

## Neoplastic Solid Lesions of Pediatric age group- A hospital based study

Kediya AS, Likhari KS, Girji DD, Likhari SK

### ABSTRACT

**Background:** 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. Only 2% of all the malignant tumors occur in infancy and childhood.

**Aim:** To observe frequency, age and sex wise distribution and to correlate histopathological findings of tumors of pediatric age group.

**Method:** A prospective cross sectional study conducted during Jan '2005 to Nov '2010 in the department of Pathology of S.R.T.R. Medical College & Hospital, Ambajogai. 94 cases of pediatric solid tumor diagnosed clinically and histopathologically were included.

**Result:** Pediatric tumors accounts for 4.8% with a female predominance (M:F ratio 0.84:1). 64.89% were benign and 35.11% were malignant with B: M ratio of 1.85:1. Maximum cases were observed in the age group 10-15 year i.e. 47 cases (50%) followed by 25 cases (26.6%) in 0-5 year of age group and 22 cases (23.4%) in 5-10 year of age group.

**Conclusion:** Most common benign tumor was hemangioma. Retinoblastomas and lymphomas were the most common malignant tumors.

**Key Words:** neoplastic lesion, pediatric tumour, benign, malignant

### INTRODUCTION

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 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.<sup>1</sup> Most benign tumors are of little concern but sometimes they can cause serious problems due to their location or rapid increase in size.<sup>2</sup>

“Child is not a miniature adult” the features of malignancies in children differ biologically and histologically from those of adults.<sup>3</sup> The main differences are; incidence and type of tumor, prevalence of underlying familial or genetic aberration, tendency of fetal and neonatal malignancies to regress spontaneously or cytodifferentiate and close relationship

between abnormal development (teratogenesis) and tumour induction (oncogenesis).<sup>2</sup>

But for brain tumors, tumors in the children are invariably classified by histological type rather than their anatomic site, as their prognosis depends on the former.<sup>4</sup> Histologically, these tumors are often characterized by sheets of cells with small round nuclei and frequently show features of organogenesis specific to the site of tumor origin so designated by suffix “Blastoma” and collectively referred to as small round blue cell tumors.<sup>2</sup>

Acute leukaemia, brain cancers, lymphomas and sarcomas of soft tissue and bone predominate in children and adolescents. In adults, in contrast, epithelial tumors of organs like lung, colon, breast, and prostate are most common. Unlike incidence patterns in adults where cancer rates tend to rapidly increase with

increasing age, relatively wide age variability exists during development, with two peaks, one in early childhood and another in adolescence. During the 1st year of life, embryonal tumors such as Neuroblastoma, Wilms' Tumor (Nephroblastoma), Retinoblastoma, Rhabdomyosarcoma and Medulloblastoma are most common. These tumors, which are likely congenital, occur far less often among older children, whose developmental processes and cell differentiation have slowed considerably and are extremely unusual in adults.<sup>5</sup>

Embryonal tumors together with acute leukemias, Non-Hodgkin lymphomas and gliomas, peak in incidence from 2–5 years of age. As children age, especially after they pass 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.<sup>5</sup> It appears that adolescence is a transitional period between the common early childhood malignancies and characteristic carcinomas of adulthood.<sup>5</sup>

Accurate diagnosis and staging of disease is imperative, especially for children, whose cure rates are so high. Accuracy also is essential, not only because the nature of therapy depends strongly on the type of cancer but also because better and worse prognostic subgroups, based on stage of disease, have been established for most cancers that occur in children. Accordingly, children with a better prognosis are treated with less intensive therapy thus avoiding the occurrence of excessive acute adverse effects and long-term complications of

therapy. Because of major advances in diagnosis and multimodality therapy over 60% of childhood cancers are now curable.<sup>5</sup>

The present study is undertaken to observe frequency, age/sex wise distribution, to classify benign and malignant paediatric tumor in a period from Jan 2005 to Nov 2010 with the exclusion of leukemias.

## MATERIAL AND METHODS

A prospective cross sectional study conducted during Jan '2005 to Nov '2010 in the department of Pathology of S.R.T.R. Medical College & Hospital, Ambajogai, to know the frequency of pediatric tumor.

*Study Population:* 94 cases of pediatric solid tumor diagnosed clinically and histopathologically.

*Inclusion Criteria:* Only those cases which after clinical examination had been subjected to biopsy or surgery and subsequently to histopathological examination.

*Exclusion Criteria:* Patients who were treated conservatively, either biopsy or surgery was not performed or referred to other hospitals were excluded from the study.

While selecting the age, sex and clinical presentation of the patient formed an important part. All recruited patients were examined thoroughly. Local examination included site, size, surface, consistency and movement of the swelling. Only those cases were selected for study which had been subjected for histopathological examination.

## RESULTS

A total of 1958 cases were received by the department during the study tenure; out of which pediatric tumors were 94 (4.8%). Out of total malignant tumour 1123, pediatric tumours were 33 (2.94%) Out of 94 cases 43 were male and 51 were female with 0.84:1 M:F ratio. Out of 94 cases of pediatric tumors, 61 (64.89%) were benign and 33 (35.11%) were malignant with B: M ratio of 1.85:1. Maximum cases were observed in the age group 10-15 year i.e. 47 cases (50%) followed by 25 cases (26.6%) in 0-5 year of age group and 22 cases (23.4%) in 5-10 year of age group.

**Table.1.** Frequency of Paediatric Tumours according to Age distribution

| Age groups | Malignant |        | Benign  |        |
|------------|-----------|--------|---------|--------|
|            | No.(33)   | %      | No.(61) | %      |
| 0-4 year   | 11        | 33.33% | 13      | 21.31% |
| 5-9 year   | 9         | 27.28% | 12      | 19.67% |
| 10-15 year | 13        | 39.39% | 36      | 59.02% |

Total 33 cases of malignant pediatric tumors consisted of 7 cases (21.21%) each of retinoblastomas and lymphomas, 6 cases (18.18%) of Wilms' tumors, 2 cases (6.06%) each of Ewing's sarcoma, mesenchymal chondrosarcoma, osteosarcoma, rhabdomyosarcoma and teratoma and 1 case (3.03%) each of germ cell tumor, squamous cell carcinoma and secondary in lymph nodes. Thus lymphomas and Retinoblastomas are the most common malignant tumors followed by kidney, bone and soft tissue tumors.

In malignant pediatric tumors, maximum cases were observed in the age group of 0-5 year i.e. 12 cases (36.36%) followed by 10-15 year i.e. 11 cases (33.33%) and 5-10 year i.e. 10 cases (30.31%) with a M:F ratio of 1.75:1.

All the 7 cases of retinoblastoma were below 5 year of age with M:F ratio of 0.75:1 and the most common presentation was white pupillary reflex. One case (14.29%) had bilateral involvement and positive family history. Out of 7 cases of lymphoma, 4 were NHL and 3 were HL with most common age group affected was 5 – 10 year (5 cases) followed by 10 15 year (2 cases). All 7 cases of lymphoma were male and presented with lymph node disease. All the 6 cases of Wilms' tumor presented with kidney involvement and the most common age group affected was 0 – 5 year (4 cases) followed by 5 – 10 year (2 cases) with M:F ratio of 2:1. Both the cases of Ewing's sarcoma were female aged 12 and 15 year and both the cases of osteosarcoma were male aged 13 and 15 year. All the 4 cases of soft tissue tumor presented with swelling. 2 cases of malignant teratomas were studied, one in ovary and second in sacrococcygeal region. Testis, anal canal and inguinal lymph node were the site involved respectively in cases of germ cell tumor, squamous cell carcinoma and secondaries.

Out of 61 cases of benign tumors, 36 (59.02%) were soft tissue tumors, 18 (29.50%) were fibro adenomas, 3 cases (4.91%) were nerve sheath tumors, 2 (3.27%) were bone tumors i.e. osteochondroma and 2 (3.27%) were mature cystic teratoma of ovary. In benign pediatric tumors, maximum cases were observed in the age group of 10-15 year i.e. 36 cases (59.02%) followed by 0-5 year i.e. 13 cases (21.31%) and 5-10 year i.e. 12 cases (19.67%) with a M: F ratio of 0.56:1.

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 cases was of hemangioendothelioma (1.64%).

**Table.2.** Distribution of Various Malignant Paediatric Tumours according to site

| Tumor Type                 | Organ          | Site                  |     |      |       | No. of cases |
|----------------------------|----------------|-----------------------|-----|------|-------|--------------|
|                            |                | *C                    | **A | ***I | ****G |              |
| Lymphoma                   | Lymph nodes    |                       |     |      |       | 8            |
|                            | NHL            | 2                     | 1   | 0    | 1     |              |
|                            | HL             | 1                     | 1   | 0    | 1     |              |
| Secondary                  | Lymph node     | 0                     | 0   | 1    | 0     |              |
| Retinoblastoma             | Eye            |                       |     |      |       | 7            |
| Squamous cell carcinoma    | Anal canal     |                       |     |      |       | 1            |
| Wilms' tumor               | Kidney         |                       |     |      |       | 6            |
| Teratoma                   | Ovary          |                       |     |      |       | 1            |
|                            | Sacroccocygeal |                       |     |      |       | 1            |
| Mixed Germ cell tumor      | Testis         |                       |     |      |       | 1            |
| Osteosarcoma               | Bone           | Proximal end of tibia |     |      |       | 2            |
|                            |                | Proximal Humerous     |     |      |       | 2            |
| Ewing's Sarcoma            |                | Distal Femur          |     |      |       |              |
| Rhabdomyosarcoma           | Soft Tissue    | Lower Limb            |     |      |       | 2            |
|                            |                | Head, Neck, Face      |     |      |       |              |
| Mesenchymal Chondrosarcoma |                | Upper Limb            |     |      |       | 2            |

\*Cervical    \*\*Axillary    \*\*\*Inguinal    \*\*\*\*Generalised

## DISCUSSION

Incidence of total pediatric tumor reported in the studies of Singh et al (1988)<sup>5</sup> and Akhiwu et al (2009)<sup>7</sup> was 5.15% and 5.83% respectively which is in accordance with the present study (4.8%). Banerjee et al (1986)<sup>1</sup> and Sharma et al (2004)<sup>4</sup> recorded the ratio of benign to malignant paediatric tumor in the range of 1.35:1 to 2.06:1 which is comparable with the present study (1.85:1). Incidence of paediatric malignant tumor was 2.94% in present study which is low as compared to the studies of Jamal et al (2006)<sup>8</sup> and Jabeen et al (2010)<sup>9</sup> who recorded the incidences as 4.3% and 4.4% respectively.

In present study, most common age group affected for malignant tumor was 10-15 year

(39.39%) followed by 0-4 year (33.33%) and 5-9 year (27.28%) which is in accordance with the study of Jabeen et al (2010).<sup>9</sup>

The Male to female ratio of malignant pediatric tumors in present study is in concordance with the studies done by Jussawalla et al (1988)<sup>10</sup>, Akhiwu et al (2009)<sup>7</sup> and Jabeen et al (2010)<sup>9</sup>.

In our study, most common malignant tumor were retinoblastoma and lymphoma followed by Wilms' tumor. In studies of Sharma et al (2004)<sup>4</sup> and Akhiwu et al (2009)<sup>7</sup> most common tumor reported was lymphomas followed by Wilms' tumor and retinoblastoma while Jabeen et al (2010)<sup>9</sup> reported lymphomas as the most common tumor followed by retinoblastoma and Wilms' tumor.

In our study, most common benign tumor was hemangioma followed by fibroadenoma and lipoma which is similar to the findings of study done by Sharma et al (2004).<sup>4</sup>

## Limitations:

Major limitation is exclusion of leukemias in this study which is most common malignancy in paediatric age. Also, Patients treated conservatively; on which biopsy or surgery was not performed & referred to other hospitals were also excluded from study thus reducing the incidence of paediatric tumours.

## CONCLUSION

Neoplastic solid lesions in paediatric age group in Marathwada region of Maharashtra is similar to that observed in rest of the country.

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## AUTHOR NOTE

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**Anupkumar S Kediya**, Assistant Professor, Pathology, PCMS & RC, Bhopal

**Komal Singh Likhari**, Professor, Pathology, RKDFMCH & RC Bhopal (**Corresponding Author**): Email: dr.komallikhar@yahoo.com

**DD Girji**, Professor, Pathology, V K Patil Medical Foundation, Ahmednagar, PCMS & RC, Bhopal

**S K Likhari**, Community Medicine, RKDFMCH & RC Bhopal

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