Received: 10 June 2022 | Revised: 2 July 2022 | Accepted: 4 July 2022

DOI: 10.1002/pbc.29894

Pediatric Blood & Cancer

LETTER TO THE EDITOR

SARS-CoV-2 infection in children undergoing oncologic treatment in Hong Kong: A population-based cohort during the Omicron wave

To the Editor:

SARS-CoV-2 infection (COVID-19) led to a global pandemic disrupting all aspects of healthcare. After a period of limited local transmission, emergence of the Omicron variant BA.2 resulted in rapid surge of cases in the densely populated city of Hong Kong since the end of January 2022.[1] Existing literature reported overall milder disease course of COVID-19 in the pediatric age group (symptomatic in 50%–60%, severe disease 1%–6%, mortality < 0.1%),[2] but children undergoing anti-cancer therapy and hematopoietic stem cell transplantation (HSCT) have been shown to carry higher risks of severe complications (up to 20%) and mortality (4%–5%).[3,4] Nonetheless, these findings have largely been derived from registry or institution-based data and predated dominance by the Delta/Omicron variants. Hong Kong Children's Hospital (HKCH) is the only referral center for Pediatric Oncology and HSCT in Hong Kong. Based on such population-wide cohort, we herein describe the clinical features of children on active anti-cancer therapy or less than 12 months of HSCT infected with SARS-CoV-2 from 1 February to 31 March 2022 during which the majority of local community infections were attributed to the Omicron BA.2 subvariant. This study was approved by the Research Ethics Committee of HKCH.

Among 210 patients on active therapy, 47 patients (22%) were diagnosed with COVID-19 (male:female = 35:12). The median age at infection was 10.1 years (range: 2.1–20.2). Twenty-nine patients had underlying diagnosis of hemic/lymphoid malignancies, whereas 18 patients had CNS or extra-CNS solid tumors; nine had history of HSCT. Thirteen (28%) of patients were considered to be on intensive phases of chemotherapy. Only two patients received ≥1 dose of COVID-19 vaccine ≥2 weeks before documented infection (both Comirnaty). Thirty-three patients were diagnosed using RT-PCR, while 14 patients were diagnosed using rapid antigen test. Forty-two (89%) patients were symptomatic, with the most common symptoms being fever and cough, followed by gastrointestinal disturbances. None developed neurological symptoms. Patients who were asymptomatic were diagnosed either from screening during hospital attendance or as part of contact tracing. Twenty-seven (57%) patients required hospitalization, and the median duration of admission was 5 days (range 1–43). Forty patients had mild symptoms, while two were considered to have moderate symptom severity (lower respiratory tract infection in 1, systemic inflammation in 1), and remdesivir was used in four patients. None required intensive care, and there was no mortality. COVID-19 resulted in interruption of therapy in 83%. Serial RT-PCR testing indicated persistent positivity in some patients. Among the 24 patients who had repeat RT-PCR ≥14 days from initial diagnosis, 14 (58%) and 8 (33%), respectively, had persistent detectability for ≥14 days and ≥21 days. Four patients had persistent positivity for more than 1 month, and lasted as long as 64 days. One of them experienced symptomatic reactivation/re-infection. In 12 patients who had anti-SARS-CoV-2 IgG performed ≥14 days from diagnosis (median = 29 days, range 15–65 days), seven (58%) had detectable receptor-binding domain IgG (median titer = 224.3AU/ml, range 52.9–545.2AU/ml).

SARS-CoV-2 Omicron subvariant resulted in frequently symptomatic but mostly mild infection for unvaccinated children undergoing anti-cancer treatment in Hong Kong. This concurred with the lower mortality rate observed in adult oncology patients infected during the Omicron wave in New York.[5] Uniquely, there had not been any documented infection in children undergoing oncologic therapy prior to the Omicron wave in Hong Kong, and the majority of our patients had not been vaccinated against SARS-CoV-2, implying that the observed disease course largely reflects that in children without prior immunity. In spite of the above, COVID-19 commonly resulted in treatment interruption and may adversely impact the oncologic outcome; the persistent viral detection observed also promotes the acquisition of mutations in the viral genome. Overall, our data and transmissibility of the current viral variants reinforce the importance of personal hygiene and SARS-CoV-2 vaccination before and after infection in children undergoing immunosuppressive therapy.

ACKNOWLEDGMENTS

The authors are most grateful to all healthcare providers who have dedicated themselves to the care for our patients at Hong Kong Children's Hospital during such trying times. We thank Ms. Jasmine Lee for her assistance in the submission process.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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REFERENCES

1. Cheng VC-C Ip JD, Chu AW-H et al. Rapid spread of SARS-CoV-2 Omicron subvariant BA. 2 in a single-source community outbreak. *Clin Infect Dis*. 2022. https://doi.org/10.1093/cid/ciac203
2. Chua GT, Wong JSC, Lam I et al. Clinical characteristics and transmission of COVID-19 in children and youths during 3 waves of outbreaks in Hong Kong. *JAMA Netw Open*. 2021;4(5):e218824.
3. Meena JP, Gupta AK, Tanwar P et al. Clinical presentations and outcomes of children with cancer and COVID-19: a systematic review. *Pediatr Blood Cancer*. 2021;68(6):e29005.
4. Mukkada S, Bhakta N, Chantada GL et al. Global characteristics and outcomes of SARS-CoV-2 infection in children and adolescents with cancer (GRCCC): a cohort study. *Lancet Oncol*. 2021. 22(10): 1416-1426.
5. Lee M, Quinn R, Pradhan K et al. Impact of COVID-19 on case fatality rate of patients with cancer during the Omicron wave. *Cancer Cell*. 2022;40(4):343-345.