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Parainflammation: An Immunohematological Risk Factor for the Emergence and Re-Emergence of Diseases

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ABSTRACT

Parainflammation also known as Low Grade Chronic Inflammation (LGCI) is a subclinical condition that is not routinely diagnosed especially in apparently healthy persons. The present review describes the parainflammatory theory of diseases a major risk factor to the emergence and re-emergence of diseases. We therefore recommend routine diagnostic tests, life style and dietary changes to limit the occurrence of parainflammation in apparently healthy persons as a preventive measure to combating the emergence and re-emergence of diseases.

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Introduction

Parainflammation otherwise known as Low Grade Chronic Inflammation (LGCI) is a shift in the inflammatory response from short to long-lived subclinical inflammation that causes breakdown of the immune tolerance [1, 2]. It involves a persistent harmful degenerative process in which neutrophils, macrophages, lymphocytes and plasma cells are released in the tissues producing antibodies, cytokines, growth factors, and enzymes hence contributing to the progression of tissue damage, fibrosis, granuloma and/or systemic inflammation. The common signs and symptoms of parainflammation includes body pain, myalgia, arthralgia, chronic fatigue, depression, anxiety, constipation, diarrhea, weight gain or loss and frequent infections [3].

Pathogenesis of Parainflammation

(a) Failure of eliminating the agent causing an acute inflammation such as infectious pathogens.
(b) An autoimmune process in which the immune system is sensitized to the normal components of the body and attacks healthy tissues.
(c) Recurrent episodes of acute inflammation and exposure to a low level of a particular irritant or foreign material that cannot be eliminated by enzymatic breakdown or phagocytosis in the body.
(d) An increase in inflammatory markers as a result of lifestyle and/or physic-pathological changes such as chronic stress, nutrition, ageing and epigenetics changes [4, 5].

Parainflammation Theory of Diseases

Parainflammation appears to be a grand unifying factor predisposing apparently healthy persons to diseases. This is because all human diseases whether infectious and/or non-infectious involves inflammation at the cellular level due to either early cell death(apoptosis) translating into specific organ or gland disease or stem cell stimulation resulting in abnormal cellular proliferation and/or metastasis disease. This supports the hypothesis on the emergence and re-emergence of diseases due to changes in the cellular microenvironment in apparently healthy persons that stimulates a parainflammatory state [6, 7]. Apparently healthy state according to the WHO is a condition of complete physical, mental and social well-being and not merely the absence of disease or infirmity [8]. Disease on the other hand is a particular abnormal condition that negatively affects the structure or function of part or all of an organism which is not due to any external injury [8]. Diseases can be general or local, acute or chronic. Basically, all human cells require four elements to maintain their physiological state namely food, water, oxygen and detoxification. The body is designed to remain in a physiological state (healthy) over a hundred years as long as these elements are efficiently maintained. A breakdown of any of these elements at the cellular level alters the functionality of tissues and organs leading to harmful induction of different barrier systems in the body where the blood-brain barrier, the blood-retinal barrier, the blood-nerve barrier, the blood –lymph barrier and the blood-cerebrospinal fluid barrier. The barrier systems although unique are similarly structured and equipped with junctional complexes where different connexins, protein sub-units of gap junction channels and hemi-channels constitute important partners whose induction results in

systemic parainflammation underlying diseases [6, 7].

Diagnosis of Parainflammation

It is important to make a differential diagnosis because parainflammation is not a specific disease but a mechanistic process to diseases. History and physical examination are thus needed for a definitive diagnosis of parainflammmation. The laboratory indications may include abnormal red cell and platelet indices from the complete blood cunt analysis, increased serum proinflammatory cytokines such as IL-8, IL-1, IL-6 and TNF-α, increased antinuclear antibodies, rheumatoid factor, amyloid A, C-reactive protein and concomitant hypoalbuminemia as well as polyclonal gammopathy (increase in all gamma globulins) in serum electrophoresis [2, 3, 9, 10].

Risk Factors for Parainflammation

Recent studies has revealed that certain social, environmental and lifestyle habits promotes parainflammmation by increasing the levels of proinflammatory markers. These includes sedentary lifestyle, obesity, cigarette smoking, psychological and physical stress (sleeping disorders), poor diet and diet rich in processed food with saturated fat, trans fat or refined sugar, environmental and industrial toxicants [10, 11].

Management of Parainflammation

Lifestyle adjustments, dietary adjustments and the use of over-the- counter drugs are recommended for the management of parainflammation. The consumption of processed and packaged foods containing transfats, saturated fats like vegetable oils and corn syrups should be limited in daily diets. Fruit and vegetables rich in fiber, fish oil, and micronutrients such as selenium, zinc, vitamin D, vitamin E and magnesium are highly recommended as well as routine physical exercise. Non-steroidal anti-inflammatory drugs like aspirin and ibuprofen could be applied to manage pains due to parainflammation [10, 12].

Conclusion

Reducing parainflammation through healthy lifestyle, diet and routine laboratory investigations holds promise for preventing the emergence and re-emergence of diseases.

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