Research Article
Volume 12:7, 2020
DOI: 10.37421/jcst.2020.12.637

Journal of Cancer Science & Therapy

ISSN: 1948-5956 Open Access

Changing Paediatric Cancer Practice in COVID-19 Times

Rajendra B. Nerli[1], Abhilasha Sampagar[2], Manas Sharma[1], Shridhar C. Ghagane[3], Sushant Deole[1], Pulkit Gupta[1], Shashank D. Patil[1] and Murigendra B. Hiremath[4]

[1]Department of Urology, JN Medical College, KLE Academy of Higher Education and Research, JNMC Campus, Belagavi, India
[2]Division of Paediatric Hemato-Oncology, Department of Paediatrics, JN Medical College, KLE Academy of Higher Education and Research, JNMC Campus, Belagavi, India
[3]Urinary Biomarkers Research Centre, Department of Urology, KLES Kidney Foundation, KLES Dr. Prabhakar Kore Hospital and Medical Research Centre, Belagavi, India
[4]Department Biotechnology and Microbiology, Karnatak University, Dharwad, India

Abstract

Introduction: Experts dealing with the treatment of cancer in children believe that the COVID-19 pandemic could pose a serious global challenge to the delivery of affordable and equitable treatment to children with cancer. In this paper we report our experience in the management of children with cancer in these COVID-19 times.

Patients and Methods: Out-patient case records, in-patient case records, imaging pictures of all children with cancer attending our hospital were retrieved and analyzed.

Results: Our study period extended from Dec 2019 until the end of April 2020. During this period, it was observed that the number of children attending the outpatient department, undergoing day-care procedures including chemotherapy, as well as children undergoing surgery progressively declined due to COVID-19 associated lockdown. Efforts were made to help the children and their families to gain easy access to treatment.

Conclusion: COVID-19 has disrupted the world and has caused widespread anxiety among families of children with cancer. The medical fraternity with active help from all agencies should work out measures to reduce these difficulties faced by children and their families to provide the means to ensure the continuity of curative treatments and palliative care as effectively as possible.

Keywords: COVID-19 • Pandemic • Childhood cancer • Pediatric oncology • Urologic oncology

Introduction

The origin story of coronavirus seems to be well fixed: someone at the now world-famous Huanan seafood market in Wuhan was infected with a virus from an animalin late 2019. Corona virus disease 2019 (COVID-19) spread from that first cluster in the capital of China's Hubei province to a pandemic that has killed about 2,59,406 people so far [1]. As of 6th May 2020, 3,756,104 persons from 215 countries have tested positive for the virus [1]. World Health Organization has stated that people of all ages could be infected by the new corona virus and that older people, and people with medical co-morbidities (such as asthma, diabetes, heart disease) appeared to be more vulnerable to becoming severely ill with the virus [2].

Earlier reports and analysis from China had shown that only 1% of COVID-19 cases were children younger than 10 years [3], similar to the proportion for Severe Acute Respiratory Syndrome-Coronavirus 2 (SARS-CoV2) and Middle East Respiratory Syndrome (MERS-CoV) epidemics [4,5]. It is well known that infants and young children are at a risk for admission to hospital following respiratory tract infection with viruses such as respiratory syncytial virus and influenza virus [6]. It is believed that immaturity of the respiratory tract and immune system contributed tothe occurrence of viral respiratory disease in this age group [6]. Dong et al. [7] reporting on the epidemiological characteristics of the novel coronavirus disease (COVID-19) stated that, children of all ages were susceptible and there was no significant sex difference. Only 4.4% of the children were asymptomatic, while the majority (89.7%) presented with mild to moderate symptoms. Children less than 1 year of age were more likely to develop severe or critical forms (10.1%). However, this report did not mention any underlying conditions including cancer. There exists very scarce information regarding the clinical features and outcome of immunocompromised children with cancer infected with corona virus-19.

Liang et al. [8] reported that adult patients with cancer were more susceptible to infection than individuals without cancer because of their systemic immunosuppressive state caused by the malignancy and anticancer treatments, such as chemotherapy or surgery. They reported that 18 of 1590 patients admitted with COVID-19, had a history of cancer, which seemed higher than the incidence of cancer in the overall Chinese population (285·83 [0·29%] per 100000 people, according to 2015 cancer epidemiology statistics) [9,10]. It was also observed that patients with cancer were at a higher risk of severe events (requiring invasive ventilation, or death) compared with patients without cancer (seven [39%] of 18 patients vs 124 [8%] of 1572 patients; Fisher's exact p=0.0003).

Bouffet et al. [11] in their commentary wrote that we were all living in very difficult times and that the pandemic was rapidly affecting the delivery of care for children with cancer around the world. Despite the global explosion of research to identify strategies to prevent and treat the infection, there seems to be no answer in sight for at least a few months or more, till the right drug is identified and developed and vaccines are tested. In this paper, we report our experience in the management of children with cancer in these COVID-19 times.

Patients and Methods

This study was taken up following permission obtained from the

***Address for Correspondence:** Rajendra B. Nerli, Department of Urology, JN Medical College, KLE Academy of Higher Education and Research, JNMC Campus, Belagavi-590010, India, Tel: +91-9886616317; Email: rbnerli@gmail.com*

Received 12 June, 2020; **Accepted** 06 July, 2020; **Published** 14 July, 2020

institutional/university ethical committee (KLESKF/IEC/2020/015). Out-patient case records, in-patient case records,imaging pictures of all children with cancer attending our hospital were retrieved and analyzed. The collected data was analyzed for day-care procedures, OPD attendance, surgical procedures, and new cases. Complications, death, and outcome were also noted.

Results

During the study period Dec 2019 till the end of April 2020, the number of children attending the Paediatric Medical Oncology and Paediatric Urologic Oncology OPD, undergoing day-care chemotherapy, admission to inpatient areas and undergoing surgical operations/biopsy were as shown in Table 1 and Figure 1.

The Department of Paediatric Medical Oncology took several steps to continue with day- care therapy (chemotherapy, physiotherapy & counseling) for existing patients of leukaemia and lymphoma. These included communication through telephone, WhatsApp® messages, Instagram®, etc. Travel advisories were issued to patients so that they could obtain travel passes from the district authorities. Hospital ambulances were used to ferry the patients within the city limits during the lockdown. Children being treated with high dose chemotherapy were put on low dose chemotherapy to prevent complications (Figure 2). Children who were from distant places and could not travel were put on alternate oral medications. No major outcome deviations were noted during this period.

A total of 5 children undergoing treatment under our care presented with fever, cough, and breathlessness during this period. All these children were assessed and throat swabs were obtained for viral checks, which turned out to be negative. One of these children of acute lymphoblastic leukaemia had a large mediastinal mass with superior vena-cava syndrome (Pre-treatment Total WBC count 156,000 came down to 3500 post-induction) and presented with fever, cough and breathlessness, and tested negative to the virus (Figure 3). During this period, we had one death of a child with neuroblastoma undergoing chemotherapy and died due to aspiration [11].

Three children operated for Wilms' tumour and undergoing post-operative chemotherapy had to miss their day-care schedules as they were not able to travel due to inter-state travel restrictions. The state and district authorities helped us in getting them travel advisories or passes and continue with treatment by the end of April 2020.

Discussion

The first case of the COVID-19 pandemic in India was reported on 30th January 2020. On 22nd March 2020, India observed a 14-hour voluntary public curfew at the instance of the Prime Minister Narendra Modi [12]. The government followed it up with lockdowns in 75 districts where COVID-19 cases had occurred as well as all major cities [12]. Further, on 24th March, the prime minister ordered a nationwide lockdown for 21 days, affecting the entire 1.3 billion population of India. On 14th April, the prime minister extended the ongoing nationwide lockdown till 3rd May [12].

It is well known that most childhood cancers behave aggressively and need immediate treatment, often requiring prolonged periods of intensive multiagent chemotherapy. Postponement of treatment such as surgery, radiation, and chemotherapy may not be a safe option in children. COVID-19 is presently the focus of attention of the government and hospital authorities. Social distancing, isolation, wearing of face masks, and repeatedly washing the hands remain the best measures to limit its spread. Children with cancer are definitely at risk oftransmission of coronavirus and this has resulted in widespread anxiety among families of these children [12].

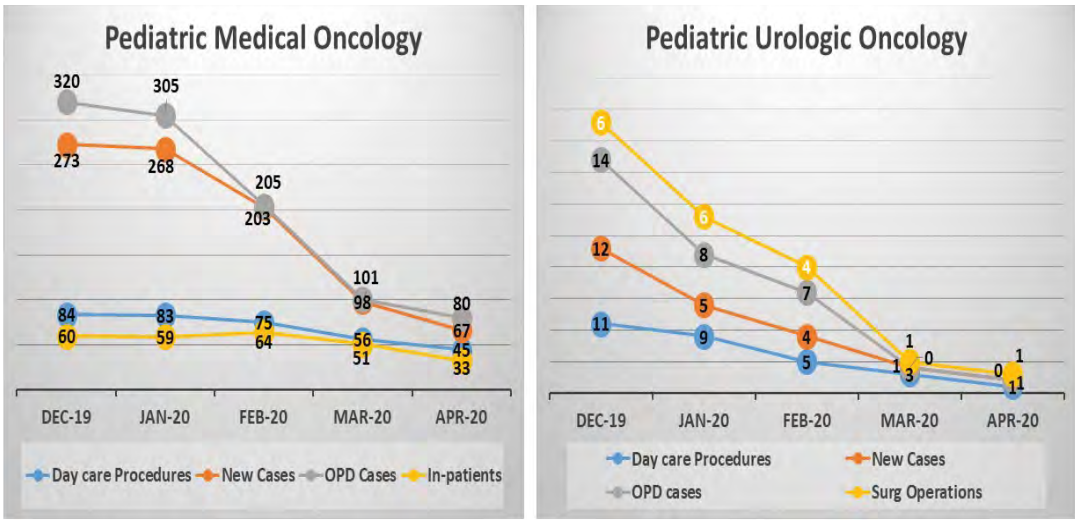
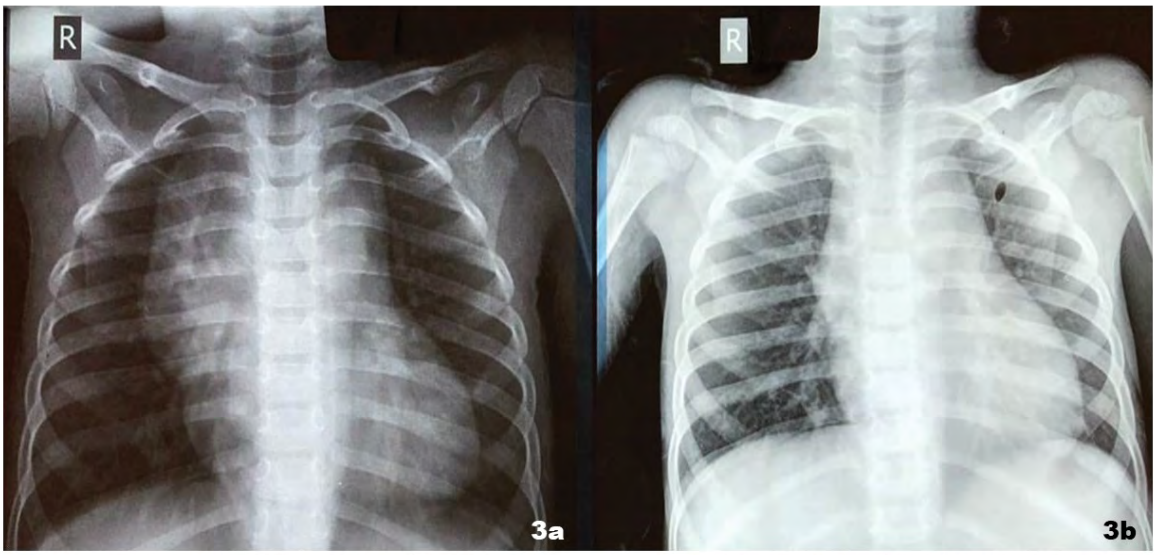


Figure 1. Data showing a declining trend in the number of children attending Paediatric and Urologic Oncology Clinic at our centre during the COVID-19 pandemic.

Table 1: Children under paediatric medical oncology and paediatric urologic oncology care.

Variables	Dec 19	Jan 20	Feb 20	March 20	April 20
Paediatric Medical Oncology					
Day care Procedures	84	83	75	56	45
New Cases	273	268	203	98	67
OPD Cases	320	305	205	101	80
In-patients	60	59	64	51	33
Paediatric Urologic Oncology					
Day care Procedures	11	9	5	3	1
New Cases	12	5	4	1	1
OPD cases	14	8	7	-	-
Surgical Operations	6	6	4	1	1

Figure 2. A follow-up case of Stage-V Wilms' tumour receiving adjuvant chemotherapy as day-care procedure.



Pre-chemotherapy chest radiograph Post-chemotherapy (Day-2) chest radiograph

Figure 3. 3a. A child with Acute Lymphoblastic Leukaemia presenting with a large mediastinal mass causing superior vena-cava syndrome. **3b.** Post-chemotherapy reduction in the size of the mediastinal mass is evident on day 2.

Sullivan et al. [13] reported on the general principles for continuing multi-disciplinary care during the SARS-CoV-2 (COVID-19) pandemic. This group felt that the COVID-19 pandemic presented aglobal threat to the safe and effective care for children with cancer and that there was an urgent need amongst health professionals and families for informed guidance on the range of reasonable and safe adaptations to their services and cancer treatment while protecting the health and safety of staff, patients and families. Earlier in 2018 the WHO Global Initiative for Childhood Cancer (GICC), had set an ambitious goal of improving survival rates for 90% of the World's children who lived in low- and middle-income countries (LIMC) to 60% by 2030 [13,14]. The GICC then had identified 6 common index cancers; Acute Lymphoblastic Leukaemia, Burkitt and Hodgkin Lymphoma, Retinoblastoma, Wilms' tumour, and Low-Grade Gliomas.

It has become clear now that it is not possible to maintain services as usual during this COVID-19 pandemic [15]. It is for healthcare providers to evaluate the means to ensure the continuity of curative treatments and palliative care as effectively as possible. Arrangements need to be made so that the patients and their families can access care, in the presence of serious lockdowns and curfews. General guidelines have included suggestions as to maintain the standards of care for the diagnosis, treatment, and supportive care for children with cancer and that these should not be compromised or electively modified during the pandemic.

All children suspected of having cancer must be investigated without delay. It is a matter of apprehension that children with the early clinical signs of cancer may remain in the community and not be referred or present for investigation due to travel restrictions, fear of presenting to the hospital due to familial financial issues. Unfortunately, evidence exists that there has been a delay in the presentation of acute illness in children in high prevalence areas [16,17]. Similarly, children with solid tumours need to go surgical interventions if indicated at an appropriate time. Delay in surgical is known to be associated with poor prognosis. We have formulated a guideline for triage of paediatric urological oncology cases to aid in the decision-making and timely management of these patients (Table 2). Kotecha [18] concluded in his correspondence that "The coming months would pose many additional challenges, which might include accessibility to health-care resources, effects on drug manufacture and supply, and the effect on the care of children with cancer from low and middle income countries. However, continued collaboration among the international paediatric oncology community would be required to get through such uncertain times." [19-25].

Table 2: Triage of paediatric urological malignancies for decision-making algorithm.

	Variables	Low Priority	Intermediate Priority	High Priority
Wilms Tumour	**New patient with renal mass**			**COG Approach** [19,20]**:** • If upfront Nephrectomy is not feasible, a delay of 1 month for small tumours. · Consider neo-adjuvant chemotherapy in patients with clinical and radiological features suggesting Wilms' tumour. **SIOP Approach** [19,20]: • Neo-adjuvant chemotherapy to be initiated and consider for delayed nephrectomy. A maximum 12-week delay is safe.
	Localized Wilms' tumour (Post-operative management)		• Consider chemotherapy within 3 weeks of nephrectomy. • To add G-CSF in multi-drug regimen.	• High risk tumours: Adjuvant radiation therapy to flank or abdomen [21].
	Metastatic Wilms' tumour (Post-operative management)	• Metastatectomy • Radiation therapy to lungs	• Chemotherapy	• Adjuvant radiation therapy to flank or abdomen in case of high risk tumour (Anaplastic, Blastemal type) [22].
	Bilateral Wilms' tumour			• NAC followed by Nephron Sparing Surgery [23].
Testicular Tumours	**Pre-pubertal Testicular Tumour (age < 1 year)**			• If ultrasound imaging reveals salvageable testis, inguinal approach to tumour excision and frozen section. • Yolk Sac tumour: proceed to orchiectomy • Teratoma: If adjacent testicular parenchyma is pre-pubertal, preserve testis [24].
	Pre-pubertal Testicular Tumour (age > 1 year)			• Elevated AFP levels: consider immediate radical high inguinal orchiectomy [24].
	Paratesticular Rhabdomyo sarcoma			• Radical high inguinal orchiectomy • Age>10 years, normal CT imaging and complete resection with negative margin à no further treatment • Suspected metastatic lymph nodes on staging CT: Consider biopsy of nodes. • Ipsilateral nerve-sparing RPLND in case of positive nodes [25].

COG: Children's Oncology Group; SIOP: International Society of Paediatric Oncology; G-CSF: Granulocyte-Colony Stimulating Factor; AFP: Alpha-Feto Protein; CT: Computed Tomography; RPLND: Retro Peritoneal Lymph Node Dissection

[**Note:** There is no evidence base concerning the likely impact on clinical outcomes for making further recommendations. Clinicians working in oncology settings should be directed by their local experience and available health-care resources during the COVID-19 pandemic].

Conclusion

COVID-19 has disrupted the world and has caused widespread anxiety among families of children with cancer. The medical fraternity with active help from all agencies should work out measures to reduce these difficulties faced by children and their families to provide the means to ensure the continuity of curative treatments and palliative care as effectively as possible.

Conflict of Interest

Authors declare as none.

References

1. Worldometer. COVID-19 Corona virus pandemic. (2020).
2. World Health Organization. Corona virus disease (COVID-19) advice for the public: Myth busters. (2020).
3. Wu, Zunyou, and Jennifer M. McGoogan. "Characteristics of and important lessons from the corona virus disease 2019 (COVID-19) outbreak in China: Summary of a report of 72,314 cases from the Chinese center for disease control and prevention." *JAMA* 323 (2020): 1239-1242.
4. Denison, Mark. "Severe acute respiratory syndrome corona virus pathogenesis, disease and vaccines: An update." *Pediatr Infect Dis J* 23 (2004): 207-214.
5. Al-Tawfiq, Jaffar A, Rana F. Kattan and Ziad A. Memish. "Middle East respiratory syndrome coronavirus disease is rare in children: An update from Saudi Arabia." *World J Clin Pediatr* 5 (2016): 391-396.
6. Tregoning, John and Jürgen Schwarze. "Respiratory viral infections in infants: causes, clinical symptoms, virology, and immunology." *Clin Microbiol Rev* 23 (2010): 74-98.
7. Dong, Yuanyuan, Xi Mo, Yabin Hu and Xin Qi, et al. "Epidemiology of COVID-19 among children in China." *Pediatric* 145 (2020): e20200702
8. Liang, Wenhua, Weijie Guan, Ruchong Chen and Wei Wang, et al. "Cancer patients in SARS-CoV-2 infection: A nationwide analysis in China." *Lancet Oncol* 21 (2020): 335-337.
9. Wang, Hanping and Li Zhang. "Risk of COVID-19 for patients with cancer." *Lancet Oncol* 21 (2020): e180.
10. Wanqing, Chen, Rongshou Zheng, Peter D. Baade and Siwei Zhang. "Report of cancer epidemiology in China, 2015." *ZhonghuaZhong Liu ZaZhi* 41 (2019): 19-28.
11. Bouffet, Eric, Julia Challinor, Michael Sullivan and Andrea Biondi, et al. "Early advice on managing children with cancer during the COVID-19 pandemic and a call for sharing experiences." *Paed Blood Cancer* 2 (2020): e28327.
12. Wikipedia. "COVID-19 pandemic in India." (2020).
13. Sullivan, Michael, Eric Bouffet, Carlos Rodriguez-Galindo and Sandra Luna-Fineman, et al. "The COVID-19 pandemic: A Rapid Global response for Children with Cancer from SIOP, COG, SIOP-E, SIOP-PODC, IPSO, PROS, CCI and St Jude Global." *Paediat Blood Cancer* 7 (2020): e28409.
14. Lam, Catherine, Scott C. Howard, Eric Bouffet and Kathy Pritchard-Jones. "Science and health for all children with cancer." *Science* 363 (2019): 1182-1186.
15. Bhakta, Nickhill, Lisa M. Force, Claudia Allemani and Rifat Atun, et al. "Childhood cancer burden: A review of global estimates." *Lancet Oncol* 20 (2019): 42-53.
16. Bouffet, Eric, Julia Challinor, Michael Sullivan and Andrea Biondi, et al. "Early advice on managing children with cancer during the COVID-19 pandemic and a call for sharing experiences." *Paed Blood Cancer* 6 (2020): 190-196.

17. Lazzerini, Marzia, Egidio Barbi, Andrea Apicella and Federico Marchetti, et al. "Delayed access or provision of care in Italy resulting from fear of COVID-19." *Lancet Child Adolesc Health* 4 (2020): 10-11.

18. Kotecha, Rishi. "Challenges posed by COVID-19 to children with cancer." *Lancet Oncol* 21 (2020): 235-239.

19. Dome, Jeffrey, Norbert Graf, James I. Geller and Conrad V. Fernandez, et al. "Advances in Wilmstumor treatment and biology: Progress through international collaboration." *J Clinical Oncol* 33 (2015): 2999-3004.

20. Marie-France, Tournade, Com Nougue, De J. Kraker and Ludwig Rolf, et al. "Optimal duration of preoperative therapy in unilateral and non-metastatic wilms' tumor in children older than 6 months: Results of the Ninth International Society of Pediatric Oncology Wilms' Tumor Trial and Study." *J Clinical Oncol* 19 (2001): 488-500.

21. Graf, Norbert, Marie-France Tournade and Jan de-Kraker. "The role of preoperative chemotherapy in the management of wilms' tumor: The SIOP Studies." *Urologic Clinic North America* 27 (2000): 443-454.

22. Pasqualini, Claudia, Rhoikos Furtwängler, Harm Tinteren and Roberto A. Teixeira, et al. "Outcome of patients with stage IV high-risk Wilms tumour treated according to the SIOP 2001 protocol: A report of the SIOP Renal tumour study group." *Europe J Cancer* 128 (2020): 38-46.

23. Sharma, Manas, Nerli Rajendra, Ghagane Shridhar and Hiremath Murigendra, et al. Oncological and renal function outcome in children with unilateral wilms tumors treated with nephron sparing surgery or ablative nephrectomy. *Paed Blood Cancer* 65 (2018): 305-307.

24. Ross, Jonathan, Lisa Rybicki and Robert Kay. "Clinical behaviour and a contemporary management algorithm for pre pubertal testis tumors: A summary of the pre pubertal testis tumor registry. *J Urol* 168 (2002): 1675-1679.

25. Wiener, Eugene, James R. Anderson, Jacqueline I. Ojimba and Thomas E. Lobe, et al. "Controversies in the management of paratesticular rhabdomyosarcoma: Is staging retroperitoneal lymph node dissection necessary for adolescents with resected paratesticular rhabdomyosarcoma." *Seminar Pediatr Surgery* 10 (2001): 146-152.

How to cite this article: Rajendra B. Nerli, Abhilasha Sampagar, Manas Sharma and Shridhar C. Ghagane, et al. "Changing Paediatric Cancer Practice in COVID-19 Times." *J Cancer Sci Ther*. 12 (2020). DOI: 10.37421/jcst.2020.12.637