MAK HILL Publications International Journal of Tropical Medicine

Research Article
doi: 10.36478/makijtm.2024.4.136.142

Profile of Pediatric Neoplasms in a Rural Hospital from Western India

[1]Rahul M. Jadhav, [2]Swati V. Dahe, [3]Amol R. Gaikwad, [4]Shreyans A. Amin, [5]Nikhil S. Deshpande, [6]Ravindra R. Karle and [7]Suryakant D. Dongre

[1-7]*Department of Pathology, Dr Balasaheb Vikhe Patil Rural Medical College, Loni, Maharashtra, India*

OPEN ACCESS

Key Words
Twin pregnancy, solid tumors, neonatal outcomes, obstetric management, pediatric lesions

Corresponding Author
Shreyans A. Amin,
Department of Pathology, Dr. Balasaheb Vikhe Patil Rural Medical College, Loni, Maharashtra, India-413736
shreyansgaamin@gmail.co

Author Designation
[1]Associate Professor
[2]Assistant Professor
[3,4]Post Graduate Student
[5,6]Professor
[7]Professor and Head

Received: 21 August 2024
Accepted: 15 September 2024
Published: 28 October 2024

Citation: Rahul M. Jadhav, Swati V. Dahe, Amol R. Gaikwad, Shreyans A. Amin, Nikhil S. Deshpande, Ravindra R. Karle and Suryakant D. Dongre, 2024. Profile of Pediatric Neoplasms in a Rural Hospital from Western India. Int. J. Trop. Med., 19: 136-142, doi: 10.36478/makijtm.2024.4.136.142

ABSTRACT

Pediatric lesions requiring surgical interventions are highly varied. They range from developmental and congenital conditions to acute emergencies, benign and malignant neoplasms and other space-occupying lesions. Pediatric surgical specimens are much fewer and routinely very few pathologists come across them. There has been very few studies providing details about solid benign neoplasm, solid malignant neoplasm along with leukemia cases found in pediatric populations. The literature search reveals a lack of reports, particularly in the context of India, viewing the profile of pediatric surgical specimen workload. The prevalence of these lesions can be affected by various factors like geographical location, tropical climate and socio-economic conditions. To study the profile of pediatric neoplasms in a rural hospital including solid benign, solid malignant neoplasm and leukemia The present study was a retrospective descriptive cross-sectional study carried out from 1st January 2016 to 31st December 2023. The study included all pediatric (0-14 years) histopathology and hematology samples received in the department of pathology. All specimens after receiving were fixed properly using 10% formalin and grossed within 24 hours and stained by haematoxylon and eosin (HandE) staining, blood samples received suspecting leukemia were run within 2 hours of receiving the sample and slides were made stained by leishmann stain followed by the cytochemical stain of freshly prepared Myeloperoxidase (MPO) or Periodic acid Schiff (PAS) stain were done to reach final diagnosis of leukemia along with morphology. Out of a total of 135 neoplasms, a maximum of 42.22% cases were of solid malignant neoplasm followed by 29.63% cases of leukemia and 28.15% cases of solid benign neoplasm. From the solid malignant neoplasm subtype, maximum cases of 15.55% were found in both 5-9 years and 10-14 year age group. Leukemia cases were found more commonly in the 0-4 years of age group with total of 10.37% cases followed by 9.62% cases each in the 5-9 years and 10-14 years age group. Majority of solid benign neoplasms were found in 0-4 years of age group with total of 11.85% cases followed by 8.14% cases each in 5-9 year and 10 to 14 year age group. Overall study showed a male preponderance with a sex ratio of 1.5:1. Malignant solid tumors were common tumors in pediatric age group in our region 42.22%. There is a male preponderance for pediatric lesions with sex ratio of 1.5:1. Arbitrarily divided age group show equal distribution of lesions. In solid malignant neoplasms, the commonest neoplasm were hodgkins and non-hodgkin lymphoma followed by neuroblastoma. In solid benign neoplasm category the commonest neoplasm were vascular tumors followed by germ cell tumor having cases of mature teratoma and foetiform teratoma. Among leukemias, acute lymphoblastic leukemia cases were most common followed by Acute Myeloid Leukemia.

INTRODUCTION

Pediatric pathology is distinct from adult pathology in many ways in view of types of diseases, genetic and molecular defects, therapies (including side effects and long-term complications) and outcomes. This is not only because of congenital malformations but also because infections and tumors that affect children are not the same as those seen in adults[2]. Pediatric surgical pathology specimens differ from adults in natural history and management and present a number of challenges for the pathologist. They are affected by several factors such as topographical location, tropical atmosphere and socioeconomic conditions. They range from developmental and congenital anomalies to acquired conditions like benign and malignant neoplasms and other space-occupying lesions[3]. Pediatric surgery in underdeveloped areas of the globe suffers from a lack of infrastructure and poor financial resources[4]. Cancer is much less frequent in children than in adults, affecting only about 1 in 400 children by their fifteenth birthday and only 1 in 320 people by their nineteenth birthday[5]. 1-5% of all cancers occur before the age of 20 years[6]. In global statistics, cancer does not appear among the primary causes of death in children aged <5 years. It is relegated to sixteenth position by other causes such as infections, prematurity complications, malformations, malnutrition and accidents[7]. Tumors that occur in children are as diverse as those in adults and present a number of challenges for the pathologist[4]. Compared with cancers that occur in adults, childhood cancers are rare comprising only 1% of all cancers[8]. >10% of all deaths in children below 15-year of age are caused by malignant diseases in the developed countries. In the developing world, childhood cancers are yet to be recognized as a major pediatric illness[9]. The profile of pediatric tumors varies considerably and differs from that in adults. Virtually any tumor can occur in children. However, the main types of cancer in children are leukemias, lymphomas, and sarcomas[10]. The manner of grouping the cancers is also different. For children, the International Classification of Childhood Cancer (ICCC) is based on the morphology of the tumors and consists of 12 main groups[11]. Recent WHO Classification is the adaptation of ICCC classification for pediatric tumors. Benign tumors are more common than the malignant tumors. Most benign tumors are of little concern but on occasion, they cause serious disease by virtue of their location or rapid increase in size. Both benign and malignant tumors need a comprehensive evaluation to provide an appropriate diagnosis for designing therapy and predicting prognosis[12]. A literature search shows that there is a paucity of studies on the combined profile of childhood solid neoplasms and leukemia and hence this study is undertaken.

MATERIALS AND METHODS

The present study is a retrospective descriptive cross-sectional study from 1st January 2016 to 31st December 2023. The study included all pediatric (0-14 years) histopathology and hematology samples received in the Department of Pathology at a Rural Hospital serving patients from northern and western Maharashtra. All specimens after receiving were fixed properly using 10% formalin and grossed within 24 hours and stained by hematoxylin and eosin (HandE) staining[13], blood samples received suspecting leukemia were run within 2 hours of receiving the sample and slides were made stained by leishmann stain followed by the cytochemical stain of freshly prepared Myeloperoxidase (MPO) or Periodic acid Schiff (PAS) stain were done to reach final diagnosis of leukemia along with morphology, special stains and immunohistochemistry applied as needed for solid neoplasms. The analysis focused on the distribution of neoplasms by age, sex, location and diagnosis. Both solid and hematological neoplasms along with leukemia were included from children under 14 years within the specified period, subdivided into age groups 0-4 years, 5-9 years, and 10-14 years, while cases with incomplete records were excluded. Data was analyzed using statistical software, employing descriptive statistics to summarize the findings.

RESULTS AND DISCUSSIONS

During the 8-year study period, a total of 135 cases were diagnosed of 0-14 years of age group. A total of 95 solid neoplasms including 38 cases of solid benign neoplasm, 57 cases of solid malignant neoplasm and 40 cases were of leukemia. There were equal number of cases in each age group starting from 0-4 years, 5-9 years and 10-14 years. Across all the age groups, solid malignant neoplasms were commonest 57(42.22%) cases followed by leukemia 40(29.63%) cases and benign solid neoplasms were 38 (28.15%) cases (Table 1). (Table 2) shows sex wise distribution of cases. In our study male cases outnumbered female cases by approximately 20%. The male to female ratio is 1.54:1. The male dominance was obvious in leukemia and solid malignant neoplasm cases. (Table 3) shows that among the solid malignant neoplasm, lymphoma was the most common solid malignant neoplasm in the pediatric population accounting for 21 (36.84%) cases out of a total 57 cases having 12 cases of Hodgkins lymphoma and 9 cases of non Hodgkin lymphoma with different subtypes like 1 case of Burkitt lymphoma and 1 case of non-Hodgkins lympohoma T cell type. Pediatric kidney tumors with 8(14.03%) cases are the second most common lesions including 6 cases of nephroblastoma (Wilm`s tumor). Bone tumors and Neuroblastoma were third most common solid malignant neoplasm with 7(12.28%) cases of Ewings sarcoma showing female

Table 1: Age Wise Distribution of All Pediatric Neoplasms.

Age group (in years)	Solid benign neoplasm	Solid malignant neoplasm	Leukemia	Total %
0-4 years	16	15	14	45
5-9 years	11	21	13	45
10-14 years	11	21	13	45
Total	38	57	40	135
Percentage	28.14%	42.22%	29.62%	100%

Table 2: Sex Wise Distribution of Cases

Sex	Solid benign neoplasm	Solid Malignant neoplasm	Leukemia	Total	%
Male	19	36	27	82	60.74%
Female	19	21	13	53	39.25%
Total	38	57	40	135	100

Table 3: Profile of solid Malignant Neoplasm

Type of tumor	0-4 years	5-9 years	10-14 years	Males	Females	Total (%)
Lymphoma	4	11	6	17	4	21 (36.84%)
Kidney tumors	2	2	4	3	5	8 (14.03%)
Bone tumors	2	0	5	1	6	7 (12.28%)
Neuroblastoma	5	2	0	6	1	7 (12.28%)
Sarcoma	1	3	2	3	3	6 (10.52%)
CNS tumors	0	1	2	2	1	3 (5.26%)
Germ cell tumors	1	1	0	1	1	2 (3.50%)
Malignant epithelial neoplasm's	0	1	1	2	0	2 (3.50%)
Retinoblastoma	0	0	1	1	0	1 (1.75%)
Total	15	21	21	36	21	57

Table 4: Profile of Cases of Leukemia

Type of leukemia	0-4 years	5-9 years	10-14 years	Males	Females	Total (%)
Acute lymphoblastic leukemia	12	08	05	18	07	25 (62.5%)
Acute myeloid leukemia	02	05	02	07	02	09 (22.5%)
Chronic myeloid leukemia	-	-	06	02	04	06 (15%)
Total	14	13	13	27	13	40

Table 5: Profile of Solid Benign Neoplasms

Type of tumor	0-4 years	5-9 years	10-14 years	Males	Females	Total (%)
Vascular tumors	6	7	3	6	10	16 (42.10%)
Germ cell tumor	7	-	-	5	2	7 (18.42%)
Bone tumor	-	3	1	2	2	4 (10.52%)
Nerve sheath tumors	-	1	2	2	1	3 (7.89%)
Breast	2	-	1	2	1	3 (7.89%)
Soft tissue tumors	1	-	2	2	1	3 (7.89%)
Liver tumor	-	-	1	-	1	1 (2.63%)
Skin tumor	-	-	1	-	1	1 (2.63%)
	16	11	11	19	19	38

Table 6: Comparison of Cases Found in Different Age Groups

Age group	Punia[14] (n=385)	Bhalodia[15](n=43)	Present study (n=135) (2024)
0-4 years	61 (15.85%)	44.18%	45 (33.33%)
5-9 years	100 (25.97%)	25.58%	45 (33.33%)
10-14 years	224 (58.38%)	30.24%	45 (33.33%)

Table 7: Comparison of Cases According to Gender Distribution

Sex	Punia[14] (n=385)	Shah[1](n=118)	Present study (n=135) (2024)
Male	231 (60%)	92(77.96%)	82(60.74%)
Female	154 (40%)	26(22.03%)	53(39.25%)
Sex Ratio	1.5:1	3.53:1	1.5:1

Table 8: Comparison of Solid Malignant Neoplasms Along with Leukemia

Type of tumor	Punia[14] (n=385)	Bhalodi[17](n=43)	Yeole[18]	T Sujitha[17](n=160)	Present study (n=135) (2024)
Leukemia	Excluded	44.18%	32.8%	-	40 (41.23%)
Lymphoma	8 (7.27%)	16.27%	12.65%	23.07%	21 (21.64%)
Kidney tumors	-	9.30%	5.25%	3.84%	8 (8.24%)
Bone tumors	36 (32.73%)	2.32%	3.85%	3.84%	7 (7.21%)
Neuroblastoma	1 (0.91%)	6.97%	-	-	7 (7.21%)
Soft tissue sarcoma	19 (17.27%)	2.32%	4.3%	11.53%	6 (6.18%)
CNS tumors	26 (23.64%)	6.97%	17.6%	38.46%	3 (3.09%)
Germ cell tumors	4 (3.64%)	-	-	3.84%	2 (2.06%)
Malignant epithelial neoplasms	8 (7.27%)	-	-	15.38%	2 (3.50%)
Retinoblastoma	7 (6.36%)	-	-	-	1 (1.03%)
Total	110	43		26	97

Table 9. Comparison of Solid Benign Neoplasms

Type of tumor	Punia[14](n=385)	Lee[16](n=171)	T Sujitha[17](n=160)	Present study (n=135) (2024)
Vascular tumors	68 (24.73%)	23.39%	23.75%	16 (42.10%)
Germ cell tumor	-	-	-	7 (18.42%)
Bone tumor	62 (22.55%)	7.60%	20%	4 (10.52%)
Nerve sheath tumors	14 (5.09%)	8.77%	1.87%	3 (7.89%)
Breast	24 (8.73%)	5.26%	6.87%	3 (7.89%)
Soft tissue tumors	-	-	-	3 (7.89%)
Foetiform teratoma	-	-	-	2 (5.26%)
Liver tumor	-	-	-	1 (2.63%)
Skin tumor	23 (8.36%)	26.31%	8.75%	1 (2.63%)
	275	171	134	38

preponderance with sex ratio of 1:6. The present study also found 7(12.28%) cases of the neuroblastoma. In present study, sarcoma account for 6(10.52%) cases each. In present study, there were only 3 cases from CNS tumors and 2(3.51%) cases of germ cell tumors were also noted. Malignant epithelial tumors are usually seen in older age group but 2 (3.50%) cases of carcinoma were noted in present study. Present study found 1 case each of squamous cell carcinoma and retinoblastoma as rare case in pediatric age group of 10-14 years. (Table 4) shows that in present study, majority of cases were of acute lymphoblastic leukemia with 25(62.5%) cases out of total 40 cases of leukemia found in 8 years followed by 9 cases of acute myeloid leukemia having 3 cases of AML-M4 subtype, 1 case each of AML M2 and AML M3 subtype. It was confirmed on cytochemistry stains using myeloperoxidase stain and periodic acid schiff stain. Surprisingly, present study found 6 cases of CML in age group of 10-14 years with female preponderance with sex ratio of 1:2. (Table 5) shows that in the present study, most common solid benign neoplasms were vascular tumors with 16 (42.10%) cases comprising 11 cases of hemangioma and 5 cases or lymphangioma with female preponderance with a sex ratio of 1:1.5. The Second most common solid benign neoplasm finding was germ cell tumor with 7(18.42%) cases followed by Benign bone tumors with 4 (10.52%) cases and 3 cases each of nerve sheath tumors, breast tumors and soft tissue tumors. 2 rare cases of foetiform teratoma was diagnosed in the present study.

In present study, children were affected most commonly by solid malignant neoplasms with 57 (42.22%) cases having the most common profile of malignant cases being lymphoma (21 cases, 36.84%), neuroblastoma and kidney tumours containing 6(8.77%) cases of nephroblastoma (wilm`s tumor) with 5-9 years and 10-14 years age group being the most common age group affected followed by 0-4 years age group. The second most frequent cases were of leukemia with 40 cases having most common profile of leukemia as acute lymphoblastic leukemia having 25(62.5%) cases followed by 9(22.5%) cases of acute myeloid leukemia Total 38 cases of solid benign neoplasms were found having vascular tumor as most common neoplasms out of which hemangioma was most common tumor with 11(28.94%) cases followed by lymphangioma having 5(13.15%) cases and mature teratoma having 5(13.15%) cases. 2 rare cases of foetiform teratoma were also found. The profile of neoplasm found in the present study would help to suspect and for early treatment of the child with surgical intervention which can save the life of the child. In the present study, there was an equal number of cases in all three age groups having 45 cases. Whereas, Punia[14] study found a maximum number of cases in 10-14 years of age groups having 58.38% cases of the study in the same age group and Bhalodia[15] study found a maximum number of cases in 0-4 years of age group. Different studies have found different age groups with various prevalence (Table 6). The present study showed a male preponderance for overall neoplasms occurring to the pediatric population with a sex ratio of 1.5:1 which correlates with the findings of Punia[14] study having same sex ratio. Whereas, Shah[1] study found a sex ratio of 3.53:1 (Table 7). In the present study, among malignant neoplasms and leukemia cases, leukemia was the most prevalent with total of 40(41.23%) cases out of which 25 cases were of acute lymphoblastic leukemia which also correlated with the findings of Yeole[18] study and Bhalodia[15] study having 32.8% and 44.18% leukemia cases respectively while other studies excluded findings of leukemia. Present study found lymphomas as most common neoplasm among solid malignant neoplasm category having total 21(21.64%) cases with 12 cases of Hodgkins lymphoma and 9 cases of non-Hodgkins lymphoma followed by kidney tumors having 8(8.24%) cases out of which 6 were of nephroblastoma (Wilm`s tumor), 7(7.21%) cases of Ewings sarcoma and 7(7.21%) cases of neuroblastoma. It correlated with findings by Bhalodia[15] study which also showed lymphoma cases as the most common finding with 16.27% cases among solid malignant neoplasm in children. Whereas findings by Punia[14] study found bone tumors as the most common solid malignant neoplasm with 32.73% cases. Yeole[18] study and T. Sujitha[17] study found CNS tumors as the most common solid malignant neoplasm with 17.6% and 38.46% cases respectively. As the present study is being done at a center that is not receiving that much of brain biopsies it`s difficult to find the exact prevalence of CNS tumors in rural areas using the present study. Still, there were a total of 3 CNS tumors consisting of pilocytic astrocytoma, pleomorphic xanthoastrocytoma and medulloblastoma as findings but they don't represent the entire population finding (Table 8). The present study found vascular tumors consisting of hemangioma and lymphangioma as the most common solid benign neoplasm category with a total of 16(42.10%) cases out of which 11 were of hemangioma and 5 were lymphangioma. This correlated with findings by Punia[14] study having 24.73% vascular tumors in their study and T. Sujitha[17] study having 23.75% cases of vascular tumors. Whereas, Skin tumors were the most common category found in Lee[16] study. The present study had 7(18.42%) cases of germ cell tumors

containing 5 cases of mature teratoma and 2 cases of foetiform teratoma cases while other studies have not mentioned teratoma findings. Bone tumors were the third most common solid benign neoplasms found in the present study with 4(10.52%) cases whereas Punia[14] and T Sujitha[17] showed 22.55% and 20% solid benign bone tumor cases respectively. In the present study, there were 2 cases of foetiform teratoma, it is most commonly confused with the condition known as fetus-in-fetu it is important to differentiate foetiform teratoma from fetus-in-fetu due to the possibility of malignant transformation of foetiform teratoma[19] (Table 9).

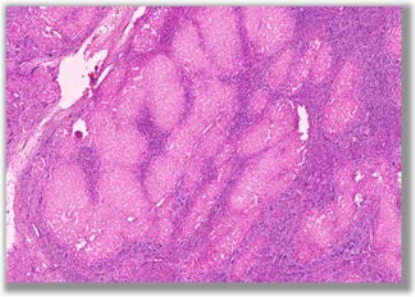

Fig. 1: Focal Nodular Hyperplasia: A Solitary Nodule with a Central Scar and Nodules of Bland Hepatocytes Separated by Fibrous Septa Containing Many Bile Ducts, HandE Stain (x40)

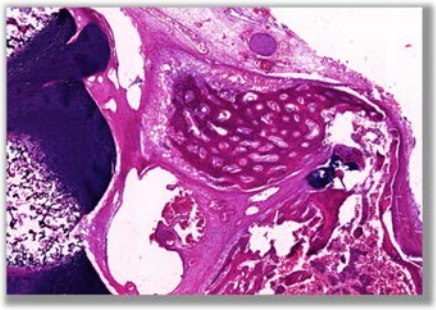

Fig. 2: Foetiform Teratoma: The Tumor Showed Varying Degree of Organization Including Well-Formed Skin with Appendages and Long Bone with Endochondral Ossification, HandE Stain (x40)

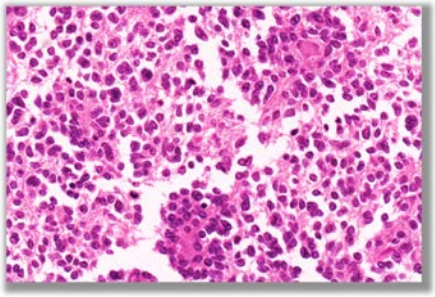

Fig. 3: Medulloblastoma: Sheets of Densely Packed Undifferentiated Small Round Blue Cells with Many Homer Wright Rosettes and Mitosis with an Apoptotic Body, HandE Stain (x400)

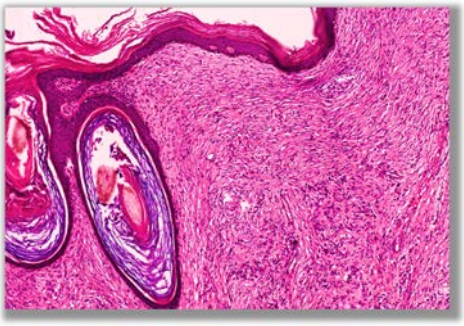

Fig. 4: Neurothekoma: Multinodular Growth in the Dermis Showed Spindle Cells Arranged in a Fascicular Pattern, HandE Stain (x40)

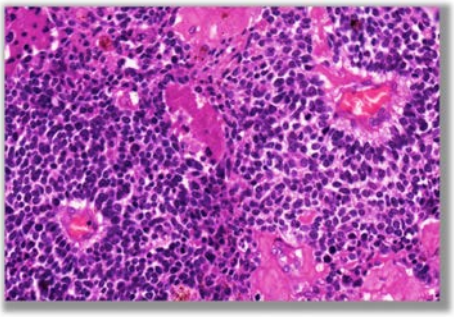

Fig. 5: Retinoblastoma: Small Round Blue Cell Tumor with Perivascular Rosette, HandE Stain (x400)

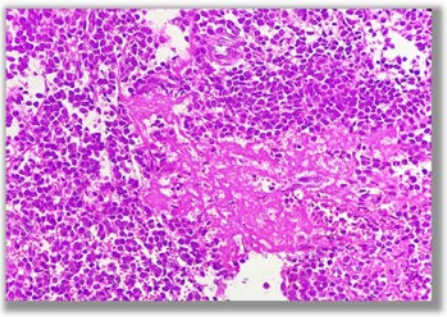

Fig. 6: Ewings Sarcoma Showing Small Blue Round Cells with Necrosis, Diagnosis was Made on IHC, HandE Stain, (x400)

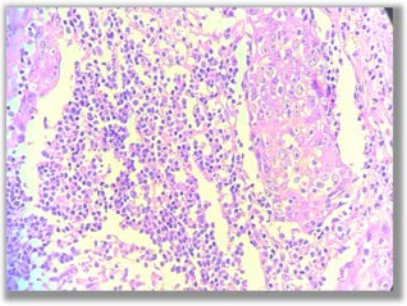

Fig. 7: Squamous Cell Carcinoma: The Tumor Presented as Metastasis in a Cervical Lymph Node in a 14-Year-old Boy, p63 IHC was Positive on Further Evaluation, HandE Stain, (x400)

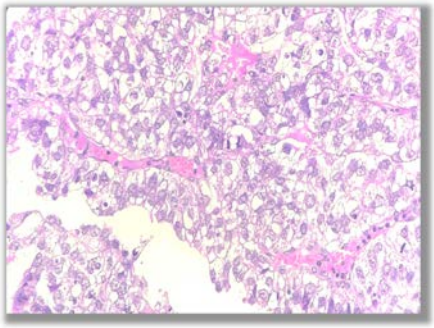

Fig. 8: Yolk Sac Tumor: Classic Morphology of Yolk Sac Tumor with Microcystic, Papillary and Solid Pattern Along with Schiller Duval Bodies were Seen, HandE Stain, (x400)

Limitation of Study: This study doesn't provide the molecular diagnosis of certain cases and as per the limited availability of immunohistochemical (IHC) markers, it is difficult to confirm a diagnosis on a molecular basis. Lymphoma cases were diagnosed using an available panel of IHC markers and leukemias were classified using morphology and cytochemical stains, some patients got follow-up by molecular analysis but many had financial constraints leading to a lack of follow-up for leukemia and lymphoma cases.

CONCLUSION

Malignant solid tumors were common tumors in the pediatric age group in our region (42.22%). There is a male preponderance for pediatric lesions with a sex ratio of 1.5:1. Arbitrarily divided age groups show equal distribution of lesions. In solid malignant neoplasms, the commonest neoplasms were hodgkins and non-hodgkins lymphoma followed by neuroblastoma. In the solid benign neoplasm category the commonest neoplasm were vascular tumors followed by germ cell tumors having cases of mature teratoma and foetiform teratoma. Among leukemias, acute lymphoblastic leukemia cases were most common followed by Acute Myeloid Leukemia.

ACKNOWLEDGMENT

We wish to acknowledge Dr. Vivek Gharpure, Department of Pediatric Surgery and the technical staff of the Department of pathology and Central Clinical Laboratory for their valuable contribution.

REFERENCES

1. Shah, N., 2015. Paediatric Surgical Pathology-a Profile of Cases from Western India and Review of Literature. Journal of clinical and diagnostic research, Vol. 9(1).
2. Husain, A.N. and j. T. Stocker., 2011. Color Atlas of Pediatric Pathology. 1st Edn., NY: Demos Medical Publishing, New York, ISBN-14: 978-1933864570, Pages: 528.
3. Bijjaragi, S., P. Borah and O. Puvvala, 2016. Histomorphological spectrum of paediatric surgical lesions: Experience at a tertiary care centre. Indian J. Pathol. Oncol., Vol. 3.
4. Grosfeld, J.L., J.A. O'Neill, A.G. Coran and E.W. Fonkalsrud., 2006. Pediatric surgery E-book: 2-Volume set. 6th Edn., England: Mosby., London,, ISBN-13: 9780323076630.
5. Steliarova-Foucher, E., M. Colombet, L.A.G. Ries, F. Moreno and A. Dolya *et al.*, 2017. International incidence of childhood cancer, 2001–10: A population-based registry study. The Lancet Oncol., 18: 719-731.
6. Piñeros, M., L. Mery, I. Soerjomataram, F. Bray and E. Steliarova-Foucher, 2021. Scaling Up the Surveillance of Childhood Cancer: A Global Roadmap. JNCI: J. Nat. Cancer Inst., 113: 9-15.
7. Saloni D., S. Fiona, R. Hannah and R. Max, 2023. "Child and Infant Mortality".
8. Meier D.E., L.J. Tarpley and R. Riviello, 2013. General Surgery in the Tropics. In: Hunter's Tropical Medicine and Emerging Infectious Disease., Magill A.J., D.R. Hill, T. Solomon and E.T. Ryan, (Eds.)., Elsevier, Canada, ISBN-14: 978-0272796726.
9. Sharma S., K. Mishra, S. Agarwal and G. Khanna, 2004. Solid tumors of childhood. Indian J Pediatr., 71: 501-504.
10. Lanier, A.P., P. Holck, G.E. Day and C. Key, 2003. Childhood Cancer Among Alaska Natives. Pediatrics, 112.
11. Kusumakumary P., R. Jacob, R. Jothirmayi and M.K. Nair, 2000. Profile of pediatric alignancies: A ten year study. Indian Pediatr., 37: 1234-1238.
12. Steliarova F.E., C. Stiller, B. Lacour and P. Kaatsch, 2005. International Classification of Childhood Cancer, third edition. Cancer, 103: 1457-1467.
13. Suvarna K.S., C. Layton and J.D. Bancroft, 2018. Bancroft's Theory and Practice of Histological Techniques. 8th Edn., Elsevier Health Sciences, London, England, ISBN-13: 9780702068645, Pages: 584.
14. Punia, R.S., I. Mundi, R. Kundu, G. Jindal, U. Dalal and H. Mohan, 2014. Spectrum of nonhematological pediatric tumors: A clinicopathologic study of 385 cases. Indian J. Med. Paediatric Oncol., 35: 184-186.
15. Bhalodia J.N. and M.M. Patel, 2011. Profile of Pediatric Malignancy: A Three-Year Study. Nati jou comm med., 2: 24-27.
16. Lee C.K., E.K. Ham, K.Y. Kim and J.G. Chi, 1966. Brain tumors in childhood and adolescence. J KCRA, 1: 75-80.
17. Sujitha T., R.P. Uma, G. Vahini and P.J. Rajendra, 2023. Histopathological spectrum of pediatric tumours: A five-year cross-sectional study in a tertiary care centre. Global J Res Anal., Vol. 12, No. 2.

18. Yeole B.B., S.H. Advani and L. Sunny, 2001. Epidemiological features of childhood cancers in greater Mumbai. Indian Pediatr., 38: 1270-1277.

19. Pace, S., M.A. Sacks, L.F. Goodman, E.P. Tagge and A. Radulescu, 2021. Antenatal Diagnosis of Retroperitoneal Cystic Mass: Fetiform Teratoma or Fetus in Fetu? A Case Report. Am. J. Case Rep., Vol. 22.