



SPECTRUM OF PEDIATRIC MALIGNANCIES IN A TERTIARY CARE CENTER - A RETROSPECTIVE OBSERVATIONAL STUDY FROM ANDHRA PRADESH, INDIA

Oncology

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ABSTRACT

Background: Studies are scarce from Andhra Pradesh regarding the spectrum of pediatric cancers. Hence we aimed to study the demographic profile, type, and pattern of pediatric malignancies in a tertiary care centre. **Methods:** A retrospective observational study was conducted in the Department of Medical Oncology, SVIMS, Tirupati from June 2016 to July 2018. All patients aged 0-18 years with a confirmed diagnosis of malignancy were enrolled in the study, and data related to age, sex, and type of cancer were retrieved from clinical records. Descriptive statistics were used to analyze data by SPSS 22. **Results:** Of the 92 patients registered, 50 (54%) had hematolymphoid malignancies, and 42 (46%) had solid malignancies. The median age was 13 years, and 62 (67.3%) were males, and 30 (32.7%) were females. Leukaemia 38 (41.3%) was the most common pediatric malignancy followed by lymphoma 17 (18.4%), out of which Acute lymphoblastic leukaemia (ALL) was seen in 23 (25%) and Hodgkin's lymphoma in 9 (9.8%). Among solid tumours, Ewing's sarcoma was the most common malignancy 10 (10.8%). **Conclusions:** ALL was the most common haematological malignancy, while Ewing's sarcoma was predominant type seen in solid malignancy.

KEYWORDS

Leukemia, Pediatric cancer, Andhra Pradesh.

1. INTRODUCTION:

Cancer remains one of the primary causes of death in children between 1-15 years of age next to malnutrition and infections in India⁽¹⁾. In developing countries, pediatric malignancies account for 4.1% to 12.5% of all malignancies. In India, approximately 45000 children are diagnosed with cancer every year⁽²⁾. Childhood cancers are unique in the sense that they arise from embryonal cells, respond rapidly to treatment because of which survival has drastically improved over the past two decades.

The Department of Medical Oncology, SVIMS, is one of the major referral centres for a wide variety of cancers diagnosed in any hospital across the state of Andhra Pradesh. We aimed to study the epidemiology of pediatric malignancies to give an insight into the pattern of distribution of childhood cancers and to characterize their demographic features.

2. Materials and Methods:

Study design:

A retrospective observational study was conducted in the Department of Medical Oncology, SVIMS, Tirupati, India, from June 2016 to July 2018. Patients aged 0-18 years with a diagnosis of malignancy were included in the study. The clinical database of these patients was analyzed, and data regarding age, sex, and type of cancer were collected.

Statistical analysis:

Microsoft Excel 2013 was used for data entry and double-checked for any errors. Frequency and proportions were used to summarise categorical variables. Mean $\pm$ SD was used to summarise continuous variables, and the median with interquartile range was used to summarise the skewed variables. Data analysis was done using Statistical Package for the Social Sciences version 22.0.

3. Results:

Demographic characteristics:

Out of 92 patients that were included in the study, 62 (67.3%) were male, and 30 (32.7%) were female with a male to female ratio of 2:1. The median age was 13 years ranging from 2 to 18 years. Patients were

stratified into three different age groups: 0-6 years, 7-12 years and 13-18 years with the highest number of cases 48 (52%) noted in the category of 13-18 years.

Profile of pediatric malignancies:

Table 1: Showing the spectrum of pediatric malignancies.

S.No	Type of Tumours	No of Cases	Percentage
1	Leukemias	38	41.3
2	Lymphomas	17	18.4
3	CNS Neoplasms	3	3.2
4	Neuroblastoma	2	2.1
5	Renal Neoplasms	4	4.3
6	Malignant bone tumours	13	14.1
7	Soft-tissue Sarcomas	8	9
8	Germ Cell Tumors	4	4.3
9	Others	3	3.3
	Total	92	100

Tumours were stratified according to the International Classification of Childhood Cancers (ICD 0-3). Hemato-lymphoid malignancies were seen in 55 (59.8%) and solid malignancies in 37 (40.2%) patients. Leukaemia was the most common malignancy seen in 38 (41.3%) followed by lymphoma 17 (18.4%) among hematolymphoid malignancies. Acute lymphoblastic leukemia (ALL) was seen in 23 (25%) patients, Acute Myeloid leukemia (AML) in 10 (10.8%) and Chronic myeloid leukemia (CML) in 5 (5.4%) patients. Among lymphomas (17), there were 9 (9.8%) Hodgkin's lymphomas and 8 (8.7%) Non-Hodgkin's lymphoma cases.

Among solid malignancies, malignant bone tumours comprised 13 (14%). Ewing's sarcoma (skeletal) was the most common 10 (10.8%) solid tumour followed by renal neoplasm 4 (4.4%), extraosseous Ewing's sarcoma 4 (4.4%), other soft tissue sarcomas 4 (4.4%) and germ cell tumour in 4 (4.4%). Osteosarcoma was seen in 3 (3.2%) patients. The central nervous system tumours were among the least common solid malignancies 3 (3.2%) with one astrocytoma and two medulloblastoma cases. ALL was the most common pediatric cancer overall 23 (25%).

4 Discussion:

Pediatric cancer incidence is increasing in India⁽³⁾. In our study, male preponderance was seen, which is comparable to other studies done in India by Pattnaik et al.⁽⁴⁾ and Chauhan et al.⁽⁵⁾. This may be partially related to skewed gender selection of cases rather than true disparity, which may be explained by cultural factors where boys get more attention and are brought to medical care more often than girls. Genetic difference in immune function may also contribute to more number of lymphomas among males. The distribution of pediatric malignancies was different in three age groups with the highest incidence (52%) in the 10-14 age group, which was similar to Punia et al.⁽⁶⁾ and Chauhan et al. study⁽⁵⁾.

Table 2: Comparison of the spectrum of pediatric malignancies with other studies(%).

Types of tumours	Jabeen et al.(13) 2010	Bhalodia et al.,(6) 2011	Pattnaik et al., (4) 2012	Devi S et al (12) 2014	Jan m et al.,(9) 2015	Chauhan et al.,(5) 2017	Present study 2018
Leukemias	14.3	44.18	45.5	10.15	38.1	29.4	41.3
Lymphomas	24.2	16.27	8.2	16.16	23.8	17.6	18.4
CNS tumors	3.7	6.97	3.6	6.0	9.5	7.8	3.2
Neuroblastoma	-	6.97	4.5	5.64	6.35	2.0	2.1
Retinoblastoma	17.4	-	5.5	6.0	4.76	2.0	-
Renal tumors	6.8	9.30	4.5	10.15	4.76	9.8	4.3
Hepatic tumors	1.3	-	0.9	-	-	-	-
Malignant bone tumors	7.3	2.32	10.0	12.41	4.76	11.8	14.1
Soft tissue sarcomas	-	2.32	11.8	11.6	6.35	7.8	9
Germ cell tumors	3.7	-	4.5	6.0	-	7.8	4.3
Others	21.3	11.67	0.9	15.7	1.59	4.0	3.3

The annual incidence of pediatric cancers worldwide is more than 2 lakh cases, of which 80% are from developing countries⁽⁷⁾. Leukaemia was the most common malignancy seen in our study accounting for 41.3%, which was similar to studies done by Bhalodia et al.⁽⁸⁾ (44.1%), Pattnaik et al.⁽⁴⁾ (45.5%) and Jan M et al.⁽⁹⁾ (38.1%). In western countries, ALL (30%) is followed by CNS tumors (20%) and lymphomas (12%) (10). Contrary to western studies, the incidence of brain tumours is less in India, making lymphoma the second most common malignancy accounting for 18.4% in our study. These results were in concordance with the study done by Chauhan et al.⁽⁵⁾ (17.6%) and Bhalodia et al.⁽⁸⁾ (16.2%). We have a small number of CNS tumours (3.2%) reported which could be related to underdiagnosis of cases due to lack of well equipped magnetic resonance imaging scanning centres with anesthetists backup, delay in diagnosis and referral of such cases by the rural centre physician may limit their presentation to Medical Oncology department⁽¹¹⁾. The incidence of malignant bone tumours in our study was higher (14.1%) than most other studies except Punia et al.⁽⁶⁾ (32.7%), which reported very high incidence as the study included solid tumours only. The incidence of the renal tumour was low (4.3%) in concordance with Pattnaik et al.⁽⁴⁾ study (4.5%) and contrast with other studies Devi S et al.⁽¹²⁾ (10.1%) and Bhalodia et al.⁽⁸⁾ (9.3%).

5 Conclusion :

ALL was the most common haematological malignancy, and Ewing's sarcoma was the most common solid malignancy.

6 Limitations:

The study population is relatively small to generalize the results.

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