

# Hodgkin Lymphoma

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## Introduction

Lymphomas are cancers caused by the malignant transformation of immune cells within the lymphatic system. This system includes the lymphatic vessels and nodes, the spleen, thymus, bone marrow and tonsils that collectively help protect the body from infection and disease.<sup>1</sup> Lymphomas are the third most common malignancy in children and adolescents (10-12%), and are divided into two main types, Hodgkin and Non-Hodgkin Lymphoma.<sup>2</sup>

The pathology of Hodgkin Lymphoma can be characterized by giant “owl eyed” cells called Reed-Sternberg cells, and the two main subdivisions include Classic Hodgkin or Nodular Lymphocyte-Predominant. The Epstein-Barr virus (EBV) has been theorized as a causative factor for this malignancy although remnants of the virus are not seen in every case. Also, there is an increase in the incidence observed among patients with an underlying immunodeficiency or with a family history of Hodgkin Lymphoma.<sup>3</sup>

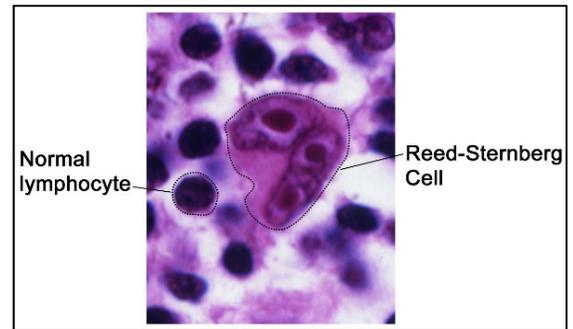


Figure 1. <sup>1</sup>

Hodgkin Lymphoma makes up 6% of childhood cancers, and it is highest among adolescents aged 15 to 19 years (29 cases per 1 million).<sup>1</sup> The male to female ratio differs by age with a male predominance in children less than 5 years old and a slight female predominance in the adolescent population.<sup>1</sup> More than 90% of children with Hodgkin Lymphoma are cured with our modern therapeutic approach, and the potential treatment modalities include chemotherapy and radiation. With increasing survival rates, we have focused on decreasing the long-term side effects of chemotherapy and radiation by using a risk and response-based approach to therapy.<sup>1</sup>

## Clinical Presentation and Diagnosis

Most patients with Hodgkin Lymphoma will present with painless, swollen lymph nodes near the neck, chest, underarm, or groin. Three quarters of adolescents will present with disease in the chest (mediastinum), and although many are asymptomatic, the disease within the chest may cause cough or difficulty breathing while lying down.<sup>3</sup> Classic systemic symptoms of Hodgkin Lymphoma, often referred to as B symptoms, include fever, drenching night sweats, and weight loss. The presence of these symptoms is used in the staging.

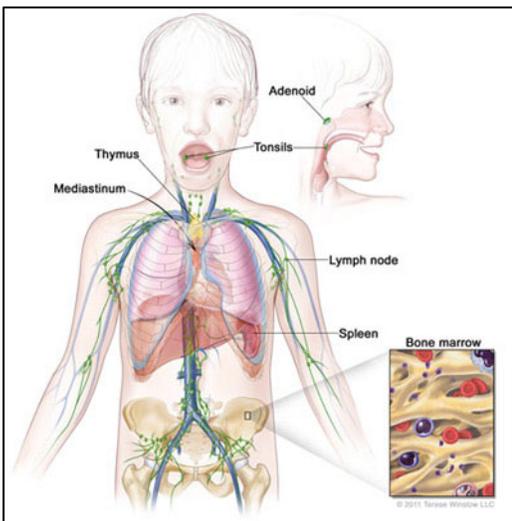


Figure 2.<sup>5</sup>

The diagnosis of Hodgkin Lymphoma will involve a biopsy of swollen lymph node(s), and additional imaging (CT, MRI, PET), diagnostic labs, and likely a bone marrow biopsy to determine the spread of the disease. Hodgkin Lymphoma is given a stage, I to IV, depending upon the location of the disease in the body, and then further assigned a letter to classify the patient's risk and prognosis. The letters refer to the presence or absence of the B symptoms (A or B), cancer found in non-lymph tissue (E), or cancer found in the spleen (S). Finally, patients are given a risk group (low-, intermediate-, or high-risk disease) to determine the appropriate treatment approach.<sup>3</sup>

## **Treatment**

The pediatric multidisciplinary team, including the pediatric oncologists, radiation oncologist, and surgeons, will consider several factors to determine the appropriate therapy. This includes the stage of the cancer, tumor size, presence of B symptoms, type of Hodgkin Lymphoma, and ultimately how the cancer responds to chemotherapy. The initial treatment of Hodgkin Lymphoma will involve a combination of chemotherapy drugs to stop the growth and spread of the lymphoma, and the duration and number of cycles depends upon the patient's risk group. Following chemotherapy, many patients with Hodgkin Lymphoma will additionally receive radiation therapy which has proven efficacy against this cancer. However, the interim response to initial chemotherapy is an important prognostic factor and has been used to tailor the need for radiation in patients with lower risk disease, rapid early response, and complete resolution of the cancer to chemotherapy alone.<sup>1</sup>

In the last decade, the overall survival for patients with Hodgkin Lymphoma has improved dramatically. However, patients with relapsed or refractory disease may require high dose chemotherapy and a stem cell transplant to cure their disease. Pediatric clinical trials have also continued to investigate novel immunotherapy and targeted drugs, like Brentuximab vedotin, for the approximately 10% of patients that do not respond to standard therapies.<sup>3</sup>

## **Experience at Akron Children's Hospital**

We reviewed our experience treating patients with Hodgkin Lymphoma from January 2006 to January 2020. During this time period, we diagnosed 59 new cases of Hodgkin Lymphoma, with an average of 4 cases annually (2 to 6 cases per year). Overall, this tumor accounts for 4.8% of our newly diagnosed malignancies in the last 15 years. The age at diagnosis ranged from 2 to 20 years old with a median of 15 years old, comparable to the national data reporting the highest incidence among adolescents aged 15 to 19 years old.<sup>1</sup> A majority of cases were confirmed by pathology to be a Classic Hodgkin Lymphoma (85%) and the remaining were the Lymphocyte-predominant subtype. There was also an overall slight male predominance (1.2:1), but this was more accentuated in the lymphocyte-predominant subtype (3.5:1).

Almost all of our patients' treatment included a combination of chemotherapy agents, and thirty-five cases required radiation as a part of their therapy. Additionally, only one patient had a relapse of their Hodgkin Lymphoma and ultimately required a stem cell transplant. The overall survival of our patients with Hodgkin Lymphoma is 100%, and this is comparable to the national SEER database cure rates that report a 5-year survival of 98.2%.<sup>4</sup> Akron Children's currently has an open clinical trial for advanced Hodgkin Lymphoma, and we continue to collaborate on research efforts with the Children's Oncology Group to benefit our patients.

## References

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