

# A Tertiary Hospital-based Study on Spectrum of Pediatric Malignancies in ENT and Head and Neck Region

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## Abstract

**Background:** The incidence of malignant tumors of ENT and head and neck region in children is relatively less common than in adults, but they are increasing according to latest literature. The actual statistics in India are not available, but in the United States (USA), approximately 1 in 333 individuals between the ages of 0 and 20 years will be newly diagnosed with cancer each year, affecting a total of nearly 7500 children under the age of 15 years and another 3500 adolescents between 15 and 20 years of age.

**Aim of the Study:** The aim is to study and analyze the different types of malignancies occurring in pediatric age group in a tertiary hospital of Telangana.

**Materials and Methods:** A total of 67 children presenting with various malignancies of ENT and head and neck masses were included in this study. This cross-sectional study was carried out at a tertiary care teaching hospital at Secunderabad, Telangana. All the children were elicited of ENT symptoms, followed by a thorough ENT examination. All the children were subjected to necessary appropriate investigations such as computed tomography paranasal sinuses, magnetic resonance imaging head and neck region, fine-needle aspiration cytology, ultrasound examination of the neck, and biopsy of the tumor. The biopsy tissue was subjected to histopathological, histochemical, and immunocytochemical examinations. Treatment modalities adopted for the children in this study were followed up for 2 years and tabulated. All the data were analyzed using standard statistical methods.

**Observations and Results:** A total of 67 children below 12 years with ENT and head and neck malignant tumors were included in the study. The prevalence rate was 0.24%. There were 39 male children and 28 female children with a male-to-female ratio of 1:1.39. The youngest child was aged 1 year and the eldest child was aged 11 years with a mean age of  $8.44 \pm 1.35$  years. The most common tumor was non-Hodgkin's lymphoma, 21/67 (31.34%), followed by eosinophilic granuloma, 18/67 (26.86%). Neuroblastoma was observed in 14/52 (20.89%) and thyroid malignancy was seen in 13/52 (19.40%) children [Table 1].

**Conclusions:** ENT and head and neck tumors in pediatric age group are not uncommon. The prevalence rate was 0.24%. Among the malignant lesions, lymphomas are most frequent, and among them, the most common was non-Hodgkin's lymphomas. The gender ratio was 1:1.39 (male:female). Awareness of a potential malignancy and careful follow-up of children with suspicious head and neck cancers are mandatory so that more and more head and neck cancers in children are brought to treatment before it is too late. The most common age groups were 4–6 and 10–12 years.

**Key words:** Hodgkin's lymphoma, Malignancies, Nasopharyngeal carcinoma, Pediatric age group, Rhabdomyosarcoma, Squamous cell carcinoma and radiotherapy

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## INTRODUCTION

Malignant tumors are not uncommon in pediatric age groups. The clinical presentation varies with the type of malignant tumors. Most of the children with ENT diseases and head and neck masses are found to have diseases of inflammatory nature. However, other etiologies include congenital and

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neoplastic in nature. Persistent lymph node masses increase the concern of the parents, especially, if they are in the posterior triangle or supraclavicular space that is painless, hard, and not mobile. A single hard node measuring more than 3 Cms persisting for >6 weeks should be investigated thoroughly to exclude malignancy.<sup>[1]</sup> Malignant tumors of ENT and head and neck region account for approximately 5% of all childhood malignancies.<sup>[2]</sup> The cell of origin in these tumours varies considerably; they include blastoma cells, soft tissue supporting cells, small round cell, and hamartomatous processes that mimic malignant tumors.<sup>[3]</sup> Small round cell tumors are usually undifferentiated and poorly differentiated, making it difficult to diagnosis. Whatever may be the type of tumor, they require a coordinated method for diagnose. The children with malignancies require immediate, comprehensive evaluation to provide the most appropriate diagnosis for designing therapy and predicting prognosis.<sup>[4]</sup> It includes histopathological examination with or without histochemical, immunocytochemical, ultrastructural, cytogenetic, and diagnostic molecular pathology techniques.<sup>[5]</sup>

#### Type of the Study

This was a prospective, cross-sectional, and analytical study.

#### Period of the Study

The study duration was from December 2016 to September 2018.

#### Institute of the Study

This study was conducted at Gandhi Medical College, Secunderabad, Telangana, India.

## MATERIALS AND METHODS

A total of 67 children presenting with various malignancies of ENT and head and neck masses were included in this study. This cross-sectional study was carried out at a tertiary care teaching hospital at Secunderabad, Telangana. An ethical committee clearance was obtained before the commencement of the study. An ethical committee cleared consent form was used for the study.

#### Inclusion Criteria

1. Children aged from 1 to 12 years,
2. Children of both the genders,
3. Children with primary malignant tumors only,
4. Children with symptoms pertaining to ENT diseases,
5. Children with duration of symptoms for more than 6 weeks were included in the study.

#### Exclusion Criteria

1. Children with primary intracranial, intraorbital tumors, and inflammatory swellings mimicking neoplasms were excluded from the study

2. Non-neoplastic swellings presenting as tumor-like conditions were excluded from the study.
3. Children with reactive cervical lymphadenitis were excluded.

All the children were elicited of ENT symptoms, followed by thorough ENT examination.

All the children were subjected to necessary appropriate investigations such as computed tomography paranasal sinuses, magnetic resonance imaging head and neck region, fine-needle aspiration cytology, ultrasound examination of the neck, and biopsy of the tumor, and histopathological, histochemical, and immunocytochemical examination was performed. Treatment modalities adopted for the children in this study were followed up for 2 years and tabulated. All the data were analyzed using standard statistical methods.

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## OBSERVATIONS AND RESULTS

A total of 67 children below 12 years of age who were diagnosed having ENT and head and neck malignant tumors from among the total of 27,896 children who took treatment for various diseases were included in this study. The department was attached to a tertiary teaching hospital; the prevalence rate was calculated as 0.24% during the study period of 2 years. There were 39 male children and 28 female children with a male-to-female ratio of 1:1.39. The youngest child was aged 1 year and the eldest child was aged 11 years with a mean age of  $8.44 \pm 1.35$  years. The age group distribution was tabulated and found that children aged 4–6 years and those aged 10–12 years were affected more frequently in this study and accounted together for 42/67 (62.68%) patients. The most common tumor was non-Hodgkin's lymphoma, 21/67 (31.34%), followed by eosinophilic granuloma 18/67 (26.86%). Neuroblastoma was observed in 14/52 (20.89%) and thyroid malignancy was seen in 13/52 (19.40%) children [Table 1]. Neuroblastoma and eosinophilic granuloma were mostly seen in younger age groups from 1 to 6 years, 17/52 (25.37%), followed by children aged above 6 years [Table 1].

## DISCUSSION

The incidence of malignant tumors of ENT and head and neck region in children is relatively less common than in adults, but they are increasing according to latest literature. The actual statistics in India are not available, but in the United States (USA), approximately 1 in 333 individuals between the ages of 0 and 20 years will be newly diagnosed with cancer each year, affecting a total of nearly 7500 children under the age of 15 years and another

**Table 1: The age incidence and type of malignant tumor in the study (n - 67)**

Age group (years)	n (%)	Non-Hodgkin's Lymphomas - 21	Rhabdomyosarcoma - 12	NP carcinoma - 3	Eosinophilic granuloma - 18	Thyroid carcinoma - 13	Neuroblastoma - 14
1-3	11 (16.41)	01	01	00	05	00	04
4-6	20 (29.85)	06	04	00	06	02	02
7-9	14 (20.89)	02	05	01	04	03	03
10-12	22 (32.83)	12	02	02	03	08	05

3500 adolescents between 15 and 20 years of age. 5% of all childhood cancers are head and neck malignancies, thereby affecting approximately 550 children every year.<sup>[6]</sup> There are other studies which also confirm such an increase in the incidence of pediatric malignancies: The overall annual incidence of cancer in children under 15 years of age rose from 11.22 cases/100,000 person-years in the time period of 1973–1975 to 14.03 cases/100,000 person-years in 1994–1996 - an increase of 25%. In this subset, the incidence rate increased from 1.10 to 1.49 cases/100,000 person-years in the same timeframe - an increase of 35%.<sup>[7]</sup> In the present study, the most common tumor was non-Hodgkin's lymphoma, 21/67 (31.34%), followed by eosinophilic granuloma, 18/67 (26.86%). Neuroblastoma was observed in 14/52 (20.89%) and thyroid malignancy was seen in 13/52 (19.40%) children [Table 1]. Neuroblastoma and eosinophilic granuloma were mostly seen in younger age groups from 1 to 6 years, 17/52 (25.37%), followed by children aged above 6 years [Table 1]. In a similar study by Sengupta and Pal,<sup>[8]</sup> lymphomas were the most common (43.39%), followed by rhabdomyosarcoma, nasopharyngeal carcinoma, and others such as thyroid carcinomas. Other studies observed the incidence to be between 7% and 60% in regard to lymphoma in pediatric population.<sup>[9-11]</sup> Rhabdomyosarcoma was the second most common tumor in the present study like other studies.<sup>[12]</sup> Worldwide, literature outlines the common pediatric ENT and head and neck tumors as lymphoma (59%), rhabdomyosarcoma (13%), thyroid (10%), nasopharyngeal carcinoma (5%), neuroblastoma (5%), non-rhabdomyosarcoma soft tissue sarcoma (4.5%), salivary gland malignancies (2.5%), and malignant teratoma (1%).<sup>[6]</sup> In the Rapidis *et al.*,<sup>[13]</sup> lymphomas accounted for 52.3% of the malignant neoplasms - the most frequent of the head and neck malignancies followed by rhabdomyosarcoma and other soft tissue sarcomas. From a German study, it was concluded that the primary malignant tumors in children were commonly arising from soft tissue: Sarcomas (0.39/100000), followed by lymphomas (0.09/100000) and thyroid carcinoma (0.07/100000).<sup>[14]</sup> In a Nigerian study among general population, cancers displayed male predominance, with a gender ratio of 1.8:1; 2.4% of carcinomas were occurring in children. Hematopoietic malignancies constituted 20.4% of head and neck cancers and comprised mainly lymphomas,

which accounted for 19.3% of all head and neck cancers. The most common childhood malignancy was Burkitt's lymphoma, which comprised 28.2% of pediatric head and neck cancers.<sup>[15]</sup> There are few limitations to the present study such that the study was conducted in a tertiary teaching hospital and hence may not represent the actual community based statistics.

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## CONCLUSIONS

ENT and head and neck tumors in pediatric age group are not uncommon. The prevalence rate was 0.24%. Among the malignant lesions, lymphomas are most frequent, and among them, the most common was non-Hodgkin's lymphomas. The gender ratio was 1:1.39 (male:female). Awareness of a potential malignancy and careful follow-up of children with suspicious head and neck cancers are mandatory so that more and more head and neck cancers in children are brought to treatment before it is too late. The most common age groups were 4–6 and 10–12 years.

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