

The impact of the intrinsic stress factor on the intestinal microbiome in the COVID era

Authors:

Phd student Constantin Alexandra Oana^{1,2}, Prof. Univ. Dr. Spiru Luiza^{1,2}

1. "Carol Davila" University of Medicine and Pharmacy - Bucharest, Romania. Department of Geriatrics-Gerontology-Elias University Emergency Hospital (temporary headquarters of the Chronic Diseases Hospital "St. Luke")
2. "Ana Aslan" International Foundation - Center for Memory Diseases and Longevity Medicine - Bucharest, Romania

Keywords: intestinal microbiome, stress, SARS COV2 infection, inflammatory bowel disease.

Abstract:

This article aims to present the close interaction between environmental factors, respectively in this case the stress in the family context, accentuated more especially in the pandemic period and the appearance of an autoimmune pathology. A strong emotional stress, as well as the anxiety that accompanies it can disrupt homeostasis and thus favor an exacerbation of the inflammatory process in the intestine and an imbalance of the intestinal microbiota, thus creating a vicious circle that can result, in this case, in -an inflammatory bowel disease, such as ulcerative colitis.

Informations from literature:

Hippocrates, the father of Medicine of all times, said 2400 years ago that "all diseases begin in the intestine." Recent scientific research lays the groundwork for a new approach to treating various pathologies, bringing to light the interdependent relationship between intestinal health and physical and mental health.

Called the "second brain", the intestinal microbiome has a unique imprint for each individual, and its content as the number and type of microorganisms dictates the health of the body. The human gut is home to a community of microorganisms whose number is ten times greater than the cells of the human body and whose genome has a hundred times more genes than the human genome contains. Also known as the "gut flora," the microbiota is mostly concentrated in the colon and interacts with the host to modulate a number of bodily functions closely related to environmental exposure (stress, diet, medications).¹

Also, the COVID-19 pandemic has a profound impact on the health and well-being of the population worldwide as well as implicitly on the post-traumatic stress and psychological impact that remains as an imprint on today's society². Such a period of crisis has significant repercussions both in the field of diseases clinical as such and of a psychological nature which in turn can be a trigger for new pathologies.²

Case presentation:

A 47-year-old patient with no significant personal pathological history presented to the Guard Room for multiple diarrheal stools (approximately 10-12 stools / day), loss of appetite, significant weight loss (10 kg in 3 months), abdominal cramps and fatigue. It is worth mentioning that this clinical picture appeared in the context of the hospitalization of the daughter, who suffers from a severe form of COVID-19.

Biological: significant inflammatory syndrome (ESR, CRP ↑↑), mild anemia, much increased fecal calprotectin.

Colonoscopy: descending colon with hyperemic mucosa, edematous, with multiple ulcerations of variable size (2-4mm), superficial, irregular, bleeding diffusely on contact with the endoscope, covered in places by mucopurulent and hemorrhagic exudates.

Biopsy: inflammatory infiltrate with a predominance of neutrophils in the mucosa and submucosa, neutrophils disseminated between glandular cells - appearance of cryptitis, reduction in the number of mucus-producing cells. The appearance is suggestive of ulcerative colitis.

Treatment: mesalazine 3 g / day in the acute phase, for 1 month, then the maintenance dose-1 g / day for 3 months with the improvement of symptoms, improvement of quality of life and pedestrian gain. Periodic monitoring revealed an increase and maintenance of liver function markers (ALT, AST, GGT), which is why it was decided to discontinue mesalazine treatment until normalized liver tests. Subsequently, monoclonal antibody therapy-Adalimumab with good tolerance and maintenance of clinical remission was initiated.

Conclusions:

Stress is a non-specific response of the body to any aggression imposed on the environment by disrupting the homeostasis of the whole body, including the intestine and is manifested by anxiety, depression and impaired immune response.³ The intestinal microbiome plays a fundamental role in many aspects of human biology, including metabolism, endocrine homeostasis, neurology and immunology. Strong emotional stress, as well as the anxiety that accompanies it can disrupt the homeostasis of the microbiota and thus favor an exacerbation of the inflammatory process in the intestine and an imbalance of the intestinal microbiota, thus creating a vicious circle that can result, in this case, in an inflammatory bowel disease, such as ulcerative colitis.

Bibliography:

- 1.<https://www.medichub.ro/reviste/medic-ro/impactul-microbiomului-intestinal-asupra-sanatatii-fizice-si-mintale-id-2996-cmsid-51>
2. Matthew W. Gallagher, Lia J. Smith, Angela L. Richardson & Laura J. Long (2021) Examining Associations Between COVID-19 Experiences and Posttraumatic Stress, *Journal of Loss and Trauma*, 26:8, 752-766, DOI: 10.1080/15325024.2021.1886799
3. Molina-Torres G, Rodriguez-Arrastia M, Roman P, Sanchez-Labraca N, Cardona D. Stress and the gut microbiota-brain axis. *Behav Pharmacol*. 2019 Apr;30(2 and 3-Spec Issue):187-200. doi: 10.1097/FBP.000000000000478. PMID: 30844962