

PROCEEDINGS OF INTERNATIONAL CONFERENCE ON RESEARCH IN EDUCATION & SCIENCE

 **ICRES2024**

APRIL, 27-30

ANTALYA/TURKEY

EDITORS

MACK SHELLEY

OMER TAYFUR OZTURK





www.icres.net

Volume 1, Pages 1-2823

Proceedings of International Conference on Research in Education and Science

© 2024 Published by ISTES

ISBN: 978-1-952092-63-3

Editors: Mack Shelley & Omer Tayfur Ozturk

Articles: 1-174

Conference: International Conference on Research in Education and Science (ICRES)

Dates: April 27-30, 2024

Location: Antalya, Turkiye

Publication Date: December 01, 2024

Conference Chair(s):

Dr. Mack Shelley, Iowa State University, United States


Dr. Wilfried Admiraal, Leiden University, the Netherlands

Dr. I-Tsun Chiang, National Taiwan Normal University, Taiwan

Dr. Wenxia Wu, George Washington University, United States

Crohn`s Disease and Bechterew`s Disease in Practice of Surgeon- Proctologist and Rheumatologist

Olena Sulima

Dnipro City Hospital, Ukraine,  <https://orcid.org/0000-0002-6129-5207>

Volodymyr Sulyma

Dnipro State Medical University, Ukraine,  <https://orcid.org/0000-0002-8373-6480>

Ruslan Duka

Dnipro State Medical University, Ukraine,  <https://orcid.org/0000-0003-3962-8746>

Kateryna Yaroshenko

Dnipro State Medical University, Ukraine,  <https://orcid.org/0000-0002-0658-0486>

Serhij Malinovskyj

Dnipro State Medical University, Ukraine,  <https://orcid.org/0000-0002-5554-836X>

Abstract: In work analyzed clinical manifestations and treatment program in patients with Crohn`s disease (CD - regional enteritis as part of inflammatory gastrointestinal tract) and Bechterew`s disease (BD - ankylosing spondylitis, AS) in practice of surgeon-proctologist and rheumatologist. Crohn's disease, also known as Crohn syndrome and regional enteritis, is a type of inflammatory bowel disease that may affect any part of the gastrointestinal tract from mouth to anus, causing a wide variety of symptoms. Ankylosing spondylitis (AS, from Greek ankylos, fused; spondylos, vertebrae; -itis, inflammation), previously known as Bechterew's disease (or syndrome) and Marie-Strümpell disease, is a chronic inflammatory disease of the axial skeleton with variable involvement of peripheral joints and nonarticular structures. An analysis of the examination and treatment of patients of these groups by the specified doctors and implementation of the results in the practical activities of the medical community and in the process of training new personnel was carried out. Received results underscore the increased objectivity in the control of knowledge on the part of teachers' interest and increasing of students and of medical interns' interest to master a subject, that allowed to prepare a general practitioner in surgery and surgeons, and integrate in the future in practical public health in worldwide. Training of general practitioners is a major task of medical higher educational institution, and therefore the proper teaching of surgery in a whole range of other disciplines will create conditions for quality medical practice doctor in the future, and should meet the requirements of the integration process of the educational systems of other countries. The main goal of any innovation – improving the quality in any sphere of life. A comparison in this work of these results application new pedagogical methods on ESTC in Medicine.

Keywords: Crohn`s disease, Bechterew`s disease, examination, treatment

Citation: Sulima, O., Sulyma, V., Duka, R., Yaroshenko, K., & Malinovskyj, S. (2024). Crohn`s Disease and Bechterew`s Disease in Practice of Surgeon-Proctologist and Rheumatologist. In M. Shelley & O. T. Ozturk (Eds.), *Proceedings of ICRES 2024-- International Conference on Research in Education and Science* (pp. 131-141), Antalya, Turkiye. ISTES.

Introduction

Regional or granulomatous ileitis is a chronic bowel disease (Crohn's disease) that covers all the layers of the intestinal wall (transmural lesions), and sometimes spreads to the mesentery, regional lymph nodes affecting both the small and large intestines, but most often localized in the terminal section of a thin guts (regional, terminal ileitis). These diseases can be accompanied by damage to the peripheral joints, spine, or joints and spine (Ankylosing spondylitis or Bechterew`s disease). The clinical manifestations of the joint syndrome in both processes are the same. (*Braun J, Sieper J., 2007*).

The pathogenesis of the intestinal process and joint damage has not been fully established, but it is believed that many mechanisms participate in it, and in particular, toxic, immune, autoimmune. In the blood of patients, antibodies to the cells of the intestinal mucosa, lymphocytotoxin antibodies, circulating immune complexes, in which, possibly, antigenic components of intestinal microbes, etc., are also present.

In Crohn's disease, articular manifestations usually occur in childhood and adolescence. The development of peripheral arthritis in these diseases is usually not associated with the carriage of the histocompatibility antigen B27. Ankylosing spondylitis is more common in men than in women (3: 1). This disease usually develops in people who have HLA B27. Articular changes with regional ileitis occur more often in patients with other extraintestinal manifestations of the processes - with ulcers of the oral mucosa, exacerbate erythema nodosum, gangrenous pyoderma.

So too can the onset of symptoms. Although symptoms usually start to appear in late adolescence or early adulthood (ages 17 to 45), symptoms can occur in children or much later in life. The most common early symptoms of AS are frequent pain and stiffness in the lower back and buttocks, which comes on gradually over the course of a few weeks or months. At first, discomfort may only be felt on one side, or alternate sides. The pain is usually dull and diffuse, rather than localized. This pain and stiffness is usually worse in the mornings and during the night, but may be improved by a warm shower or light exercise.

Also, in the early stages of AS, there may be mild fever, loss of appetite, and general discomfort. It is important to note that back pain from AS is inflammatory in nature and not mechanical. The pain typically becomes persistent (chronic) and is felt on both sides, usually lasting for at least three months. Over the course of months

or years, the stiffness and pain can spread up the spine and into the neck. Pain and tenderness spreading to the ribs, shoulder blades, hips, thighs, and heels is possible as well.

Note that AS can present differently at onset in some people. This tends to be the case in women more than men. Quoting Dr. Elaine Adams, "Women often present in a little more atypical fashion so it's even harder to make the diagnosis in women." For example, we have heard anecdotally from some women with AS that their symptoms started in the neck rather than in the lower back.

Varying levels of fatigue may also result from the inflammation caused by AS. The body must expend energy to deal with the inflammation, thus causing fatigue. Also, mild to moderate anemia, which may also result from the inflammation, can contribute to an overall feeling of tiredness.

Chronic inflammatory arthritis, a hallmark of several inflammatory rheumatic diseases, and inflammatory bowel disease are both life-long conditions, with substantial morbidity and even mortality. These diseases are highly prevalent—for example, chronic arthritis has a frequency of approximately 2%–3% within a given population. Interestingly, the co-existence of gut and joint inflammation was found to be prominent in spondyloarthritis, a family of interrelated rheumatologic diseases. Number of typical clinical and genetic characteristics, including peripheral arthritis (particularly of lower limb joints) as well as inflammation of the axial skeleton (e.g., spine). Moreover, different forms of may also affect other organs, such as the skin (psoriasis) or the eye (anterioruveitis), demonstrating the systemic nature of these diseases. (*Jacques P, Elewaut D., 2008*).

Various subtypes have been described based upon clinical features, but any two may share important characteristics. The prototypical disorder of the family is ankylosing spondylitis (AS), which is characterized by prominent inflammation of the axial skeleton (spine, sacroiliac joints), although other joints may also be affected. Other diseases include infection-triggered reactive arthritis, some forms of juvenile idiopathic arthritis, arthritis in association with inflammatory bowel diseases (IBD), and some forms of psoriatic arthritis.

Method

The pathogenesis of the intestinal process and joint damage has not been fully established, but it is believed that many mechanisms participate in it, and in particular, toxic, immune, autoimmune. In the blood of patients, antibodies to the cells of the intestinal mucosa, lymphocytotoxin antibodies, circulate immune complexes, in which, possibly, antigenic components of intestinal microbes, etc., are also present.

A recent study found a strong association between increased levels of an inflammatory marker in the gut and the subsequent development of Crohn's disease in those with existing ankylosing spondylitis.

Patients participating in the study were asked to provide stool and blood samples, as well as to complete a questionnaire at the beginning of the study, (to establish their baseline scores) and once again five years later at the follow up visit. Of the patients with ankylosing spondylitis initially enrolled in the study, 80% completed the study by returning for the follow up examination.

Researchers found that an elevated level of gut inflammation at the start of the study – as evidenced by increased levels of a protein called calprotectin in the stool – was a strong predictor of the development of Crohn's disease within five years.

The striking relationship between Crohn's disease and AS has been recognized for many years: up to 10% of Crohn's Disease patients develop AS, and, vice versa, Crohn's disease commonly develops in patients primarily diagnosed with AS. As both have an important underlying genetic heritability, it has been suggested that the two diseases could have an overlapping set of predisposing genes. Strong evidence for this idea has been derived from the Icelandic genealogy database: it was shown that AS and Crohn's disease have a strong elevated cross-risk ratio in first- and second-degree relatives.

However, the precise nature of the predisposing genes remained unknown for some time. Nowadays, in the absence of a positive response in the treatment of refractory forms of Crohn's disease (CD) with articular manifestations with 5-aminosalicylic acid (5-ASA) drugs and steroids, reserve drugs are prescribed - immunosuppressants, which in some cases do not solve the problem. The development of refractoriness to treatment is observed in an average of 35-40% of patients and leads to severe complications, surgical interventions and disability of young people of working age. "Biological" drugs continue to be used in the complex treatment of this category of patients. Infliximab remains quite effective and safe in refractory clinical inflammatory bowel diseases.

In 2020-2023, a preliminary study of the complex use of 5-aminosalicylic acid (5-ASA), corticosteroids, immunosuppressants and biological therapy (infliximab) for the treatment of patients with inflammatory bowel diseases with joint manifestations was continued: 31 patients with CD with the cooperation of gastroenterologists, proctologists and rheumatologists.

Crohn's disease (CD) (regional enteritis, granulomatous ileitis) is an inflammatory disease involving all layers of the intestinal wall in the process; characterized by intermittent (segmental) nature of the lesion of various sections of the gastrointestinal tract. It is characterized by diarrhea mixed with mucus and blood, abdominal pain (often in the right iliac region), weight loss, and fever.

Extraintestinal manifestations of CD are noted to 25% of cases, including Bechterew's disease. This causes a systemic immuno-inflammatory process with damage to the vessels, the synovial membrane of the joints and the ligamentous apparatus of the spine. Peripheral arthritis in patients with CD develops more often with widespread colon damage. As a rule, its manifestation falls on the first year from the onset of bowel disease. In

70% of cases, arthritis develops with an exacerbation of intestinal pathology, but sometimes its symptoms may precede the symptoms of the underlying disease, especially in patients with Crohn's disease. In joint damage is observed in 10% of patients with CD. In 75% of cases, joint damage occurs in the form of peripheral arthritis, in 25% of spondylitis and sacroileitis.

The describes the medical history of a concomitant manifestation of classical Bechterew's disease (positive HLA B 27), which preceded the detection of Crohn's disease of the stomach, terminal ileum, and rectum by 10 years. Scientists discuss the relationship between the two diseases, in particular, in view of the probable definite extraintestinal manifestation of Crohn's disease. The simultaneous presence of two diseases causes difficulties in assessing humoral activity. 5-aminosalicylic acid is the drug of choice for ankylosing spondylitis with overt or silent bowel inflammation. Early detection of these two diseases is important for therapy and prognosis. (*Mielants H, et al., 1995*).

Bechterew`s disease (BD) and Crohn's disease (CD), especially when associated with spondylitis are interrelated conditions included within the categories of spondyloarthropathic disease entities. They share some common clinical, genetic, and microbiological findings. An extensive amount of studies which have been carried out by various independent groups throughout the world have shown that *Klebsiella pneumoniae* microorganisms could be suggested as the most likely etiopathogenetic triggers for BD and CD based on the molecular mimicry mechanism and the existence of the evidence for immunological, microbiological, and molecular link between *Klebsiella* and self antigens. (*Thjodleifsson B, Geirsson AJ, Bjornsson S, Bjarnason I., 2007*).

It is proposed that the use of low starch diet in conjunction with the currently used treatment might help in the eradication of *Klebsiella* microbes from the bowel and could result in the stoppage and alleviation of the disease process in patients with BD and/or CD.

Crohn's disease is an immune-mediated gastrointestinal inflammatory disease, which could arise from an interplay between genetic and environmental factors. *Klebsiella* microbes were suggested to have a vital role in the initiation and perpetuation of the disease through the mechanism of molecular mimicry. This proposition is based on the results of various studies where significantly elevated levels of antibodies against the whole bacteria or preparations from *Klebsiella* microbes and antibodies to collagen types I, III, IV, and V were detected in patients with CD and patients with BD. Molecular similarities were found between *Klebsiella* nitrogenase and HLA-B27 genetic markers and between *Klebsiella* pullulanase and collagen fibers types I, III, and IV. (*Danoy P, et al., 2010*).

Furthermore, significantly positive correlations and cross-reactivity binding activities were observed between anti-*Klebsiella* and anticollagen antibodies among patients with CD and BD. Early treatment of CD patients with anti-*Klebsiella* measures is proposed, which may involve the use of antibiotics and low starch diet together with other traditionally used immunomodulatory, immunosuppressive, or biologic agents.

Before to 10% of cases of Bechterew`s disease (BD) are associated with inflammatory bowel disease (IBD), either Crohn's disease (CD). A much larger percentage of BD patients have subclinical gut inflammation manifested either by endoscopic findings or by histology. The association with HLA-B27 is less strong in IBD-associated BD than in idiopathic AS, and there is evidence for an association between gut inflammation in BD with the Crohn's-disease-related CARD15 mutations. Despite the different genetics, the immunopathology suggests common inflammatory pathways in gut and joint inflammation in AS, and in gut inflammation in BD and CD. (*Barrett JC, et al., 2008*).

Although this observation is of interest to unravel the pathophysiology of the disease, systematic screening of BD patients by ileocolonoscopy is not indicated in the absence of gut symptomatology as only a small proportion of BD patients with subclinical gut inflammation will develop overt CD over time. Treatment of AS associated with IBD with non-steroidal anti-inflammatory drugs (NSAIDs) is problematic because of concerns of potential re-activation of IBD by NSAIDs. Major advances have been made in recent years with the establishment of anti-tumour necrosis factor (TNF) therapy in AS, the other spondyloarthritides and IBD. Anti-TNF agents are of particular relevance to BD patients with concomitant CD who are at risk of exacerbation of the underlying bowel disease when treated with NSAIDs. (*Burton PR, et al., 2007*).

In CD, infliximab, unlike etanercept, is effective in treating clinical symptoms, inducing and maintaining remission, and mucosal healing. Adalimumab appears to be effective in treating both BD and CD; however, official approval is pending. Currently, infliximab is the drug of choice for the treatment of patients with active BD associated with CD.

In the case of extraintestinal manifestations of Crohn's disease, active disease, if present, should be treated to induce remission, which can have a positive effect on the course of most accompanying extraintestinal manifestations. However, for some extraintestinal manifestations, special treatment should be instituted. This latter part of the management of the disease will be discussed in this chapter, particularly for pyoderma gangrenosum, uveitis, spondylarthropathy (axial arthropathy), and primary sclerosing cholangitis, which have also been described in quiescent Crohn's disease. In the past, several new drugs have been developed to treat extraintestinal manifestations of Crohn's disease, and only the role of infliximab has increased in extraintestinal manifestations associated with Crohn's disease. Drugs specifically targeted for this treatment, derived from several randomized controlled trials or case series, are sulfasalazine, 5-ASA, corticosteroids, azathioprine or 6-mercaptopurine, methotrexate, infliximab, adalimumab, etanercept, and cyclosporine or tacrolimus.

Collaboration between proctologic surgeons, gastroenterologists, and rheumatologists is recommended for the appropriate management of patients with Crohn's disease (CD) and associated Bechterew`s disease (BD). We aimed to establish the appropriateness of rapid referral to a specialist. A systematic review of the literature was conducted to describe the prevalence of concomitant CD-BD and diagnostic accuracy. A consensus was then reached between expert surgeons, gastroenterologists, and rheumatologists to confirm the appropriateness of

each patient referral to a specialist. A review of the literature confirmed a high prevalence of concomitant CD-BD.

Consensus among proctologists, gastroenterologists, and rheumatologists was used to confirm the appropriateness of each recommendation. The main criteria for referral of patients with BD to a proctologist or gastroenterologist were: rectal bleeding, chronic abdominal pain, perianal fistula or abscess, chronic diarrhea, and nocturnal symptoms. The main criteria for referring patients with Crohn's disease to a rheumatologist included: chronic low back pain, dactylitis, enthesitis, and peripheral joint pain/swelling. Several primary and secondary warning signs for the diagnosis of concomitant CD-BD have been identified. The use of these recommendations in routine clinical practice can avoid diagnostic delays and reduce clinic overload.

Results

We analyzed the cooperation of proctological surgeons and rheumatologists in the examination and treatment of patients with Crohn's disease and Bechterew's disease on based Regional Proctological Center (Dnipro), Dnipro City Hospital and Department Surgery #1 of Dnipro State Medical University.

In each case of extraintestinal manifestations of Crohn's disease, active disease, if present, should be treated to induce remission, which may positively influence the course of most concomitant extraintestinal manifestations. For some extraintestinal manifestations, however, a specific treatment should be introduced. This latter part of disease management will be discussed in this chapter, in particular for pyoderma gangrenosum, uveitis, spondylarthropathy - axial arthropathy - and primary sclerosing cholangitis, which have also been described in quiescent Crohn's disease. (*Sulima, O., & Sulyma, V., 2020*).

Few new drugs for the treatment of extraintestinal manifestations of Crohn's disease have been developed in the past and only the role of infliximab has increased in Crohn's disease-related extraintestinal manifestations. Drugs specifically aimed at this treatment, stemming from a few randomized controlled studies or case series, are sulfasalazine, 5-ASA, corticosteroids, azathioprine or 6-mercaptopurine, methotrexate, infliximab, adalimumab, etanercept and cyclosporine or tacrolimus. Unfortunately, because of the paucity of data in this field, the best evidence presented and discussed in this article for the treatment of these extraintestinal manifestations is extrapolated from patients that for the most part did not suffer from Crohn's disease.

You might already see a rheumatologist for BD. A proctologist (gastroenterologist) diagnoses and treats Crohn's disease.

If you do have to take one of these medicines, your doctor will prescribe it with a proton pump inhibitor like omeprazole that prevents and treats gastric ulcers.

One TNF inhibitor, etanercept (Enbrel), works for BD but not for Crohn's disease. In fact, it might cause more IBD flares, or even trigger IBD in people who didn't have it before.

Corticosteroids, or steroids, act on your immune system to bring down inflammation. Examples of these medicines are:

- Budesonide
- Hydrocortisone
- Methylprednisolone
- Prednisone

Doctors may prescribe steroids for some cases of moderate to severe Crohn's disease. But over time, they can have serious side effects. Steroid injections or pills are a treatment for arthritis in your arms, legs, fingers, or toes. These injections aren't as helpful for arthritis in the spine.

Researchers are looking at other biologic drugs that might treat both Bechterew's disease and Crohn's disease.

Discussion

Treatment Crohn's disease:

Mild to moderately severe:

This category includes cases that can be observed on an outpatient basis, with the ability to eat normally, without signs of intoxication, abdominal pain, space-occupying formations, or obstruction. 5-ASA (mesalamine) is usually used as first-line therapy. Pentaza® is the drug of choice for lesions of the small intestine, and Asacol® if for lesions of the distal ileum and colon. However, the benefit of any 5-ASA drug in small bowel Crohn's disease is negligible, and many experts oppose its use in small bowel Crohn's disease.

Some experts view antibiotics as first-line treatment; they can also be used as reserve drugs in the absence of response to treatment with 5-ASA within 4 weeks; the choice of drugs is empirical. When using any antibiotic, the duration of treatment is 8–16 weeks.

If the response is good, maintenance therapy is prescribed.

Moderately severe to severe:

In the absence of fistulas and abscesses, but in the presence of severe pain, tenderness on palpation, fever, vomiting, as well as in the absence of response to treatment in a mild form of exacerbation, the administration of corticosteroids orally or parenterally helps to quickly relieve symptoms. Oral prednisolone usually gives a faster and more reliable effect than oral budesonide, but budesonide has less pronounced side effects and is considered in many treatment centers, especially European ones, as the drug of choice among corticosteroids.

If there is no rapid response to corticosteroids or if the dose of these drugs cannot be reduced within several weeks, these drugs should be discontinued and other therapy should be prescribed.

An antimetabolite (azathioprine, 6-mercaptopurine, or methotrexate), a tumor necrosis factor (TNF) inhibitor (infliximab, adalimumab, or certolizumab pegol), or a combination of both, may be used as second-line therapy after corticosteroids and even as first-line therapy as more preferable to corticosteroids. Prescribing these drugs based on measurements of drug and antibody levels resulted in clinical success in most cases. When these lines of treatment fail in patients for whom surgery is not possible or appropriate, newer biologics may be used, including anti-integrins (eg, vedolizumab) or anti-IL-12/23 (eg, ustekinumab). . In addition, other biological agents are rapidly emerging.

If obstruction develops, treatment is first carried out by aspiration through a nasogastric tube and intravenous administration of solutions. Intestinal obstruction in uncomplicated Crohn's disease should resolve within a few days, and therefore does not require specific anti-inflammatory therapy or parenteral nutrition; however, the absence of a rapid response is an indication of urgent surgical intervention and indicates complications or another etiology of the disease.

Fulminant course or formation of abscesses:

If there are signs of intoxication, high fever, ongoing vomiting, the phenomenon of rebound pain, or a painful palpable formation, hospitalization and intravenous administration of solutions and antibiotics are indicated. Abscesses must be drained via percutaneous or surgical access. Intravenous corticosteroids or biologic agents are given only when infection has been ruled out or effectively controlled. If there is no response to corticosteroids and antibiotics within 5-7 days, surgery is usually indicated.

Treatment of Bechterew`s disease:

It is not possible to completely cure the disease, but with the help of conservative therapy you can: reduce inflammation; relieve pain syndrome.

The basis for the treatment of ankylosing spondylitis in women and men is the following: non-steroidal anti-inflammatory drugs (NSAIDs); glucocorticoids (they, like NSAIDs, also have an anti-inflammatory effect); immunosuppressants; drugs that are considered biological modifiers (correctors) of the immune response.

The use of non-drug treatment methods also gives good results: eliminating loads on the cervical, thoracic and lumbar spine; physiotherapy - it is used only during remission; Spa treatment.

In sanatoriums for patients with ankylosing spondylitis, mud therapy and balneotherapy are successfully

practiced; breathing exercises-in order to counteract the occurrence of chest immobility physiotherapy.

The patient should sleep on a hard bed. To prevent cervical lordosis from developing, the pillow or cushion that is placed under the neck should be removed.

Conclusion

Crohn's disease and Bechterew's disease are unusual pathological conditions in medicine, which require a compatible cooperative approach to the examination and treatment of patients of these groups by proctologists, gastroenterologists and rheumatologists.

We recommend using the proposed technologies in the practices of surgeons-proctologists and rheumatologists for investigation and medicaments treatment or surgical operations of patients with Crohn`s disease and Bechterew`s disease.

Acknowledgements

We wish to gratefully acknowledge the advice and support of representatives and staff Dnipro State Medical University, Regional Proctology Centre and Dnipro City Hospital (Dnipro, Ukraine) in the preparation of our work and this text.

References

- Braun J, Sieper J. Ankylosing spondylitis. *Lancet*. 2007;369:1379–1390. [PubMed].
- Jacques P, Elewaut D. Joint expedition: linking gut inflammation to arthritis. *Mucosal Immunol*. 2008;1:364–371. [PubMed].
- Mielants H, Veys EM, Cuvelier C, De Vos M, Goemaere S, et al. The evolution of spondyloarthropathies in relation to gut histology. II. Histological aspects. *J Rheumatol*. 1995;22:2273–2278. [PubMed].
- Thjodleifsson B, Geirsson AJ, Bjornsson S, Bjarnason I. A common genetic background for inflammatory bowel disease and ankylosing spondylitis: a genealogic study in Iceland. *Arthritis Rheum*. 2007; 56:2633–2639. [PubMed].
- Danoy P, Pryce K, Hadler J, Bradbury LA, Farrar C, et al. Association of variants at 1q32 and STAT3 with ankylosing spondylitis suggests genetic overlap with Crohn's disease. *PloS Genet*. 2010; 6:e1001195. doi: 10.1371/journal.pgen.1001195. [PMC free article] [PubMed].
- Barrett JC, Hansoul S, Nicolae DL, Cho JH, Duerr RH, et al. Genome-wide association defines more than 30 distinct susceptibility loci for Crohn's disease. *Nat Genet*. 2008;40:955–962. [PMC free article] [PubMed].
- Burton PR, Clayton DG, Cardon LR, Craddock N, Deloukas P, et al. Association scan of 14,500

nonsynonymous SNPs in four diseases identifies autoimmunity variants. *Nat Genet.* 2007;39:1329–1337. [PMC free article] [PubMed].

Sulima, O., & Sulyma, V. (2020). The frequency of joints manifestations of inflammatory bowel disease in the practice of a rheumatologist. *Abstracts Falk Symposium 218*, Mexico. – P.33.