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Case Report

Novel coronavirus infection (COVID-19) in a 12-year-old boy with acute lymphoblastic leukemia

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ABSTRACT

Pediatric acute lymphoblastic leukemia (ALL) with COVID-19 might still have a risk of severe infection due to immunocompromised condition. The clinical features in oncology population are quite similar to those of previous reports in general pediatric cases. Chemotherapy should be arranged individually to balance the risk between leukemia progressivity itself and COVID-19 complications. Interruptions of therapy must be thought in cases with severe or symptomatic infection of severe acute respiratory syndrome-CoV-2. In this case report, chemotherapy will be started 1 week after the improvement of general condition. Chemotherapy should not be postponed for >14 days.

KEY WORDS: Chemotherapy, COVID-19, leukemia, pediatric

INTRODUCTION

Novel coronavirus (severe acute respiratory syndrome [SARS]-CoV-2) infection in Indonesia is still challenging, especially in the pediatric leukemia population. After the first case of an Indonesian patient infected with COVID-19 reported on March 1, 2020, the incidence has spread rapidly. A recent published study has reported novel coronavirus infection in children with acute lymphoblastic leukemia (ALL).[1] Acute leukemia patients, who have COVID-19, should have their individual therapy to balance the risk between leukemia progressivity itself and COVID-19 complications. The risk of severe COVID-19 infection might increase in immunocompromised children with hematologic malignancy.[2] Leukemia is one of the most common childhood malignancies in Indonesia, with a prevalence of 2.8/100,000 patients.[3] Interruptions of therapy must be thought in cases with severe or symptomatic infection of SARS-CoV-2. However, there is no clinical experience of infected pediatric patients with ALL that has been recorded, especially in the Indonesian population. We report a case of novel coronavirus infection (COVID-19) in a 12-year-old boy with ALL. Pharyngeal swab showed a positive result, by using reverse transcription-polymerase chain reaction assay.

CASE REPORT

A 12-year-old boy presented with fever, accompanied by cough and shortness of breath for 4 days prior to Doris Sylvanus Hospital admission on April 5, 2020. He was previously healthy, with a history of ALL on maintenance-phase chemotherapy. Moreover, he also experienced nasal congestion, runny nose, acute loss of sense of smell (anosmia) for 2 weeks, and skin manifestation (a red tiny spot in both extremities and trunk). Azithromycin was given for 3 days, but there was no clinical improvement. History inquiry revealed unclear contact with confirmed COVID-19 patients. His parents both displayed no upper respiratory tract infection symptoms and were also negative for SARS-CoV-2 infection on oropharyngeal swab test. He has been diagnosed with ALL-L1 since November 2017. Immunophenotyping examination showed B-lineage with aberrant expression of CD33 and CD13. Last bone marrow aspiration for evaluation in April 2018 showed total remission post chemotherapy.

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Upon admission, his body temperature was 38.7°C, with a respiratory rate of 38 times/min and saturation of 88% without oxygen supplementation. He developed tachypnea, retraction, and crackle in both lungs. Moreover, he also had loss of sense of smell (anosmia) and diminished sense of taste (ageusia). Laboratory studies showed low hemoglobin level (11.3 g/dL; normal range: 13.5–18 g/dL), low white blood cell count ($1.2 \times 10^3/\mu L$; normal range: $4.5–11 \times 10^3/\mu L$), with 22.5% neutrophils and 50.9% lymphocytes, and moderate neutropenia (absolute neutrophil count $0.72 \times 10^3/\mu L$; normal range, $1.5–7 \times 10^3/\mu L$). His peripheral blood smear showed anemia, accompanied by leukopenia and reactive lymphocytosis. Another blood examination was performed which showed normal results for random blood glucose, renal function test, liver function test, coagulation study, and serum electrolyte. Blood culture, procalcitonin, and C-reactive protein were not examined because of hospital facility limitations. The oropharyngeal swab tested positive for SARS-CoV-2. No other pathogens were found. Chest X-ray result showed bilateral pneumonia [Figure 1]. Supportive and therapeutic care including proper fluid therapy and intravenous antibiotic cefotaxime 750 mg/q8h and amikacin 180 mg/q12h was instituted. After 3-day use of those antibiotics, there was an unsatisfied clinical improvement. Therefore, the antibiotic regimen was changed to meropenem 500 mg/q8h. After 72 h, the general condition of the patient improved, and his fever, retraction, and tachypnea subsided gradually. His oropharyngeal swab tested negative for SARS-CoV-2 after 11 days of treatment (two times' consecutive examination). Chemotherapy will be started 1 week after this improvement of general condition. Patient's consent form has been obtained from his parents.

DISCUSSION

We report the first case of pediatric ALL with COVID-19 in Indonesia, which manifested as pneumonia, accompanied by acute loss of sense of smell (anosmia) and diminished sense of taste (ageusia) manifestation, with a good prognosis. The clinical features in oncology population are quite similar to those of previous reports in general pediatric cases. However, COVID-19 might have various symptoms, which could be associated with previous health condition and comorbidities.[4] Anosmia and ageusia have also been repeatedly reported in adult COVID-19 patients with oncology comorbidities, especially in Europe and Asia.[5] However, there are still inadequate published data which document typical manifestation in COVID-19 with oncology comorbidities,[6] especially in pediatric patients. In the absence of full objective assessment and nasoendoscopy, precise pathomechanism is still hard to determine. The most possible explanation is a postviral syndrome with direct infection of the olfactory mucous and impairment of olfactory sensory neurons.[7]

Figure 1: Chest X-ray of a 12-year-old boy with acute lymphoblastic leukemia and COVID-19

There is still a limited number of pediatric cases and experiences, especially with hematologic malignancy. Therefore, additional data from pediatric cases need to be collected to recognize the clinical features of COVID-19 in this population. Secondary bacterial pneumonia should be considered in high-risk individuals such as those with febrile neutropenia conditions. The SARS-CoV-2 oropharyngeal swab result might take time for 1 week in the current hospital. Empiric antibiotic for febrile neutropenia in this hospital was third generation of cephalosporin, which was used for the patient. Close contact in the core family is the major transmission route of SARS-CoV-2 infection in the pediatric population. Pediatric patients may show mild respiratory or gastrointestinal manifestation with normal chest imaging, or even asymptomatic, and thus can easily be missed.[1] All recommendations of COVID-19 in the leukemia population might still be regarded as assumptions, based on clinical experience.[2] Maintenance chemotherapy for patients in the remission phase should be postponed for no more than 14 days.[8] Increase in the maximum delay before chemotherapy provides a balance between the potential risk of SARS-CoV-2 infection and leukemia progressivity because pediatric patients in this phase of treatment have a reduced risk of recurrence.[9,10]

CONCLUSION

Clinical data on COVID-19 infection in pediatric patients with ALL are still very limited. The risk of severe COVID-19 infection should be cautioned in immunocompromised children with hematologic malignancy. More studies are needed to have a better understanding of SARS-CoV-2 infection in the pediatric population with ALL to improve the level of diagnosis and management. The decision to continue chemotherapy must be thought individually based on the patient's condition, but should not be postponed for more than 14 days.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other

clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest
There are no conflicts of interest.

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