

Immunotherapy Interventions in Lymphoma Abstract

Lymphoma is a type of cancer that originates from abnormal growth of lymphatic cells, leading to malignant tumors. It affects the lymphatic system, which is responsible for carrying lymph, a fluid containing infection-fighting white blood cells, throughout the body. There are two main types of lymphoma: Hodgkin's and non-Hodgkin's, with the latter beginning in the lymph nodes. Symptoms are nonspecific and can include lumps, loss of appetite, weight loss, and swollen glands. Immunotherapy is a specialized cancer treatment that boosts the body's immune system to fight cancer. It can be used alone or in combination with chemotherapy. Current immunotherapy interventions for lymphoma include CAR T-cell therapy, bispecific antibodies, immune checkpoint inhibitors, and vaccines, showing promise in enhancing the body's immune response against the disease. Ongoing research and clinical trials in this field aim to improve outcomes for lymphoma patients.

Immunotherapy Interventions in Lymphoma

Lymphoma: what is it?

Lymphoma, also known as lymphatic cancer, is a group of cancers in which the lymphatic cells of the lymphatic system grow abnormally and uncontrollably in high amounts, resulting in malignant tumors. Lymphomas are malignancies that are heterogeneous and arise from the rapid growth of B-cells and natural killer (NK) cell subsets of lymphocytes within different stages of maturation. The lymphatic system consists of ducts or tubercles that carry white, milky fluid substances (lymph) throughout the body. Lymphs consist of white blood cells which are infection fighting cells of the body. Found along the network of lymph vessels are lymph nodes which are small pea shaped organs. The main functions of lymph nodes is to make and store the lymphocytes. Lymphocytes can be found around the body in the pelvis region, underarm, abdomen, chest, and neck in clusters. There are two main lymphocytes: T and B lymphocytes. These two cells perform different jobs within the immune system in the body to keep everything balanced and healthy throughout. Lymphomas can be divided into two main parts. There is Hodgkin's lymphoma and non-Hodgkin's lymphomas with the majority of non-Hodgkin's lymphomas beginning in the lymph nodes. This leads malignant lymphocytes to multiply uncontrollably, hence leading them unable to perform their normal functions. The body's ability to fight infection is then affected, resulting in malignant cells crowding the bone marrow at times and preventing the production of normal blood cells.

Symptoms

The beginning of lymphoma usually feels like lumps being confirmed in one area of the body, such as the abdomen, or they could develop in multiple areas of the body. Symptoms are very non-specific whereas the patient may feel loss of appetite, nausea, weight loss, vomiting,

abdominal discomfort, and indigestion. There could be presence of swollen glands, pressure or pain in the lower back. There may be bone pain, headaches, constant coughing and abdominal pressure. Like all cancers, lymphomas are best treated when found early but are however difficult to diagnose since the symptoms are nonspecific. No screening tests are available. Medical histories are usually taken, as well as blood tests and physical examination. Conventional imaging testing could also be performed in diagnosis such as x-rays, magnetic resonance imaging (MRI), computer tomography (CT) scans, and abdominal sonograms are used to detect the speed of the disease.

Immunotherapy: what is it?

Immunotherapy is a special type of cancer treatment that usually works by using substances made by the body or in a laboratory and used to boost the immune system.

Immunotherapy can be used in many ways to treat cancers. It can be used alone or with a combination of chemotherapy. This usually works within the immune system using its ways to fight cancer but with a little boost. The immune system consists of a complex process which involves cells, proteins, and organs to fight cancer. Cancer can commonly get around the immune system's self defense system, allowing cancer to continuously grow.

Immunotherapy in Lymphoma and its Interventions

Immunotherapy goes in a long way for its interventions and treatments with cancer. Immunotherapy's interventions and treatments with lymphoma is an ongoing continuously growing research and clinical trial. Ongoing treatment interventions associated with immunotherapy and lymphoma include chimeric antigen receptor T-cells, bispecific antibodies, immune checkpoint inhibitors, and vaccines. T-cell therapies are T lymphocytes that have been engineered to express the antigen binding within an antibody that is directed against antigens associated with tumors. These antigens are specifically created from cloning DNA plasmids that

are transfected to target cells. Thus, an extensively studied target of CAR T-cell therapy for treatment of lymphoma. Bispecific antibodies are rationally designed antibodies that specifically redirect T-cells to a target cell. In this case in the setting of a tumor in immunotherapy, the T-cells are directed against a specific tumor antigen, resulting in T-cell activation which is exclusively dependent on the interaction between tumor associated antigens and other specific complex antigens required to activate native T-cells. Immune checkpoint inhibitors refer to the inhibitory pathways of the immune system. These pathways are critical for maintaining self-tolerance, thus, they help regulate immunological responses to promote immune tolerance and minimize tissue damage. Expressions of immune checkpoints have been found to be potent inhibitors of T-cell tumor immune scrutiny to immunity. The T-cell activation requires two steps. Primary signals between TCR and antigen are bound to the MHC complex of the antigen presenting cell, and the second signal is co-stimulation, where costimulatory receptors on the T-cell will interact with ligands on the presenting cell. Many vaccination ideas would be ideal considering many researches done over this idea. Vaccines give the ability to induct durable adaptive immune response against tumors. DNA vaccines offer several advantages along with Protein-based vaccines.

Overall, the exploration of immunotherapy and its several applications and variety of interventions within Lymphoma gives us insights of several application options and opportunities within this cancer. This is an ideal application and its several components to aid in providing additional support assisted from the immune system and to increase the immunological response could potentially increase the likelihood of successful future treatments.

Reference/Citations

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