase in patients with osteoarthritis was determined: CP > T2DM > HBD > GDD ($p<0.05$).

The results of the analysis of the Lequesne index showed a statistically significant increase in this indicator in all study groups compared to the control group ($p<0.001$). There was also a statistically significant difference in the level of this indicator between the different study groups ($p<0.05$). The lowest statistically significant level of the Lequesne index was observed in patients of the first group with isolated primary osteoarthritis compared with those with comorbidity ($p<0.05$), which confirms the effect of concomitant pathology accompanied by exocrine pancreatic insufficiency on the course of primary osteoarthritis according to the Lequesne index (Fig. 5).

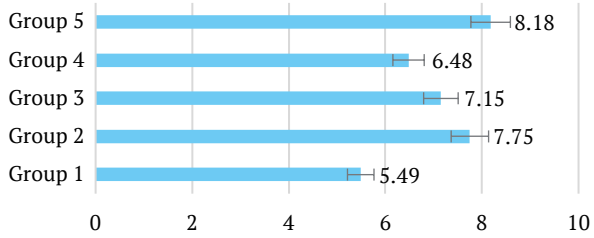

Figure 5. Lequesne index in patients of the study groups
Source: compiled by the authors

The percentage difference between the groups of patients with comorbidity and the group with isolated primary osteoarthritis according to the Lequesne index was analysed (Fig. 3). The individual index in Group 5 was 5.55% higher than in Group 2, 8.39% higher than in Group 2, 10.34% higher than in Group 3, and 18.03% higher than in Group 4. An additional post hoc analysis revealed the following rating of the impact of comorbid pathology accompanied by exocrine pancreatic insufficiency on the course of primary osteoarthritis according to the Lequesne index, which was determined by priority: T2DM > CP > HBD > GDD ($p<0.05$). Thus, the comorbidity of OA and diseases accompanied by exocrine pancreatic insufficiency has a mutually burdensome effect on the course of both OA and gastroenterological diseases, which should be addressed in the management of such patients and the selection of safe drugs for the treatment of the study patients.

DISCUSSION

In the context of comparative studies, scientists investigated the comorbidity of osteoarthritis and other diseases on the course and progression of diseases in the context of comorbidity in terms of OA stage, FJF, Lequesne index and

ExPEI in patients with the studied comorbidities. S. Swain *et al.* [15], L.K. King *et al.* [16] point out that comorbidity in patients with OA is indeed a serious problem, and the identification of the main groups of comorbidities may contribute to a better understanding and management of these conditions. The main groups are those that have prognostic significance, as they represent groups of diseases that can interact with each other and affect the course of OA and the treatment of this disease. The first group, related to cardiovascular and cerebrovascular diseases, can be particularly dangerous for patients with OA, as it includes conditions that can worsen osteoarthritis and increase the risk of complications. NSAIDs, which are widely used to treat OA, may be limited in their use in this group of patients, which raises questions about the choice of optimal therapy. The second group, related to digestive system disorders, can also have a significant impact on OA, as gastrointestinal problems cause additional restrictions on the use of medications and therapies. The third group, which includes metabolic disorders such as obesity and diabetes mellitus, is also important because these conditions can worsen the chronic course of OA and increase the risk of complications. The data obtained are consistent with the literature, which indicates the progression of osteoarthritis in patients with comorbid and polymorbid conditions in terms of OA stage, FJD, Lequesne and ExPEI index, as well as the NSAID index.

L.K. King [16], and L.K. King *et al.* [17] found that OA may have different common risk factors for different diseases. Most authors point out that the presence of comorbidity can be explained by advanced age, a risk factor for the development of OA and other diseases [15, 17]. It has also been studied that comorbid gastroenterological diseases contribute to the progression of the radiological stage of OA, FJF, and the Lequesne index stage of OA. The association of OA with gastrointestinal diseases is usually explained by the long-term use of analgesics, especially NSAIDs. An analysis of the literature revealed many studies that highlighted the association of OA with gastrointestinal diseases, and this comorbidity is usually explained by the long-term use of analgesics, especially NSAIDs. Studies have revealed uneven reporting of symptomatic gastrointestinal disorders, which requires proper diagnosis and reporting in patients with OA and their impact on OA stage, FJF, Lequesne index and ExPEI, and especially on changes in the NSAID index. L.K. King *et al.* [17] found that concomitant hypertension, gastrointestinal disease, depressed mood, and more problematic joint pain sites were associated with higher opioid use in Canadian patients with knee osteoarthritis.

Comorbidities that occur along with OA pose additional challenges and, according to many experts, often complicate the process of choosing a treatment. The risk of therapy failure increases if the patient has diabetes mellitus, arterial hypertension, chronic digestive tract diseases, depression or obesity, as well as a history of gastrointestinal bleeding, myocardial infarction or renal failure [18, 20, 21]. These diseases pose a risk of complications when using NSAIDs [21]. The results of this study are consistent with the literature, with the NSAID index. However, the development and progression of exocrine pancreatic insufficiency in OA is an issue that has not been sufficiently investigated and requires further research.

L.E. Diamond *et al.* [18], and A. Mobasheri *et al.* [19] studied the common pathogenic links between OA and comorbidities, which can be useful for improving the treatment of patients with comorbidity of several chronic conditions. This is a promising approach, as it demonstrates the general mechanisms of development and the impact of different diseases on each other. This integrated approach can lead to the development of more effective and individually tailored treatment plans for patients with comorbidity. Such research is also economically feasible, as improved treatment efficacy can reduce the cost of medical care and provide a more sustainable and less complex approach to managing chronic conditions in patients [20, 21]. The results of the study also indicate the need for special attention to patients with OA in comorbidity with diseases accompanied by exPEI, especially when prescribing therapeutic drugs.

A.L. Arruda *et al*. [22] investigated the common genetic determination between the development of osteoarthritis, type 2 diabetes mellitus and obesity and found a genetically mediated relationship between the increased likelihood of development and progression of all diseases in the setting of such comorbidity. The study of genetic determination of the development of comorbidities in OA is a promising area and is tangentially consistent with the results of our studies, as the influence of comorbid pathology on the stage of OA, FJF, Lequesne index and ExPEI was revealed.

The fact that the number and severity of comorbidities increase with age emphasises the need for more rapid and careful monitoring of patient's health in older age groups. In the presence of several chronic conditions, the risk of complications increases, the quality-of-life decreases, and the prognosis of the disease worsens. Interdisciplinary cooperation between doctors of different specialities is also important to ensure optimal treatment and prevent complications [19, 22]. The study of common pathogenic links between OA and comorbidities can be very useful for improving the treatment of patients with comorbidity of several chronic conditions. This is a promising approach, as it demonstrates the general mechanisms of development and the impact of different diseases on each other. This integrated approach can lead to the development of more effective and individually tailored treatment plans for patients with comorbidity. Such research is also economically feasible, as improved treatment efficacy can reduce the cost of medical care and provide a more sustainable and less complex approach to managing chronic conditions in patients. There are currently insufficient studies on the development and progression of exPEI under the influence of pain treatment in patients with OA and comorbidities accompanied by exPEI. This problem requires further study to better understand the relationship between the treatment of pain syndrome, OA, and the development and progression of exPEI in these patients.

CONCLUSIONS

The study determined that patients with isolated primary osteoarthritis had a statistically significant milder course of the disease in terms of such parameters as radiological stage of OA, FJF, Lequesne index and NSAID index compared with patients with comorbidity ($p<0.05$).

This indicates a significant impact of concomitant pathology accompanied by exocrine pancreatic insufficiency on the development of primary osteoarthritis in comorbidity. Additional analysis revealed a rating of the impact of comorbid pathology accompanied by exocrine pancreatic insufficiency on the clinical course of primary osteoarthritis according to the radiological stage of OA, FJF, Lequesne index and NSAID index, which was determined by priority: type 2 diabetes mellitus > chronic pancreatitis > hepatobiliary diseases > gastro-duodenal diseases ($p<0.05$). In addition, in the group of patients with isolated primary osteoarthritis, a mild degree of pancreatic exocrine insufficiency was detected by faecal α-elastase, which may be a consequence of the long-term treatment of OA with NSAIDs, glucocorticosteroids, chondroprotective and other drugs that have potentially toxic effects on the digestive tract and contribute to the development of gastroenterological diseases, including conditions accompanied by exocrine pancreatic insufficiency. The rating of the impact of pathology accompanied by exocrine pancreatic insufficiency on the course of primary osteoarthritis by the level of faecal α-elastase was established, which was as follows: chronic pancreatitis < type 2 diabetes mellitus < hepatobiliary diseases < gastro-duodenal diseases ($p<0.05$). The results of this study can be implemented in the clinical practice of doctors of various specialities to consider the peculiarities of osteoarthritis in comorbidity with diseases accompanied by functional pancreatic insufficiency. Further research should examine the genetic determination of comorbidities in OA and propose a comprehensive therapy for the studied comorbidity.

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None.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

[1] Kolasinski SL, Neogi T, Hochberg MC, Oatis C, Guyatt G, Block J, et al. 2019 American College of Rheumatology/arthritis foundation guideline for the management of osteoarthritis of the hand, hip, and knee. Arthritis Rheumatol. 2020;72(2):220–33. DOI: 10.1002/art.41142

[2] Abramoff B, Caldera FE. Osteoarthritis: Pathology, diagnosis, and treatment options. Med Clin North Am. 2020;104(2):293–11. DOI: 10.1016/j.mcna.2019.10.007

[3] Mehwish B, Ali SS, Mirza Baig AA. Effect of hip joint mobilisations and strength training on pain, physical function and dynamic balance in patients with Knee Osteoarthritis: A randomized controlled trial. J Pak Med Assoc. 2023;73(4):749–54. DOI: 10.47391/JPMA.6223

[4] Michener LA, Heitzman J, Abbruzzese LD, Bondoc SL, Bowne K, Henning PT, et al. Physical therapist management of glenohumeral joint osteoarthritis: A clinical practice guideline from the American Physical Therapy Association. Phys Ther. 2023;103(6):pzad041. DOI: 10.1093/ptj/pzad041

[5] Duong V, Oo WM, Ding C, Culvenor AG, Hunter DJ. Evaluation and treatment of knee pain: A review. JAMA. 2023;330(16):1568–80. DOI: 10.1001/jama.2023.19675

[6] Wanjau MN, Möller H, Haigh F, Milat A, Hayek R, Lucas P, et al. The potential impact of physical activity on the burden of osteoarthritis and low back pain in Australia: A systematic review of reviews and life table analysis. J Phys Act Health. 2023;20(8):690–1. DOI: 10.1123/jpah.2022-0541

[7] Conley B, Bunzli S, Bullen J, O'Brien P, Persaud J, Gunatillake T, et al. Core recommendations for osteoarthritis care: A systematic review of clinical practice guidelines. Arthritis Care Res. 2023;75(9):1897–7. DOI: 10.1002/acr.25101

[8] Boer CG, Hatzikotoulas K, Southam L, Stefánsdóttir L, Zhang Y, Coutinho de Almeida R, et al. Deciphering osteoarthritis genetics across 826,690 individuals from 9 populations. Cell. 2021;184(18):4784–18.e17. DOI: 10.1016/j.cell.2021.07.038

[9] Babinets LS, Migenko BO, Borovyk IO, Halabitska IM, Lobanets NV, Onyskiv OO. The role of cytocin imbalance in the development of male infertility. Wiad Lek. 2020;73(3):525–28. DOI: 10.36740/WLek202003123

[10] Wang B, Liu Y, Zhang YC, Han ZY, Hou JL, Chen S, et al. Assessment of causal effects of physical activity on the risk of osteoarthritis: A two-sample Mendelian randomization study. BMC Med Genomics. 2023;16(1):237. DOI: 10.1186/s12920-023-01681-x

[11] Whitcomb DC, Buchner AM, Forsmark CE. AGA Clinical practice update on the epidemiology, evaluation, and management of exocrine pancreatic insufficiency: Expert review. Gastroenterology. 2023;165(5):1292–1. DOI: 10.1053/j.gastro.2023.07.007

[12] Babinets LS, Shaihen OR, Homyn HO, Halabitska IM. Specific aspects of clinical course in case of combination of chronic pancreatitis and concomitant viral hepatitis C. Wiad Lek. 2019;72(4):595–99

[13] Nilsdotter A, Bremander A. Measures of hip function and symptoms: Harris Hip Score (HHS), Hip Disability and Osteoarthritis Outcome Score (HOOS), Oxford Hip Score (OHS), Lequesne Index of Severity for Osteoarthritis of the Hip (LISOH), and American Academy of Orthopedic Surgeons (AAOS) Hip and Knee Questionnaire. Arthritis Care Res. 2011;63(Suppl 11):S200–S7. DOI: 10.1002/acr.20549

[14] Nawrot O. The biogenetical revolution of the Council of Europe – twenty years of the Convention on Human Rights and Biomedicine (Oviedo Convention). Life Sci Soc Policy. 2018;14:11. DOI: 10.1186/s40504-018-0073-2

[15] Swain S, Sarmanova A, Coupland C, Doherty M, Zhang W. Comorbidities in osteoarthritis: A systematic review and meta-analysis of observational studies. Arthritis Care Res. 2020;72(7):991–1000. DOI: 10.1002/acr.24008

[16] King LK. Osteoarthritis and comorbidity: Time for action. Osteoarthritis Cartilage. 2023;31(4):423–24. DOI: 10.1016/j.joca.2023.01.007

[17] King LK, Marshall DA, Jones CA, Woodhouse LJ, Ravi B, Faris PD, et al. Are medical comorbidities contributing to the use of opioid analgesics in patients with knee osteoarthritis?. Osteoarthritis Cartilage. 2020;28(8):1030–37. DOI: 10.1016/j.joca.2020.04.012
[18] Diamond LE, Grant T, Uhlrich SD. Osteoarthritis year in review 2023: Biomechanics. Osteoarthritis Cartilage. 2024;32(2):138–47. DOI: 10.1016/j.joca.2023.11.015
[19] Mobasheri A, Thudium CS, Bay-Jensen AC, Maleitzke T, Geissler S, Duda GN, et al. Biomarkers for osteoarthritis: Current status and future prospects. Best Pract Res Clin Rheumatol. 2023;37(2):101852. DOI: 10.1016/j.berh.2023.101852
[20] Sacitharan PK. Ageing and osteoarthritis. Subcell Biochem. 2019;91:123–59. DOI: 10.1007/978-981-13-3681-2_6
[21] Kloppenburg M, Kroon FP, Blanco FJ, Doherty M, Dziedzic KS, Greibrokk E, et al. 2018 update of the EULAR recommendations for the management of hand osteoarthritis. Ann Rheum Dis. 2019;78(1):16–24. DOI: 10.1136/annrheumdis-2018-213826
[22] Arruda AL, Hartley A, Katsoula G, Smith GD, Morris AP, Zeggini E. Genetic underpinning of the comorbidity between type 2 diabetes and osteoarthritis. Am J Hum Genet. 2023;110(8):1304–18. DOI: 10.1016/j.ajhg.2023.06.010

Вплив екзокринної недостатності підшлункової залози на перебіг остеоартрозу за умов коморбідності

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Анотація. Взаємозв'язок між хронічними захворюваннями та остеоартрозом є звичним явищем, особливо серед людей похилого віку. Пацієнти з остеоартрозом потребують комплексного підходу, що включає співпрацю різних медичних спеціалістів, таких як лікарі загальної практики, ревматологи, ортопедичні хірурги, гастроентерологи та травматологи. Метою цього дослідження було вивчення впливу захворювань, пов'язаних з екзокринною недостатністю підшлункової залози, на перебіг первинного остеоартрозу в умовах коморбідності. Було проаналізовано 304 пацієнти з первинним остеоартрозом та екзокринною недостатністю підшлункової залози. Всіх пацієнтів було розподілено на п'ять груп залежно від типу супутньої патології. Досліджено, що у групі пацієнтів з чистою формою первинного остеоартрозу спостерігався статистично значимо полегшений перебіг захворювання за різними показниками, такими як рентгенологічна стадія остеоартрозу, функціональної недостатності суглобів, індекс Лекена, індекс нестероїдних протизапальних препаратів, порівняно з показниками у групах з іншими супутніми захворюваннями ($p<0,05$). Це підтверджує значний вплив досліджуваної супутньої патології на перебіг первинного остеоартрозу. Під час проведення постхок-аналізу було визначено ранжування впливу коморбідних захворювань, що супроводжуються екзокринною недостатністю підшлункової залози, на клінічний перебіг первинного остеоартрозу за різними показниками, такими як рентгенологічна стадія остеоартрозу, функціональна недостатність суглобів, індекс Лекена, та індекс нестероїдних протизапальних препаратів. Результати ранжування: цукровий діабет 2-го типу > хронічний панкреатит > гепато-біліарні хвороби > гастро-дуоденальні хвороби ($p<0,05$). Виявлено, що в групі пацієнтів з ізольованим первинним остеоартрозом була наявна легка екзокринна недостатність підшлункової залози за показником фекальної α-еластази. Також було встановлено ранжування впливу патологій, що супроводжуються екзокринною недостатністю підшлункової залози, на перебіг первинного остеоартрозу за рівнем фекальної α-еластази: хронічний пакреатит > цукровий діабет 2-го типу > гепато-біліарні хвороби > гастро-дуоденальні хвороби ($p<0,05$). Результати роботи можуть бути використані у клінічній практиці лікарів різних спеціальностей: лікарі загальної практики, ревматологи, гастоентерологи

Ключові слова: суглобовий синдром; функціональна недостатність підшлункової залози; гастроентерологічні захворювання; цукровий діабет 2-го типу