Immunosuppressive/ Autoimmune Disorders

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KEYWORDS

• Autoimmune disorders • Graves disease • Hashimoto thyroiditis
• Inflammatory bowel disease • Crohn disease • Ulcerative colitis
• Systemic lupus erythematosus • Multiple sclerosis

KEY POINTS

- There are nearly 100 autoimmune diseases and the most prevalent are type 1 diabetes and autoimmune thyroid disease.
- Autoimmune thyroid disease is the most common autoimmune disorder.
- Clinical presentation and clinical management of autoimmune disorders are based on the disease type.

BACKGROUND

Autoimmune disorders refer to a category of diseases in which the immune system attacks healthy cells in the body.[1] Evidence suggests that exposure to antigens from bacteria, viruses, toxins, and blood and tissue from external sources trigger an immune response in which the body mistakenly attacks healthy cells in an attempt to rid itself of harmful substances.[1,2] As a result, the following adverse events may occur: tissue damage, malfunctions in organ growth, and organ dysfunction.[1]

Following cancer and heart disease, autoimmune diseases are the third most common disease category, affecting approximately 8% of the population.[1] Women are affected at an approximately 75% higher rate than men, and the disease onset often occurs during the childbearing years, from the ages of 14 to 44 years.[2–5] Autoimmune diseases can affect almost every body system, including neurologic, cardiac, endocrine, musculoskeletal, gastrointestinal (GI), lung, kidney, skin, eye, and vascular

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systems.[6] Some autoimmune disorders are organ specific, whereas a host of immunologic dysfunctions lead to involvement of multiple organs.[5] Over the last decade, substantial improvements have been made in the diagnosis and classification of autoimmune diseases, which have brought improvements in prognosis.[5] Diagnosis, prognosis, epidemiology, treatment, and complications are disease specific, and are discussed here by disease type.

CAUSE

Autoimmune diseases are caused by a dysfunction of the acquired immune system. These diseases can affect any system in the body and are initiated when the immune system becomes overactive and, rather than destroying invader cells, targets the body's own healthy cells and tissues.[3] Unlike the innate immune system, which is present at birth and does not use antibodies for activation, the antibodies and immune cells of the acquired immune system inappropriately target the body's own healthy tissues, signaling immune cells to attack and destroy them.[6] There is no definitive cause of autoimmune disorders.[1,6,7] However, autoimmune responses have been found to be linked to a genetic predisposition that increases the likelihood of disease development when exposed to environmental triggers.[1,5–7] In most cases, a combination of genetic predisposition, organic influences such as stress and hormonal activity, and environmental factors influence development of autoimmune disease.[1,3,5–7] Examples of these environmental factors that contribute to autoimmune disorder development include infections (bacterial, viral, or parasitic) and various environmental influences, such as medications and toxic chemicals, dietary components, occupational exposures, smoking, and decreases in vitamin D levels.[5,6,8,9]

The concept of immune tolerance also suggests that the immune system typically has the ability to prevent itself from targeting self-molecules, tissues, or cells. Within the thymus, developing lymphocytes undergo a complex process of differentiation and programming of self versus nonself, known as positive selection. Lymphocytes with potential reactivity against self-peptides are negatively selected and therefore destroyed by the body. Once these mature T cells exit the thymus, they are subjected to peripheral selection and further screened by the body for self-reactivity and again may be deleted.[5,10] It is suggested that this process of positive and negative selection may be an initial key factor in the development of autoimmune disorders.

COMMON TYPES OF AUTOIMMUNE DISORDERS

There are nearly 100 autoimmune diseases, and the 2 most prevalent types are type 1 diabetes mellitus (T1DM) and autoimmune thyroid disease (AITD).[5] However, T1DM is not discussed in this article. Graves disease (GD) and Hashimoto thyroiditis (HT) are the main AITDs.[11,12] In addition, other commonly diagnosed autoimmune disorders are rheumatoid arthritis (RA), inflammatory bowel disease (IBD; Crohn disease and ulcerative colitis), systemic lupus erythematosus (SLE), and multiple sclerosis (MS).[1,5–7]

Autoimmune Thyroid Disorders

The most common and the most frequently occurring autoimmune disorder is AITD, which is T-cell mediated and organ specific.[11] AITD affects about 5% of the population and is more common in women than in men.[11] There is evidence to support genetic susceptibility to AITD, but certain environmental factors, such as infection, stress, smoking cigarettes, medications, radiation, and iodine, also contribute to the development of AITD.[11–14] AITD occurs when the immune system becomes dysregulated and causes an attack on the thyroid.[14] The 2 main types of AITD are GD and HT, both of