Original Article

Clinicopathologic study of pediatric neoplasm

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Abstract

Objective: Paediatric malignancies, being a significant cause of death among children. This study was performed with an aim to find out the profile of childhood cancers in rural tertiary care hospital, for a period of six years (2005-2010) and present hospital based data of pediatric neoplasm. **Materials and Methods:** The paediatric population (0-14 yrs of age), was diagnosed histopathologically to have neoplasm (benign and malignant), in the Department of Pathology, S.R.T.R. Medical College, Ambejogai, Maharashtra, India were included in study for analysis. **Result:** Paediatric malignancies comprise 4.8% of the cancer of total number of cancer diagnosed on histopathology. Out of 94 cases in pediatric age group, 61 (64.89%) were benign and 33 (35.11%) were malignant. In present study, most common age group affected was 10-15 year (49 cases) followed by 0-4 year (29 cases) and 5-9 year (16 cases). There were 43 males and 51 females. Out of total 33 histologically confirmed cases of cancers, retinoblastoma and lymphoma comprised 7 cases each, followed by nephroblastoma comprising 6 cases. Bone tumor and Soft tissue tumor were the next most common tumors each accounted 4 cases followed by teratoma (2 cases), mixed germ cell tumor with yolk sac element (1 case), squamous cell carcinoma of anal canal (1 case) and secondaries in lymph node with unknown primary (1 case). In present study, total 61 cases of benign tumor included 3 cases of nerve sheath tumor (4.91%), 2 cases of benign cystic teratoma (3.28%), 2 cases of osteochondroma (3.28%), 36 cases of soft tissue tumor (59.02%) and 18 cases of juvenile fibroadenoma (29.51%). **Conclusion:** The frequency of different neoplasm which are detected at a particular centre is not an exact reflection of the prevalence of neoplasm in that population, but the information is useful in showing pattern of neoplasm in pediatric age group at the rural hospital, which may help workers at comparative studies in creation of database of pediatric tumors in India.

Keywords: Pediatric neoplasm, Retinoblastoma, Nephroblastoma, Teratoma.

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INTRODUCTION

Only 2% of all the malignant tumors occur in infancy and childhood.[1] Cancer is essentially a disease of adults, yet it is one of the common killers in childhood. In western countries, cancer is next only to trauma as a cause of mortality in children under 15 years of age. In developing countries like India, although infections and malnutrition are the major factors contributing to morbidity and mortality, malignancies are coming into greater focus because of preventive measures being taken for the former.[2] Benign tumors are more common than malignant tumors and are of little concern but sometimes they can cause serious problems due to their location or rapid increase in size. The features of malignancies in children differ biologically and histologically from those of adults such as incidence and type of tumor, their origin from the embryonal cells, prevalence of underlying familial or genetic aberration, tendency to regress spontaneously or cytodifferentiate.[3] Spectrum of malignancies in children varies with age like during the 1st year of life, embryonal tumors such as Neuroblastoma, Wilms' Tumor (Nephroblastoma), Retinoblastoma, Rhabdomyosarcoma and Medulloblastoma predominates. Embryonal tumors together with acute leukemias, Non-Hodgkin lymphomas and gliomas, peak in incidence from 2–5 years of age and as age increases, especially after puberty, bone malignancies, Hodgkin disease, gonadal germ cell malignancies (testicular and ovarian carcinomas) and various carcinomas such as thyroid cancer and malignant melanoma increase in incidence. Accurate diagnosis and staging of the extent of disease is imperative, especially for children, whose cure rates are so high.[4]

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METHOD AND MATERIAL

The study was carried out retrospectively and prospectively on the tumors encountered in pediatric age group (0 – 14 years) during the period of Jan 2005 to Nov 2010 in the dept. of pathology, at rural tertiary care hospital. The present study is undertaken to observe frequency, age/sex wise distribution, to correlate clinical and histopathological findings and to classify benign and malignant pediatric tumor with the exclusion of leukemias. All tumors were diagnosed on routine hematoxylin and eosin stained sections by experienced pathologist.

RESULTS

Total number of tumors received in the department of pathology during the period of Jan 2005 to Nov 2010 were 1958, out of which 94 (4.8%) were in the pediatric age group. Out of 94 cases in pediatric age group, 61 (64.89%) were benign and 33 (35.11%) were malignant. In present study, most common age group affected was 10-15 year (49 cases) followed by 0-4 year (29 cases) and 5-9 year (16 cases). There were 43 males and 51 females.

Benign Tumors

As shown in Table No. 1, in present study, total 61 cases of benign tumor included 3 cases of nerve sheath tumor (4.91%), 2 cases of benign cystic teratoma (3.28%), 2 cases of osteochondroma (3.28%), 36 cases of soft tissue tumor (59.02%) and 18 cases of juvenile fibroadenoma (29.51%). Among nerve sheath tumors, 2 cases were of schwannomas (3.28%) and 1 case of neurofibroma (1.64%). Out of total 36 cases of soft tissue tumors, 23 cases were of hemangiomas (37.7%), 12 cases were of lipomas (19.67%) and 1 case was of hemangioendothelioma (1.64%). In present study most common affected site in hemangioma was head, neck and face followed by extremities, chest and back while in lipoma, back and proximal upper limb were the most commonly involved sites followed by neck, distal upper limb and proximal lower limb. Two cases of osteochondroma were recorded involving distal end of Femur and Humerus respectively. All cases of juvenile fibroadenoma presented in female in the age group of 10 - 14 year.

Table 1: Incidence of Benign Tumors

Sr.No.	Tumor Type	Number of cases	Percentage %
1	Nerve sheath tumor	3	4.91%
2	Benign cystic teratoma	2	3.28%
3	Osteochondroma	2	3.28%
4	Soft tissue tumor	36	59.02%
5	Juvenile fibroadenoma	18	29.51%
	Total	**61**	**100%**

Malignant Tumors

Out of total 33 histologically confirmed cases (Table No. 2), retinoblastoma and lymphoma comprised 7 cases each, accounted for 21.21% of total malignant pediatric tumor. This is followed by nephroblastoma comprising 6 cases out of 33 cases (18.18%). Bone tumor and Soft tissue tumor were the next most common tumors each accounted for 12.12% of malignant pediatric tumors i.e. 4 cases each. Other rare tumors reported were teratoma (2 cases), mixed germ cell tumor with yolk sac element (1 case), squamous cell carcinoma of anal canal (1 case) and secondaries in lymph node with unknown primary (1 case). Out of 7 lymphoma cases, 4 were Non-Hodgkin's Lymphoma and 3 were Hodgkin's Lymphoma. Most common subtype in Non-Hodgkin's Lymphoma was diffuse small cell lymphoma. Four cases of Bone tumors were observed including 2 cases of Ewing's sarcoma and 2 cases of osteosarcoma. In soft tissue sarcoma, 2 cases were of rhabdomyosarcoma, one involving head and neck area and other involving proximal lower limb and 2 cases of mesenchymal chondrosarcoma. Two cases of malignant teratoma were reported comprising Malignant ovarian teratoma and Immature sacrococcygeal teratoma. One case each of mixed germ cell tumor with yolk sac element, squamous cell carcinoma of anal canal and secondaries in lymph node with unknown primary was recorded.

Table 2: Various Malignant Tumors in present study

Sr. No.	Tumor Type	Number of Cases	Percentage
1	Retinoblastoma	7	21.21%
2	Kidney Tumor	6	18.18%
3	Teratomas	2	6.06%
4	Lymphomas	7	21.21%
5	Bone Tumors	4	12.12%
6	Soft Tissue Tumor	4	12.12%
7	Gonadal Tumor	1	3.04%
8	Carcinomas	1	3.03%
9	Unknown Primary	1	3.03%
	Total	**33**	**100%**

DISCUSSION

Childhood tumors form a highly specific group, mainly embryonal in type and arising in the lymphoreticular tissue, CNS, connective tissue and viscera, epithelial tumors are rare. Classifying cancer by anatomic site is satisfactory for cancers in adults, but it is not suitable for classifying cancer in children.[5] Incidence of pediatric tumors, was found to be 4.8% which is comparable with the studies of Singh et al[6] and Akhiwu *et al*[7] who reported 5.15% and 5.83% incidence respectively.

Benign Tumors

In present study, soft tissue tumors comprises 59.02% (36 cases) of all benign tumors. Out of these 23 (37.70%)

were hemangiomas, 12 were lipoma (19.67%) and one case was of hemangioendothelioma (1.64%). Sharma *et al*[1] observed 52.2% incidence of overall pediatric benign soft tissue tumors. They also recorded 42.45% cases of hemangioma and 9.75% cases of lipoma in their study. In present study, 4.91% were benign nerve sheath tumor while Sharma *et al*[1] reported 8.18% and Banerjee *et al*[2] revealed 6.59% benign tumors of central and peripheral nervous system. So the present study findings are in accordance with the previous studies. Majority of breast masses in the pediatric age group are benign, but malignancies do occur. Juvenile fibroadenoma is the most frequent breast tumor in adolescent girls.[5]

Malignant Tumors

Incidence of pediatric malignant tumor was 2.94% in present study which is low as compared to the studies of Jussawalla *et al*,[8] Jamal *et al*[9], Mohammed *et al*[10], Arora *et al*[11]and Jabeen *et al*[12] who recorded the incidences as 3.5%, 4.3%, 8.44%, 1.6 – 4.8 and 4.4% respectively. This is because of the fact that various tumors like brain tumor were referred to higher centers as they were inoperable in our setting.

Table 3: Incidence of Histological types of Malignant Tumor in various studies

Tumors	Banerjee *et al*[2]	Sharma *et al*[1]	Jabeen *et al*[12]	Present Study
Retinoblastoma	8.7	6.49	17.4	21.21
Kidney Tumor	8.5	19.48	6.8	18.18
Teratomas	3.8	-	-	6.06
Lymphomas	25.9	21.43	24.2	21.21
Bone Tumors	10.5	9.74	7.3	12.12
Soft Tissue Tumor	14.3	7.14	-	12.12
Gonadal Tumor	-	8.44	3.7	3.04
Carcinomas	5	11.1	-	3.03
Unknown Primary	-	-	2.0	3.03
Others	23.3	16.18	38.6	-
Total	**100**	**100**	**100**	**100**

Incidence of various malignant tumors reported in our study are comparable with the studies of Banerjee *et al*[2], Sharma *et al*[1] and Jabeen *et al*[12] as shown in Table no. 3.

CONCLUSION

Results of the study showed that there is definite differences between tumors of pediatric population if compared with tumors in adults. Small round cell neoplasm as cited in literature as common pediatric malignant tumor holds true even at this rural hospital. The data generated at study contribute to understanding incidence of various tumors in pediatric population that would contribute to National Cancer Registry in surveillance of cancer in pediatric population in India and about its awareness.

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