



## CLINICOEPIDEMIOLOGICAL PROFILE OF MALIGNANT TUMOURS IN CHILDREN, ADMITTED IN A TERTIARY CARE CENTRE OF RAJASTHAN DURING 2019-21.

### Oncology

|                              |                                                                                             |
|------------------------------|---------------------------------------------------------------------------------------------|
| <b>Mandeep Goriya</b>        | Resident (MD) Department of Pediatric Medicine, SMS Medical College, Jaipur.                |
| <b>Pawan Kumar Sulaniya*</b> | Associate Professor Pediatric Hemato-Oncology Subdivision (MD). *Corresponding Author       |
| <b>Chandrakanta Sulaniya</b> | Assistant Professor (MS) Department of surgical oncology, SMS Medical College, Jaipur.      |
| <b>Kapil Garg</b>            | Senior Professor And Head Pediatric Hematoncology Subdivision, SMS Medical College, Jaipur. |

### ABSTRACT

**Introduction:** Childhood cancer is relatively uncommon, with the prevalence reported at 2% of all cancers in high income countries and 4%-15% in low-income countries like India. In developing countries like India, there is a need to detect cancers at an early, curable stage of the disease. **Aim & Objective:** 1) To assess 'demographic and clinical profile' of malignant solid tumours in children. 2) To assess clinical course and complication during treatment of these patients. **Material And Method:** It was a single centric prospective observational study conducted over a period of two years i.e., January 2020 to December 2021, in the department of Pediatric Medicine and department of Pediatric Surgery, SPMCHI, an attached hospital to SMS medical college, Jaipur, a government tertiary health care cancer facility. **Results:** Among the 75 children with solid malignant tumour, most of the children were aged 0-4 years (82.66%), and Male were 52% and female were 48%, with a male to female ratio of 1.08: 1. Mostly (90.67%) were from Rajasthan, only 7 were from other states, of which 5 (6.67%) were from UP and 2 (2.67%) were from MP. Mostly belonged to lower socio-economic status (53.3%). Wilm's tumor (50.67%) was the most common solid tumour, followed by Neuroblastoma (21.33%), hepatoblastoma (12%) and Rhabdomyosarcoma (8%). Palpable abdominal mass was most common finding. 48% were still under treatment, while 8% cases default treatment. Remission occurred in 32% patients. Death occurred in 12% patients. Neutropenia occurred in 50 (75.76%) cases, while bicytopenia occurred in 6.06% cases. Deranged LFTs occurred in 4.55% and dyselectrolytemia in 1.52% cases. Complications occurred in 27 patients. Of these patients 10 (37.04%) developed febrile neutropenia, 33% developed neutropenia with severe sepsis, 11.11% had developed tumor lysis syndrome. **Conclusion:** Dedicated and specialized centers such as ours help early diagnosis, treatment initiation, better outcome, and low default rate. Finally, advances in diagnostics including the turnover time and modalities of treatments need to be implemented at all level possible to improve the outcomes of these patients.

### KEYWORDS

Pediatric cancers, childhood solid tumors, Malignancy in pediatric age group, pediatric oncology, clinical profile, epidemiological profile

#### INTRODUCTION:

Childhood cancer is relatively uncommon, with the prevalence reported at 2% of all cancers in high income countries and 4%-15% in low-income countries like India<sup>1-3</sup>. Incidence of pediatric tumors is on the rise all over the world. Worldwide, the annual number of new cases of childhood cancer exceeds 200,000 and more than 80% of these are in developing countries.<sup>8</sup> From the viewpoint of cancer control, particularly in the context of developing countries like India, there is a need to detect cancers at an early, curable stage of the disease. In general, the features of malignancies in children differ biologically and histologically from those of adults with respect to incidence, type of tumor, underlying familial or genetic aberration and tendency to regress spontaneously or cyto-differentiate.<sup>9</sup> In recent years, identification of specific genes, oncogenes, tumor markers and other biological markers are included in classification & categorization of specific tumors as low, intermediate and high-risk tumours. This concept uses risk factors as predictors of outcomes.<sup>10</sup> The pattern of childhood tumors is different in different geographical areas and ethnic groups. Appropriate management of the pediatric tumors requires complete epidemiological data in different geographical areas.<sup>11-13</sup> The purpose of the present study was to give an insight into the pattern of distribution of childhood cancer in this geographical area.

#### Aims And Objectives

- To assess the demographic and clinical profile of malignant solid tumours in children.
- To assess the clinical course and complication during treatment of these patients.

#### MATERIALS AND METHODOLOGY:

It is a single centric prospective observational study conducted over a period of two years i.e., January 2020 to December 2021, in the department of Pediatric Medicine and department of Pediatric Surgery, SPMCHI, an attached hospital to SMS medical college, Jaipur, a government tertiary health care cancer facility. The study was conducted after obtaining due permission from concerned Ethics committee. It comprised of an analysis of 66 cases of pediatric solid

malignancies in pediatric age group (0-18) years. Written informed consent was obtained from the parents/guardians of all registered patients. The cases were registered for study from patients attending clinical OPD at pediatric medicine and/or pediatric surgery at their initial presentation at SPMCHI, Jaipur. The profile of childhood cancer was studied focusing on the proportion of malignancies according to: Age of the patient at presentation. Sex, Sign and symptoms, Duration of the symptoms, Clinical finding, Socio-economic status, Relevant investigations.

After a thorough clinical examination and after correlating its findings with the history, a provisional diagnosis was made and investigations were done accordingly. Patients with palpable lumps were subjected to FNAC and cytological studies. Patients were maintained under proper follow up with each visit comprised of clinical examination and relevant investigation. A histopathological diagnosis was made for the biopsy specimens. Radiological investigations such as X-ray, ultrasound, computed tomography (CT) scans, and MRI were done as required. All treatment decisions were discussed and planned among pediatric medicine and pediatric surgery, physicians and surgeons respectively. Patients were kept under follow up during treatment and were categorized among under treatment, remission, defaulter and expired on the basis of their outcome. A descriptive analysis was performed to evaluate the age and sex distribution of all tumors. To determine age distribution, patients were divided into equal age groups, i.e., 0-4 years, 5-9 years, 10-14 years and 15-18 years, and the distribution between the age groups was analyzed. Due to limitations in treatment availability and expertise, central nervous system tumors and retinoblastoma were not included in the study.

#### Inclusion Criteria:

- Age group 0- 18 years children were included.
- All malignant tumor were included

#### Exclusion Criteria:

- All hematological malignancies were excluded e.g. leukaemias and lymphomas.

• CNS tumors and retinoblastoma are excluded from the study due to lack expertise and treatment at our center.

For classification of pediatric malignancies in the present study, the International Classification of Childhood Cancers (ICCC), based on International Classification of Diseases for Oncology (ICD-O-3), was followed.

#### Statistical Analysis:

The data were entered in an excel sheet and then analyzed. Descriptive statistics for continuous variables and frequency distribution, with their percentages were calculated as required.

### RESULTS:

**Table 1: Demographic Features**

| Age Distribution (N=75)        |                    |                |
|--------------------------------|--------------------|----------------|
|                                | Number Of Patients | Percentage (%) |
| 0-4 Years                      | 62                 | 82.66          |
| 5-9 Years                      | 10                 | 13.33          |
| 10-14 Years                    | 3                  | 4              |
| SEX Distribution (N=75)        |                    |                |
| Male                           | 39                 | 52             |
| Female                         | 36                 | 48             |
| State Wise Distribution (N=75) |                    |                |
| Rajasthan                      | 68                 | 90.67          |
| UP                             | 05                 | 6.67           |
| MP                             | 02                 | 2.67           |
| Socioeconomic Status (N=75)    |                    |                |
| Lower Middle                   | 40                 | 53.33          |
| Upper Lower                    | 21                 | 28             |
| Upper Middle                   | 14                 | 18.67          |

Table 1 shows among the 75 children with solid malignant tumour, most of the children were aged 0-4 years (82.66%), while 10 (13.33%) children were aged 5-9 years and only 3 (4%) were aged 10-14 years. Male were 52% and female were 48%, with a male to female ratio of 1.08: 1. Most of the patients were from Rajasthan (90.67%), only 7 were from other states, of which 5 (6.67%) were from Uttar Pradesh and 2 (2.67%) were from Madhya Pradesh. Most of the patients belonged to lower socio-economic status (53.3%), 21 (28%) belonged to upper lower SES and 14 (18.67%) belonged to upper middle SES.

**Table 2: Tumour Distribution With Age And Sex**

| S. No. | Type of Tumour       | N (%)      | 0-4 Yrs N(%) | 5-9 Yrs N(%) | 10-14 Yrs N(%) | Male N(%) | Female N(%) |
|--------|----------------------|------------|--------------|--------------|----------------|-----------|-------------|
| 1      | Wilm's Tumour        | 38 (50.67) | 33 (44)      | 4 (5.33)     | 1 (1.33)       | 23 (30.6) | 15 (20)     |
| 2      | Neuroblastoma        | 16 (21.33) | 14 (18)      | 1 (1.33)     | 1 (1.33)       | 10 (13.3) | 06 (8)      |
| 3      | Hepatoblastoma       | 09 (12.00) | 06 (8)       | 02 (2.66)    | 01 (1.3)       | 03 (4)    | 06 (8)      |
| 4      | Rhabdomyosarcoma     | 06 (8.00)  | 04 (5.3)     | 02 (2.66)    | 02 (2.6)       | 00        | 06 (8)      |
| 5      | Germ Cell Tumour     | 04 (5.33)  | 04 (5.3)     | 00           | 00             | 03 (4)    | 01 (1.3)    |
| 6      | Ewing Sarcoma        | 01 (1.33)  | 01 (1.3)     | 00           | 00             | 00        | 01 (1.3)    |
| 7      | Renal Cell Carcinoma | 01 (1.33)  | 00           | 01 (1.33)    | 00             | 00        | 01 (1.3)    |
| Total  |                      | 75 (100)   | 62 (82.67)   | 10 (13.33)   | 03 (4)         | 39 (52)   | 36 (48)     |
|        |                      |            | 75(100%)     |              |                | 75 (100%) |             |

Table 2 shows histological type of tumors distribution according to age and sex in pediatric age group. Wilm's tumor (50.67%) was the most common type of solid tumour among paediatric cases, followed by Neuroblastoma (21.33%), hepatoblastoma (12%) and Rhabdomyosarcoma (8%). Other less common tumour were germ cell tumor (5.33%), Ewing sarcoma (1.33%) and Renal cell carcinoma (1.33%).

Clinical presentation is described in table 3. Palpable mass was most commonly found in the abdomen (92%), among which left side palpable abdomen mass was seen in 44% cases, while right side mass

was felt in 46.67% and bilateral mass palpable in 1.33% cases. Palpable mass in hypogastric region was found in 4 (5.33%) cases, while palpable mass in perineal region and chest were found in one patient each. Among children aged 0-4 years, Wilm's tumor (44%) was the most common type of solid tumour, followed by Neuroblastoma (21.3%), hepatoblastoma (12%), Germ cell tumor (5.3%), Rhabdomyosarcoma (5.3%) and Ewing sarcoma (1.33%). Among patients aged 5-9 years, Wilm's tumour (5.3%) was the most common type, followed by Hepatoblastoma (2.66%), Rhabdomyosarcoma (2.66%), Neuroblastoma (1.33%) and Renal cell carcinoma (1.33%). Among children age 10-14 years, wilm's tumor (1.33%), hepatoblastoma (1.33%) and neuroblastoma (1.33%) were most common types.

**Table 3: Presenting Clinical Features**

| S. No. | Clinical Feature                 | Number Of Patients | Percentage |
|--------|----------------------------------|--------------------|------------|
| 1      | Palpable Mass Abdomen Right      | 35                 | 46.67      |
| 2      | Palpable Mass Abdomen Left       | 33                 | 44.00      |
| 3      | Palpable Mass Hypogastric Region | 4                  | 5.33       |
| 4      | Palpable Mass Chest Left         | 1                  | 1.33       |
| 5      | Palpable Mass Perineal Region    | 1                  | 1.33       |
| 6      | Palpable Mass Abdomen Bilateral  | 1                  | 1.33       |
| Total  |                                  | 75                 | 100.00     |

Among the 39 male patients, Wilm's tumour (30.6%) was the most common solid tumour, followed by Neuroblastoma (13.3%), Germ cell tumour (4%) and Hepatoblastoma (4%). Among the 36 female patients also, Wilm's tumor (20%) was the most common type of solid tumour, followed by Hepatoblastoma (8%), Neuroblastoma (8%), Rhabdomyosarcoma (8%), Germ cell tumor (1.33%), Ewing sarcoma (1.33%) and Renal cell Carcinoma (1.33%).

**Table 4: Clinical Course & Complications**

| Clinical Course |                                        |                    |            |
|-----------------|----------------------------------------|--------------------|------------|
| S. No.          |                                        | Number of Patients | Percentage |
| 1               | Neutropenia                            | 49                 | 74.24      |
| 2               | Uneventful                             | 8                  | 12.12      |
| 3               | Bicytopenia                            | 4                  | 6.06       |
| 4               | Deranged LFTs                          | 3                  | 4.55       |
| 5               | Dyselectrolytemia                      | 2                  | 3.04       |
| Total           |                                        | 66                 | 100.00     |
| Complications   |                                        |                    |            |
| 1               | Febrile Neutropenia                    | 10                 | 37.04      |
| 2               | Febrile Neutropenia with Severe Sepsis | 9                  | 33.33      |
| 3               | Tumour Lysis Syndrome                  | 3                  | 11.11      |
| 4               | Cardio-myopathy With LVEF <60%         | 2                  | 7.41       |
| 5               | Jaundice                               | 2                  | 7.41       |
| 6               | Haemorrhagic Cystitis                  | 1                  | 3.70       |
| Total           |                                        | 27                 | 100.00     |

Table 4 represents clinical course and complications of solid malignant tumors. Clinical course was uneventful in only 8 (12.12%). Neutropenia occurred in 49 (74.24%) cases, while Bicytopenia occurred in 6.06% cases. Deranged LFTs occurred in 4.55% and dyselectrolytemia in 3.04% cases. Among the 75 paediatric patients with solid tumour, complications occurred in 27 patients. Of these patients 10 (37.04%) developed febrile neutropenia, 33% developed febrile neutropenia with severe sepsis, 11.11% had developed tumour lysis syndrome. Other less common complications were cardiomyopathy (7.41%), jaundice (7.41%) and haemorrhagic cystitis (3.7%).

**Table 5: Outcome**

| S.No. | Outcome   | Number of Patients | Percentage |
|-------|-----------|--------------------|------------|
| 1     | Under T/T | 36                 | 48.00      |
| 2     | Remission | 24                 | 32.00      |
| 3     | Expired   | 9                  | 12.00      |
| 4     | Defaulter | 6                  | 8.00       |
| Total |           | 75                 | 100        |

Among the 75 paediatric children with solid tumour included in this study, most patients (48%) were still under treatment, while 6 (8%) cases default treatment. Remission occurred in 24 (32%) patients. Death occurred in 9 (12%) patients as shown in table 5.

## DISCUSSION:

The present study findings revealed that among the 75 children with solid malignant tumor, most of the children were aged 0-4 years (82.66%), while 10 (13.33%) children were aged 5-9 years and only 3 (4%) were aged 10-14 years. Similarly **Bhadolia J (2011)**<sup>12</sup> found that the highest incidence of tumor was seen in 0-4 years of age group and lowest incidence is seen in 5-9 years of age group. **Sushmita N Bhatnagar et al (2012)**<sup>13</sup> also observed that the age at presentation ranged from day 1 of life to 12 months with a mean age of 5.18 months. **Omatayo Ja et al (2013)**<sup>14</sup> however found that seventy five cases (23.1%) were seen in the 0-4 year age group, 118 cases (36.4%) in the 5-9 year age group while 131 cases (40.4%) were seen in the 10-15 year age group. Contrary to present study findings **Rajpal Singh Punia et al (2014)**<sup>15</sup> observed that highest number of cases were in the age group of 10-14 year. **Chandrashekhar NT et al (2015)**<sup>16</sup> also found that the majority of the tumors in this study occurred between 10-15 years (40.9%), followed by 5-10 years age group (31.81%). **Yogesh Gupta et al (2017)**<sup>17</sup> found that most of the pediatric malignancies were seen in the age group 11-14 years followed by 6-10 years. **Dr. Rashmi Chauhan et al (2017)**<sup>18</sup> observed that the maximum number of cases (50.98%; 26/51) were seen in 10-14 years age group, followed by 29.41% (15/51) cases in 5-9 years age group and 19.61% (10/51) in 0-4 years. **Neelu Gupta et al (2017)**<sup>19</sup> observed that majority of the tumors in this study occurred between 11-15 years (41.66%), followed by 6-10 years age group (30%) and in 0-5 years age group (28.33%). **Navtej Singh et al (2017)**<sup>20</sup> found that maximum incidence of pediatric tumors was seen in the age group of 11-14 years (41.67%). **Kashmi Sharma et al (2018)**<sup>21</sup> found that most common age group affected was 13-18 years (226 cases), followed by 7-12 years (180 cases) and 0-6 years (104) cases. **Lateef Ahmed Wani et al (2018)**<sup>22</sup> found that the majority of the tumors in this study occurred between 0-5 years (50%), followed by 6-10 years age group (34.78%) years.

Among the 75 pediatric patients with solid malignant tumor in present study, males were slightly more (52%) as compared to females (48%), with a male to female ratio of 1.08 : 1. Almost similar findings observed by many other researchers like **Baneerje et al (1986)**<sup>23</sup> similarly observed that male to female ratio was 2.6:1. **Kusumakumary et al (2000)**<sup>24</sup> also observed that malignancies were more in males. **Bhadolia J (2011)**<sup>12</sup> also found that males are affected (58.14%) than females (41.86%) with male to female ratio of 1.38:1. **Sushmita N Bhatnagar et al (2012)**<sup>13</sup> also observed the male majority among the patients. **Omatayo Ja. et al (2013)**<sup>14</sup> also reported that majority (65.1%) were males while 34.9% were females giving a male: female ratio of about 1.9:1. **Sanjay Halder et al (2013)**<sup>25</sup> also found that In general, the malignancies were more in males (male: female 1.4:1). **Rajpal Singh Punia et al (2014)**<sup>15</sup> also observed male predominance among the patients. **Chandrashekhar NT et al (2015)**<sup>16</sup> & **V.B. Gite et al (2015)**<sup>26</sup> also observed male preponderance. **Yogesh Gupta et al (2017)**<sup>17</sup> observed that the Male: Female ratio of childhood malignancies is 1.4: 1. **Dr. Rashmi Chauhan et al (2017)**<sup>18</sup> observed male to female ratio to be 2.2:1. **Neelu Gupta et al (2017)**<sup>19</sup> also observed male preponderance. However equal frequency in both males and females (M: F=1) observed by **Navtej Singh et al (2017)**<sup>20</sup>. **Monali PM et al (2019)** reported in a study that male to female ratio was 1.6:1 with 95(62.09%) males and 58(37.90%) females. **Aditi Mittal et al (2021)**<sup>27</sup> observed that majority of cases, 67.8% were male (95/140) in comparison to 32.1% (45/140) were female. The male to female ratio was 2.1.

Overall, cancer in childhood is more common among males than females, and the male-to-female ratio in the most resource-rich countries is around 1.2:1. [3,19] However, some cancers such as retinoblastoma, Wilms' tumor, osteosarcoma, and germ cell tumor show a slight female preponderance. The reported incidence of childhood cancer in India in males (39-150 per million children per year) is higher than in females (23-97 per million children per year) in all population-based cancer registries (PBCRs) except in North East India, and this gives a male-to-female ratio that is much higher than what is seen in the developed world.

In present study most patients belonged to lower socio-economic status (53.3%). In a similar study by **Namita Sharma et al.**<sup>28</sup> most were (86%) rural patients and 14% urban patients.

The present study findings revealed that palpable mass was most commonly found in the abdomen (92%), among which left side

palpable abdominal mass was seen in 44% cases, while right side mass was felt in 46.67% and bilateral mass was palpable in 1.33% cases. Palpable mass in hypogastric region was found in 4 (5.33%) cases, while palpable mass in perineal region and chest was found in one patient each. **Sanjay Halder et al (2013)**<sup>25</sup> found that abdominal mass, abdominal pain and hematuria were the complaints at their initial presentation of Wilms tumor.

Wilms tumor (50.67%) was the most common type of solid tumor among pediatric cases in present study, followed by neuroblastoma (21.33%), hepatoblastoma (12%) and rhabdomyosarcoma (8%). Other less common tumors were germ cell tumor (5.33%), ewing sarcoma (1.33%) and Renal cell carcinoma (1.33%). Diverse findings in this aspect observed by various researchers. **Baneerje et al (1986)**<sup>23</sup> study found that Wilms tumor and retinoblastoma were much more frequent than neuroblastoma. However **Kusumakumary et al (2000)**<sup>24</sup> in a study observed that the commonest malignancy was acute leukemia accounting for 30% of all cancers. **Bhadolia J (2011)**<sup>12</sup> also found that most common non-hematological malignancy is Wilms tumor (9.30%) followed by sympathetic nervous system tumors (neuroblastomas and gangio-neuroblastomas) (6.97%). **Niharika P. et al (2012)**<sup>29</sup> observed that the most common malignancy in children was leukemia, which constituted 45.45% of the cancer load, followed by soft tissue sarcomas -11.82%, malignant bone tumors -10.00%, lymphomas- 8.17%, retinoblastomas- 5.45%, neuroblastomas-4.55%, Wilms' tumor- 4.55%, germ cell tumors- 4.55%, CNS neoplasms - 3.64%, hepatoblastoma s-0.91% and squamous cell carcinomas of the skin -0.91%. **Sushmita N Bhatnagar et al (2012)**<sup>13</sup> study observed that Neuroblastoma was the most common tumor followed by malignant germ cell tumor and hepatoblastoma. **Omatayo Ja et al (2013)**<sup>14</sup> observed lymphoma as the commonest pediatric solid malignant neoplasm seen in a study that accounted for 180 cases (55.56%). Nephroblastoma (Wilms' tumor) constituted the second largest group with 27 cases (8.33%). This was followed by retinoblastoma which accounted for 25 cases (7.72%). **Sanjay Halder et al (2013)**<sup>25</sup> found that The most common malignancy in children was leukemia, which constituted 60% of the cancer load, followed by lymphomas- 17.1%, CNS neoplasms -5.7%, renal tumors (including Wilms' tumor)- 5.7% , neuroblastomas- 4.3% , germ cell tumours-4.3%, retinoblastomas- 1.4% and hepatoblastoma -1.4% in the decreasing order of their frequencies. **V.B. Gite et al (2015)**<sup>26</sup> observed that the most common tumor in children was osteochondroma. **Yogesh Gupta et al (2017)**<sup>17</sup> observed that the most common type of solid pediatric malignancies was lymphoma (39.53%) which is followed by bone tumor and retinoblastoma (16.27% each), soft tissue tumor (11.62 %), CNS tumors (6.97 %) and Wilms tumor (6.97 % each) and only one of muco-epidermoid carcinoma (2.32%). **Dr. Rashmi Chauhan et al (2017)**<sup>18</sup> found leukemias to be the most common pediatric cancers (29.4%; 15/51 cases), followed by lymphomas (17.65%; 09/51 cases), malignant bone tumors (11.8%; 06/51 cases), renal malignancies (9.8%; 05/51 cases), brain tumors, soft tissue sarcomas and germ cell tumors (7.8%; 04/51 cases each). **Anupama Bandhan et al (2018)**<sup>30</sup> observed that the three most common childhood malignancies were leukemia (29.03%), central nervous system (CNS) tumors (25.80%), and lymphoma (19.35%), and these were followed by Wilms tumor and hepatoblastoma, each accounting for 06.45% of total childhood malignancies. **Monali PM et al (2019)**<sup>31</sup> observed that Wilms were the most common accounting for all the tumors.

Among children aged 0-4 years, Wilms's tumor (53.2%) was the most common type of solid tumor observed in the present study, followed by neuroblastoma (22.6%), hepatoblastoma (9.7%), germ cell tumor (6.5%), rhabdomyosarcoma (6.5%) and ewing sarcoma (1.6%). Among patients aged 5-9 years, Wilms tumor (40%) was the most common type, followed by hepatoblastoma (20%), rhabdomyosarcoma (20%), neuroblastoma (10%) and renal cell carcinoma (10%). **S.K. Upadhyay (1981)**<sup>32</sup> observed that leukemias (29.2%), malignant lymphoma (15.4%), bone tumors (12.6%), and soft tissue sarcomas (8.2%) were the common malignancies encountered in under 15 years age group. **Kusumakumary et al (2000)**<sup>24</sup> observed that intracranial and other Central Nervous System tumors were the largest group of solid tumors in childhood. Embryonal tumors like neuroblastoma, retinoblastoma, Wilms' tumor and hepatoblastoma were more common in children under the age of 5 years.

Among the 39 male patients, Wilms tumor (59%) was the most

common solid tumor, followed by neuroblastoma (25.6%), germ cell tumor (7.7%) and hepatoblastoma (7.7%). Among the 36 female patients also, Wilms tumor (41.7%) was the most common type of solid tumor, followed by hepatoblastoma (16.7%), neuroblastoma (16.7%), rhabdomyosarcoma (16.7%), germ cell tumor (16.7%), ewing sarcoma (2.8%) and renal cell Carcinoma (2.8%).

Among the 75 pediatric children with solid tumor included in this study, most patients (48%) were still under treatment, while 6 (8%) cases default treatment. Remission occurred in 24 (32%) patients. Death occurred in 9 (12%) patients. **Namita Sharma et al (2017)<sup>28</sup>** found that among the 303 patients studied, 33.9% patients went into remission, 35.64% were defaulters, 2.97% had stable disease, 2.31% had partial response, 20.79% expired, and 3.96% were still on treatment. Outcomes approaching similar to international standards have been achieved in India in those treated at specialized institutes as per the available literature.<sup>30</sup> However, one cannot extrapolate these results to the whole population as often those who abandon treatment or are lost to follow-up are excluded from the analysis of hospital case series, and such patients may have a more advanced disease and a poorer outlook. The highest survival has been reported seen for Wilms' tumor and Hodgkins' lymphoma where approximately two-third of the children survive for 5 years or more. The survival for retinoblastoma and germ cell tumors, which are cancers with excellent prognosis in the developed world, is disappointingly low and may be related to an advanced stage at presentation and suboptimal chemotherapy regimens used.<sup>31</sup>

Clinical course was uneventful in only 8 (12.12%). Neutropenia occurred in 49 (74.24%) cases, while bicytopenia occurred in 6.06% cases. Deranged LFTs occurred in 4.55% and dyselectrolytemia in 3.04% cases. Among the 75 pediatric patients with solid tumor, complications occurred in 27 patients. Of these patients 10 (37.04%) developed febrile neutropenia, 33% developed febrile neutropenia with severe sepsis, 11.11% had developed tumor lysis syndrome. Other less common complications were cardiomyopathy (7.41%), jaundice (7.41%) and hemorrhagic cystitis (3.7%). In a similar study by **Namita Sharma et al<sup>28</sup>**, among the documented morbidities, the most common was febrile neutropenia (9.2%) followed by chronic hepatitis B (1.6%).

## CONCLUSION

Most of the pediatric patients with solid malignant tumor were aged 0-4 years (82.66%), while 10 (13.33%) children were aged 5-9 years and only 3 (4%) were aged 10-14 years. Males were slightly more (52%), with a male to female ratio of 1.08 : 1. Palpable mass in the abdomen was most common presenting feature predominantly upper quadrants of the abdomen (92%), followed by hypogastric region (5.33%), perineal region. Wilms tumor (50.67%) was the most common type, followed by Neuroblastoma (21.33%), hepatoblastoma (12%) and rhabdomyosarcoma (8%). Other less common tumor are germ cell tumor (5.33%), ewing sarcoma (1.33%) and renal cell carcinoma (1.33%). Among children aged 0-4 years, Wilms's tumor (53.2%) was the most common type of solid tumor, followed by neuroblastoma (22.6%), hepatoblastoma (9.7%). Among 5-9 years patients, Wilms tumor (40%) was the most common, followed by hepatoblastoma (20%). Among the males, Wilms tumor (59%) was the most common, followed by neuroblastoma (25.6%), germ cell tumour (7.7%) and hepatoblastoma (7.7%). Among females, Wilms tumor (41.7%) was the most common, followed by hepatoblastoma (16.7%), neuroblastoma (16.7%), and Rhabdomyosarcoma (16.7%). Remission occurred in 24 (32%) patients. Death occurred in 9 (12%) patients. Neutropenia occurred in 50 (75.76%) cases, while bicytopenia occurred in 6.06% cases. Deranged LFTs occurred in 4.55% and dyselectrolytemia in 1.52% cases. Complications occurred in 27 patients. Of these patients 10 (37.04%) developed febrile neutropenia, 33% developed neutropenia with severe sepsis, 11.11% had developed tumor lysis syndrome.

Improving awareness of the symptoms, and increasing accessibility to healthcare can help even earlier presentation of such patients to health care. Death occurred in 12% cases during study period indication aggressive nature of some tumor. Default rate was low but can still be decreased with improved accessibility and faith in health system. Dedicated and specialized centers such as ours help early diagnosis, treatment initiation, better outcome, and low default rate. Finally, advances in diagnostics including the turnover time and modalities of treatments need to be implemented at all level possible to improve the

outcomes of these patients.

## Limitations Of This Study:

It was a single center study with small number of patients. Brain tumor and retinoblastoma were not included in this study due to lack of expertise and treatment.

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