






Giant Pulmonary Abscess After COVID-19 Pneumonia: A Case Report

COVID-19 Pnömonisi Sonrası Dev Pulmoner Apse: Olgu Sunumu

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Abstract

The Coronavirus disease-2019 (COVID-19) in children is more likely to be asymptomatic or to have mild-to-moderate symptoms; however, severe cases have also been reported. A 10-year-old boy previously diagnosed with pontocerebellar hypoplasia presented with respiratory distress after 2 days of fever. He underwent tracheal intubation. He was COVID-19 positive. On day 10, a cystic area was observed in his chest radiography and thorax computer tomography also showed a thick-walled pulmonary abscess. Percutaneous empyema drainage was performed. On day 20, an open surgical tracheotomy was performed. On day 25, the percutaneous drainage catheter was removed. On day 55, he was discharged on the home ventilator and his chest radiography was normal. Children with COVID-19 may develop a pulmonary abscess secondary to superinfections during intensive care follow-up.

Keywords: Child, COVID-19, pulmonary abscess, superinfections

Öz

Çocukların Koronavirüs hastalığı-2019 (COVID-19) asemptomatik, hafif veya şiddette hastalık olarak geçirme olasılığı daha yüksektir, ancak ciddi olgular da bildirilmektedir. Daha önce bilinen pontoserebellar hipoplazi tanısı olan 10 yaşında erkek hasta iki günlük ateş sonrası solunum sıkıntısı ile başvurdu. Solunum sıkıntısı nedeniyle entübe edildi. COVID-19 pozitif. On gün sonra çekilen akciğer grafisinde kistik bir alan gözlemlendi ve toraks bilgisayarlı tomografisinde kalın duvarlı bir akciğer apsesi görüldü. Perkütan empiyem drenajı yapıldı. Bu çalışmada COVID-19 pozitif çocukların yoğun bakım takibi sırasında süperenfeksiyonlara sekonder akciğer apsesi gelişebileceğini bildirmek istedik.

Anahtar kelimeler: Akciğer apsesi, COVID-19, çocuk, süperenfeksiyon

Introduction

Severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2) causes Coronavirus disease-2019 (COVID-19) and has caused substantial morbidity and mortality in adults. Although children with COVID-19 are more likely to be asymptomatic or have a mild to moderate disease course, severe cases were reported (1). Here, we present a child who had a pulmonary abscess associated with superinfection after COVID-19 pneumonia.

Case Report

A 10-year-old boy, previously diagnosed with pontocerebellar hypoplasia, developed bilateral femoral fractures after falling off. His both legs were placed in a cast and he was discharged on the same day. Two days later, he presented with respiratory distress and fever ongoing since discharge. He was transferred to our pediatric intensive care unit due to his worsening dyspnea/hypoxia and underwent tracheal intubation. On physical examination,



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Cite this article as: Akçay N, Menentoğlu ME, Sofuoğlu Aİ, Oğur M, Bakırtaş Palabıyık F, Şevketoğlu E. Giant Pulmonary Abscess After COVID-19 Pneumonia: A Case Report. Bagcilar Med Bull 2022;7(4):365-370

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Bagcilar Medical Bulletin published by Galenos Publishing House.

he was unconscious and in poor general condition. His blood pressure was 102/63 mmHg, heart rate was 142/min, body temperature was 38 °C, SpO₂ was 79%, and respiratory rate was 25/min. Chest examination revealed a reduced chest expansion, bilateral widespread crackles, and decreased breath sounds. His chest X-ray and computed tomography (CT) revealed diffuse ground-glass opacity bilaterally and peripheral zone consolidation (Figure 1). SARS-CoV-2 reverse transcription-polymerase chain reaction (RT-PCR) was positive on the nasopharyngeal swab. Laboratory parameters are shown in Table 1. Favipiravir, ceftriaxone, and azithromycin were initiated. He also received intravenous immunoglobulin (immunoglobulin G: 300 mg/dL) therapy. He required invasive mechanical ventilation for 10 days. On day 10, a cystic area was observed on his chest X-ray and thorax CT revealed a thick-walled pulmonary abscess accompanied by a consolidation and atelectasis zone in the lower lobe of the right lung (Figure

1). Percutaneous empyema drainage was performed by interventional radiology. His antimicrobial treatment was switched to vancomycin, meropenem, metronidazole, and liposome amphotericin B. On day 20 of intubation, an open surgical tracheotomy was performed. All of the bacterial cultures (hemocultures, tracheal aspirate, urine, and abscess drainage fluid), aspergillus serology, and antigen were negative. On day 25, the percutaneous drainage catheter was removed. On day 55, he was discharged on the home ventilator and his chest radiography was normal. The written informed consent to publication has been obtained from the parents on behalf of the patient.

Discussion

We presented a 10-year-old boy who developed a pulmonary abscess that had an air-fluid level, associated with superinfection after COVID-19 pneumonia. Our patient was immobilized and had poor oral hygiene. Superinfections and

Table 1. Serial laboratory results of the patient

Variables	HD 1	HD3	HD 6	HD 8	HD 10	HD 12	HD 14	HD 16	HD 18	HD 20	HD 24	HD 28
White blood cell count, ×10 ³ /μL	25.2	4.63	10.3	12.1	15.7	28.2	11.1	11.6	7.7	13.3	13.7	8.2
Neutrophil, ×10 ³ /μL	20.5	8.7	7.5	8.3	11.6	23.4	6.6	7.6	3.6	6.7	7.9	4.9
Lymphocyte, ×10 ³ /μL	2.7	3.9	1.3	2.4	3.7	2.4	3.4	2.8	2.9	4.3	3.1	1.8
Hemoglobin, g/dL	9.5	9.8	11.1	12.4	12.4	11.4	8.1	9.3	8.9	9.8	7.2	10.9
Platelets, ×10 ³ /μL	219	137	136	178	310	512	380	332	391	330	125	174
Glucose, mg/dL	235	115	172	116	108	107	70	337	80	65	86	89
BUN, mg/dL	6	8	27	17	25	18	16	12	17	23	18	9
Creatinine, mg/dL	0.13	0.11	0.27	0.16	0.22	0.18	0.13	0.29	0.15	0.29	0.1	0.1
Total bilirubin, mg/dL	0.24	0.91	3.08	1.96	0.98	1.4	0.78	0.58	0.66	0.53	0.57	0.81
AST, U/L	66	89	101	197	145	134	118	112	140	316	149	106
ALT, U/L	129	77	84	67	43	40	36	33	35	82	47	30
Uric acid, mg/dL	5	6.7	8.8	2	3.9	4.2	5.2	5.7	7.8	8.5	7.1	2.4
CK, U/L	119	1496	768	48	48	165	52	83	57	41	46	47
ALP, U/L	150	67	69	110	82	114	136	156	160	261	140	121
LDH, U/L	482	646	1990	1277	1414	1294	733	649	539	667	650	752
Sodium, mmol/L	140	149	148	148	151	149	160	153	160	142	142	138
Potassium, mmol/L	2.9	3.2	4.3	3.85	4.2	2.9	4.17	6.85	3.00	3.67	4.46	2.7
Total protein, g/dL	5.2	6.5	8.7	7.4	7.5	7.6	5.5	5.1	6.1	6.3	5.1	5.3
Albumin, g/dL	3.1	4.8	3.6	3.2	3.4	3.9	2.8	2.5	3.4	3.4	2.7	3.2
CRP, mg/L	117	209	475	153	54	84	116	114	93	67	102	128
Pro-Calcitonin, ng/mL	0.7	2.3	25.9	10.1	6.8	1.5	0.8	0.6	0.3	0.7	0.7	1.7
PT, sec	26.3	19.1	18.9	17.7	16.7	16.1	16.3	17.9	15.9	15.3	-	15.2
PT INR	2.1	1.5	1.5	1.4	1.3	1.3	1.3	1.4	1.2	1.2	-	1.2
aPTT, sec	42.3	36.6	39.8	39.6	42	36.5	36.8	43.4	42.9	44.3	-	40.4
D-dimer, μg/mL (FEU)	1.0	0.85	3.93	-	-	5.26	3.18	2.95	2.82	-	-	-

CPR: C-reactive protein, aPTT: Activated partial thromboplastin time, INR: International normalized ratio, LDH: Lactate dehydrogenase, AST: Aspartate aminotransferase, ALT: Alanine aminotransferase, FEU: Fibrinogen equivalent units, CK: Creatine kinase, BUN: Blood urea nitrogen, HD: Hospital day

co-infections have been reported associated with COVID-19 during the pandemic. The study by Garcia-Vidal et al. (2) described the epidemiology and outcome of co-infections and superinfections accompanying hospitalized patients with COVID-19. In this study, co-infection with COVID-19 was uncommon and mainly related to bacterial infections. The most common bacteria isolated were *S. pneumoniae* and *S. aureus*. Although superinfections were rare, they had a worse outcome. The most frequently isolated bacteria were *P. aeruginosa* and *E. coli*. Our patient received antibiotic therapy in the pediatric intensive care unit admission; therefore, we did not isolate a pathogenic bacterium.

Renaud-Picard et al. (3) reported a 59-year-old woman with a pulmonary abscess. The case was the only COVID-19-associated pulmonary abscess reported in the literature so far. This case developed a pulmonary abscess while she was SARS-CoV-2 RT-PCR negative on nasopharyngeal swab on admission and 24 days later. Our patient developed a giant pulmonary abscess on day 10 of hospitalization while SARS-CoV-2 RT-PCR was still positive. Abscesses occurring in different regions have been reported during the COVID-19 pandemic (4,5). We think that our case report holds significance since it is the first child in the literature to have a pulmonary abscess linked to COVID-19.

We observed a superinfection of COVID-19 pneumonia. The reason for the development of a pulmonary abscess in our patient may be inadequate oral care and low immunoglobulin levels. The widespread use of antibiotics

in COVID-19 pneumonia may exacerbate antimicrobial resistance and may increase morbidity and mortality.

Ethics

Informed Consent: The written informed consent to publication has been obtained from the parents.

Peer-review: Internally and externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: N.A., A.İ.S., M.O., Concept: N.A., M.E.M., A.İ.S., M.O., F.B.P., Design: N.A., M.E.M., A.İ.S., E.Ş., Data Collection or Processing: N.A., M.O., E.Ş., Analysis or Interpretation: N.A., M.E.M., F.B.P., Literature Search: N.A., F.B.P., Writing: N.A., E.Ş.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

Main Points

- This case highlights that superinfection, although rare, can cause a giant pulmonary abscess that may develop after a Coronavirus disease-2019 (COVID-19) infection.
- The widespread use of antibiotics in COVID-19 pneumonia may exacerbate antimicrobial resistance and may increase morbidity and mortality
- We recommend following precautions for infection control and reviewing factors that may cause superinfection.

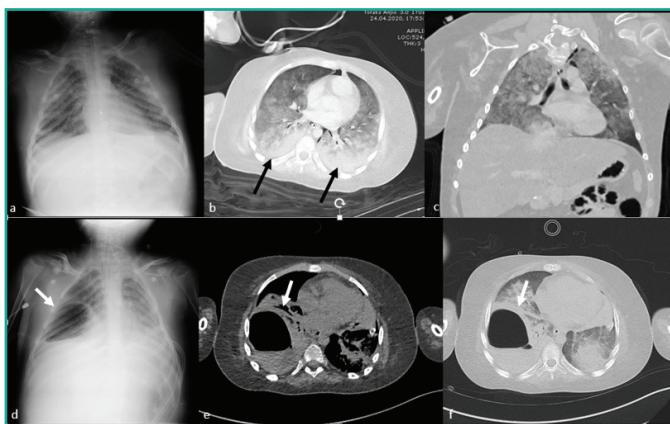


Figure 1. Increased widespread density in both lungs was observed in the chest X-ray (a). In Thorax CT, consolidation was more pronounced at the bases and diffuse ground-glass densities were detected in both lungs (b,c). Ten days later, a thick-walled cavitory lesion in the middle-lower zone of the right lung was observed in PA chest X-ray (d). Thorax CT examination: A thick-walled pulmonary abscess accompanied by consolidation and atelectasis was observed in the lower lobe of the right lung (e,f)

CT: Computed tomography

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