Non-Hodgkin's Lymphoma

Disease Information

NON-HODGKIN'S LYMPHOMA

Lymphoma is a systemic, malignant disease of lymphoid tissue. Because of the systemic nature of the disease, it is generally treated with a combination of therapies that can include chemotherapy and radiation. Non-Hodgkin's lymphoma (NHL) can begin in a nodal form in a localized region, but it ultimately tends to develop into a disseminated disease form. Prognostic factors that predict the course of the disease and the treatment options are known for each individual patient. Despite years of research and investigations into second- and third-generation combination chemotherapy protocols, none improves upon patient outcome of a first-generation chemotherapy protocol-CHOP (which includes cyclophosphamide, doxorubicin, vincristine, and prednisone).

Canine Non-Hodgkin's Lymphoma

Enlarged submandibular lymph node in canine NHL

The most common presentation in canines is enlargement of peripheral lymph nodes with a lack of outward systemic illness. However, it is thought of as a disseminated disease, and it will eventually progress into the lymphoid and non-lymphoid organs throughout the body. Diffuse large B-cell (considered high grade) is the most common form seen.T-cell lymphoma is seen in 10-38% of all cases.
The cause of canine NHL is relatively unknown. Various hypotheses exist, including the use of herbicides (2,4-dichlorophenoxyacetic acid). It has been reported that a two-fold rise in canine NHL was seen with four or more applications of 2,4-D pesticide in the household area. A weak association with exposure to strong magnetic fields was noted in one epidemiologic study. An impaired immune function has been described in canines with NHL. Immune-mediated thrombocytopenia has been associated with a higher risk of developing NHL.

The National Institutes of Health Working Formulation and the Kiel system have been adapted from humans in order to characterize canine NHL based on histology of formalin-fixed tissue. Immunophenotyping also exists to classify NHL as a B- or T-cell variant. These two methods provide useful prognostic information. Canines with B-cell tumors have improved response rates, and those with intermediate- to low-grade NHL can also have longer survival times. The relatively new use of polymerase chain reaction provides detection of clonally rearranged antigen receptor genes in 91% of canines with lymphoid malignancy. This will further allow detection of NHL in small biopsy samples and bone marrow/peripheral blood samples and detection of residual disease after chemotherapy administration.

Treatment

Therapy and management of non-Hodgkin's lymphoma primarily involves the use of cytotoxic chemotherapy combinations, because it is one of the most chemotherapy-responsive cancers. The most common combination is the CHOP-based protocol described above. With the use of multi-agent chemotherapy, one can obtain a response rate of greater than 80% of cases. The duration of response with a good quality of life is approximately 12 months.

Comparative Oncology

Radiation and combination chemotherapy protocols induce a high rate of response in humans and dogs. This response is known to last a certain period of time depending on accepted prognostic factors. The foremost problem of human and canine NHL is relapse and the acquisition of chemoresistant phenotypes. This is where disease progression returns and advances to produce eventual multi-organ failure and a decline in quality of life. The similarities of diagnosis, treatment, and relapse in humans and canines allow comparative studies to be undertaken to further analyze new molecular markers with NHL and use these new markers as targets for additional treatment.