# Chemotherapy in Children with Head and Neck Cancers

## Perspectives and Review of Current Therapies

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**KEYWORDS**

• Chemotherapy • Pediatric cancer • Lymphoma • Retinoblastoma • Rhabdomyosarcoma
• Neuroblastoma

**KEY POINTS**

- The head and neck are common sites for cancers in children and young adults; although usually from metastatic disease, several pediatric malignancies originate in various head and neck structures.
- Non-Hodgkin and Hodgkin lymphoma comprise the most common head and neck malignancies seen in children and young adults; other important malignancies include rhabdomyosarcoma, neuroblastoma, and Langerhans cell histiocytosis.
- Chemotherapy is often required to treat head and neck malignancies in children and young adults, and is associated with acute toxicities, late effects, and potential additional morbidity when combined with radiation and/or surgical therapies.
- Survival rates are favorable for many malignancies of the head and neck in children and young adults.
- As more children and young adults survive treatment for their head and neck malignancies, providers must be vigilant in monitoring for potential late effects of therapy, as well as ensuring proper transitioning of their patients to adult care.

## INTRODUCTION

Cancers of the head and neck constitute approximately 12% of all cancers in children ages 1 to 15 years in the United States.[1] Specific incidence estimates outside the United States are not widely reported, although Gosepath and colleagues[2] reported the incidence of head and neck cancers in a large cohort of German children to be 4.48 per 100,000. Both these estimates specifically excluded primary brain and spinal tumors, which are also omitted for the purposes of this review. The most common malignancies in children presenting in the head and neck are shown in **Fig. 1**. In their analysis of the Surveillance, Epidemiology, and End Results (SEER) registry from 1973 to 1996, Albright and colleagues[1] found that lymphomas, neural tumors, thyroid malignancies, and soft tissue sarcomas comprised greater than 80% of the 3050 head and neck tumors diagnosed in children during that

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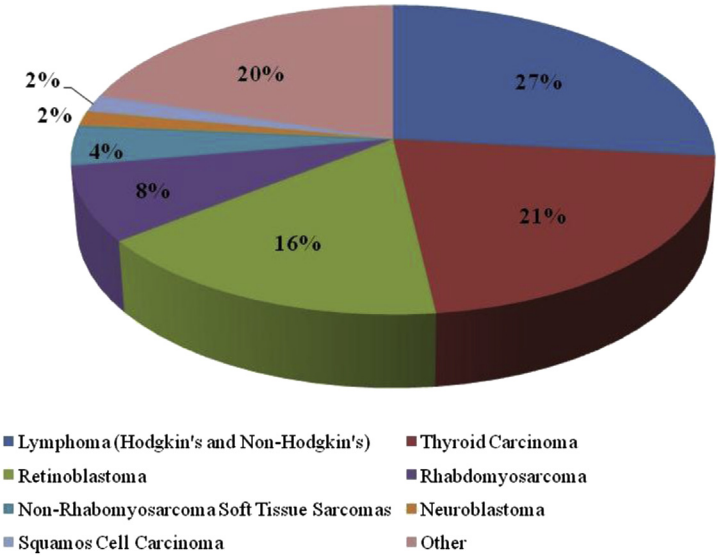


**Fig. 1.** Common pediatric malignancies of the head and neck. (*Data from* Albright JT, Topham AK, Reilly JS. Pediatric head and neck malignancies: US incidence and trends over 2 decades. Arch Otolaryngol Head Neck Surg 2002;128(6):655–9.)

period. Incidence estimates are complicated by overlapping definitions of pediatric cancers that are exclusive to the head and neck versus the more common malignancies that can originate at other sites, including the head and neck (eg, rhabdomyosarcoma). Based on an analysis of the SEER registry from 1973 to 2008 by Cesmebasi and colleagues,[3] excluding common malignancies that can originate at other sites, the incidence of cancers in children originating exclusively in the head and neck region was approximately 0.25 per 100,000. The analysis noted the 5 most common anatomic sites involved, in order of frequency, were (1) salivary glands; (2) nasopharynx; (3) nose, nasal cavity, and middle ear; (4) gum and other mouth; and (5) tongue, and almost all were of squamous cell carcinoma (SCC) histology.

The age of a child at which they present with a head and neck malignancy is an important consideration. For example, malignancies presenting in the head and neck of children age birth to 5 years old will commonly include neuroblastoma or retinoblastoma, which are exceedingly rare in older children. In adolescents and young adults (AYAs), head and neck malignancies are more likely to be lymphomas, soft tissue sarcomas, and other common adult cancers, such as SCC. Determining prognosis and appropriate treatments for young patients with head and neck malignancies requires risk stratification. Patient characteristics included in risk stratification commonly include age, anatomic site(s) involved, extent of surgical resection, presence of metastatic disease, molecular/cytogenetic features of the malignancy, histologic type/differentiation of the malignancy, and responsiveness to therapy.

On confirmation of the diagnosis, many cancers of the head and neck will require close coordination among providers regarding the timing of chemotherapy and administration of concurrent therapies. In many cases, after a biopsy or primary resection of a head and neck tumor, patients will require time for postoperative wound healing. In this instance, initiation of chemotherapy may be delayed so as to avoid poor wound healing due to general immune suppression, specifically due to chemotherapy's effect on neutrophil number and function. In addition, several malignancies of the head and neck often require radiation therapy. In managing the side effects of radiation to the head and neck, providers need to be acutely aware that many chemotherapeutic agents can impair healing at the irradiated site, and even potentiate the toxic effects of radiation (eg, doxorubicin, actinomycin-D). Knowledge of issues related to the administration of chemotherapy in various head and neck malignancies in children is critical to allow practitioners to better manage their patients while undergoing these crucial therapies. A summary of common chemotherapeutic agents used in treating pediatric malignancies of the head and neck is shown in **Table 1**.

## CANCERS OF THE HEAD AND NECK

### *Lymphoma*

Lymphoma, composed of Hodgkin lymphoma (HL) and non-Hodgkin lymphoma (NHL), is the third most common malignancy diagnosed in children in the United States (after acute leukemia and primary brain tumors). Annually, there are approximately 1700 new cases of lymphoma diagnosed