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Commentary

Short Summary on Immunodeficiency Disorders

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ABOUT THE STUDY

Immunodeficiencies are hereditary (primary) or acquired (secondary) illnesses in which components of the host immune system are missing or malfunctioning. Most Immunodeficiencies are inherited in industrialised countries, and they're usually initially noticed in the clinic as recurrent or overpowering illnesses in newborn children. However, malnutrition, which is classified as an acquired immunodeficiency, is the most common cause of immunodeficiency on a global basis. Because acquired immunodeficiencies are more likely to manifest later in life, the pathogenic mechanisms of many of them remain unknown.

Primary immunodeficiency

Primary immunodeficiencies, which number in the hundreds, are caused by genetic flaws in nonspecific innate or adaptive immune systems. Patients with Primary Immunodeficiency (PI) are more susceptible to infection than the normal population. For some people, this vulnerability manifests itself shortly after birth or during childhood, whereas for others, symptoms appear later in life. Some primary immunodeficiencies are produced by a malfunction in one of the immune system's cellular or humoral components, while others may be caused by problems in multiple components. Chronic granulomatous illness, X-linked agammaglobulinemic, selective IgA deficiency, and severe combined immunodeficiency disease are all examples of primary immunodeficiencies.

Chronic granulomatous disease

Defects in the NADPH oxidase system of phagocytic cells, such as neutrophils and macrophages, cause Chronic Granulomatous Disease (CGD), which inhibit the formation of superoxide radicals in phagolysosomes. The antibacterial activity of phagocytes is harmed when superoxide radicals are not available. As a result, infections in people with Chronic Granulomatous Disease (CGD) last longer, leading to a granuloma, a chronic local inflammation. Aspergillus spp., Staphylococcus aureus, Chromo bacterium violaceum, Serratia marcescens, and Salmonella typhimurium are the most common microorganisms that cause sickness in CGD patients.

Selective IgA deficiency

Selective IgA insufficiency is the most prevalent inherited form of immunoglobulin inadequacy, affecting one out of every 800 people. Individuals with specific IgA deficiency produce normal levels of IgG and IgM but are unable to create secretory IgA. IgA deficiency makes people more susceptible to infections of the lungs and gastrointestinal tract, for which secretory IgA is a critical defence response. Microorganisms such as H. influenzae, S. pneumoniae, Moraxella catarrhalis, S. aureus, Giardia lamblia, and pathogenic forms of Escherichia coli can cause infections in the lungs and digestive tract.

Secondary immunodeficiency

An acquired impairment of function of B cells, T cells, or both results in secondary immunodeficiency.

- Systemic disorders including diabetes, malnutrition, hepatitis, or HIV infection can produce secondary immunodeficiencies.
- Immunosuppressive treatments such as cytotoxic chemotherapy, bone marrow ablation prior to transplantation, and radiation therapy
- Long-term critical sickness in the very young, elderly, or hospitalized patients due to infection, surgery, or trauma.

Secondary immunodeficiencies, unlike primary immunodeficiencies, which have a genetic basis, are typically reversible if the underlying cause is addressed. Patients with secondary immunodeficiencies are more susceptible to opportunistic microorganisms such Candida spp., P. jirovecii, and Cryptosporidium, which cause otherwise harmless infections.

The well-known secondary immunodeficiencies are HIV infection and various related Acquired Immuno Deficiency Syndrome (AIDS). Deep CD4 T-cell lymphopenia is a hallmark of AIDS (decrease in lymphocytes). HIV-induced pyroptosis (a kind of apoptosis that triggers an inflammatory response), viral cytopathic impact, and cytotoxicity to HIV-infected cells are all factors that contribute to the decrease in CD4 T cells.

Severe malnutrition, which weakens both innate and adaptive immunity, is the most well-known cause of secondary immunodeficiency globally. The more common causes of

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secondary immunodeficiency require more research and data; yet, the number of recent findings in AIDS research vastly outnumbers that of the other single cause of secondary immunodeficiency. In terms of discoveries and cures, AIDS research has been extraordinarily beneficial, expanding research into the most common cause of immunodeficiency, hunger, would likely be just as beneficial.