CLINICAL CASE REPORTS

Long COVID-19 in Adolescence: A Case Report on its Mental Health Impact

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ABSTRACT

Long COVID-19 is a heterogeneous syndrome characterized by various signs and symptoms that persist for a minimum of two months after contracting the virus. Fatigue, cognitive deficits, depression, and anxiety are among the most commonly reported neuropsychiatric symptoms, which are often accompanied by noticeable functional impairment and distress.

Here we report the case of a 14-year-old female adolescent with long COVID-19, who manifested extreme fatigue and adynamia, along with difficulties in exercising, attending school and studying. Moreover, she developed an adjustment disorder with depressive and anxiety symptoms due to the impact of the organic malaise, showing a positive response to treatment with antidepressants.

Despite the lack of in-depth conclusions regarding the underlying causes of mental health problems in long COVID-19, these issues are likely multifactorial, involving stressors, physical symptoms, and systemic inflammation. The importance of screening and early intervention for children and adolescents with long COVID-19 should be emphasized.

Keywords: adolescent; chronic fatigue syndrome; Long COVID-19; mental health; post-COVID-19; SARS-CoV-2 infection

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INTRODUCTION

The acute phase of COVID-19 infection is well characterized, with prominent systemic and pulmonary manifestations. The majority of children and adults with COVID-19 do not experience any significant changes and live normally after acute infection with SARS-CoV-2. However, some people (both adults and children) are unable to regain their previous health after being infected, experiencing persistent long-term symptoms.[1] According to the World Health Organization, long COVID-19 (or post-COVID-19 condition) refers to symptoms that persist in individuals with a history of SARS-CoV-2 infection, usually appearing within three months of the initial onset of COVID-19. These symptoms last for a minimum of two months and cannot be explained by an alternative diagnosis.[2] There are some variations in the definition of long COVID-19, as the National Institute for Health and Care Excellence considers symptoms after four weeks of COVID-19 diagnosis as sufficient grounds to suspect long COVID-19.[3]

Long COVID-19 is recognized as a spectrum of disease, with multifactorial etiologies and manifested by a variety of core symptoms. The most common include fatigue, shortness of breath, cognitive dysfunction, depression and anxiety, all of which significantly impact daily functioning. Interestingly, long COVID-19 can also occur in patients who experience only mild or asymptomatic acute infections.[4] Although the literature describing pediatric long COVID-19 remains sparse, it is generally agreed that the time course and clusters of symptoms may vary—some children have persistent symptoms that remain after the acute infection, while others may develop new symptoms or experience a relapse after initially recovering.[2]

The incidence of long COVID-19 varies, depending on factors such as the type of population studied (clinic vs. population-based studies), the methodology of data collection (validated questionnaires versus self- or parent-reported outcomes), clinical presentation (asymptomatic vs. symptomatic), and time elapsed since the acute disease.[5] Studies with pediatric populations that included control groups showed a prevalence of long COVID-19 between 0.8% and 4.4%, with older school-aged children being more frequently affected.[5,6] Despite this variability in findings and the limited available data, it is increasingly clear that long COVID-19 is a more significant health condition than initially thought.

Reported risk factors for long COVID-19 in children and adolescents include being an adolescent, of female gender and atopic background, experiencing acute symptomatic disease, requiring intensive care unit admission, and having underlying complex chronic conditions.[5,7] The symptoms of long COVID-19 in children are often overlooked because of the systemic affectation of the disease. These patients often repeatedly use primary care services, emergencies departments, or specialized medical practices without receiving a comprehensive diagnosis or treatment plan. This contributes to the frustration felt by patients and their families, who may feel unsupported by healthcare providers and systems alike.[5]

CASE REPORT

A 14-year-old female with no relevant medical history was observed in the child and adolescent psychiatric emergency unit in November 2022. She had been referred by her pediatrician due to complaints of extreme asthenia and adynamia with no apparent organic cause. The girl was infected by SARS-CoV-2 (with mild symptoms) five months before (May of 2022), and since then developed general tiredness, spending her days on the couch or in bed. She felt general muscle weakness and struggled with physical exercise (she previously had swimming lessons) and attended school fulltime with difficulties in concentration and performance. This exacerbated her stress, as she was very focused on academic achievement. Prior to her COVID-19 infection, there were no reports of anxious or depressive symptoms. She denied lack of motivation or anhedonia, or other depressive symptoms.

In the mental status examination, she presented an anxious mood, emotional lability, and frustration with complaints of tiredness and the desire to return to school and her routines, and the feeling of being misunderstood by the medical community as “all being in her head” (sic). She denied anorexia, weight loss or history of diarrhea. The patient was referred to the pediatric immunology consultation for further evaluation. The analytical study highlighted normal thyroid function, normal NT pro-BNP and creatine kinase levels, and blood counts and peripheral blood smear without changes. Cardiac evaluation did not reveal any alteration. She was reevaluated by the child and adolescent psychiatrist two weeks after the initial emergency unit assessment, and given the maintained complaints of fatigue with no evidence of analytical or clinical evaluation that justified the symptoms, she was diagnosed with long COVID-19 and chronic fatigue syndrome.

Due to the significant impact of her physical symptoms, she developed an adjustment disorder, with anxious and depressive symptoms reactive to her organic malaise, according to the Diagnostic and Statistical Manual of Mental Disorders, Fifth edition (DSM-5). The child and adolescent psychiatrist prescribed fluoxetine (with titration up to 20mg) to help manage the patient's anxious and depressive symptoms, which were reactive to her chronic physical fatigue, as this drug is known to be effective in treating both anxiety and mood disorders in adolescents and can aid in the improvement of overall functioning and quality of life. The patient showed progressive mood and adynamia improvement on follow-up.

Concomitant to this condition, she presented episodes of persistent cough with subjective respiratory difficulty, secondary to a viral infection affecting her whole household. She was seen by a pulmonologist, and a chest X-ray showed

bilateral hilar reinforcement and the functional respiratory exam revealed presence of air-trapping and insufflation. After being prescribed bronchodilators, as well as inhaled and systemic corticosteroids, she showed partial improvement and received a diagnosis of intrinsic asthma. The possibility of it being related to post-COVID-19 infection was also taken into consideration.

During the following psychiatric consultations, she showed mood euthymia and an eagerness to feeling better, and became more engaged in the psychotherapeutic interventions. These focused on explaining her clinical condition and providing psychoeducation about the importance of gradually resuming her previous activities, prior to her current condition. The validation of her concerns, having a clear designation for her condition, and the multidisciplinary approach were fundamental for her journey to recovery. While physical limitations were still present, she felt increasingly optimistic about her outcome.

DISCUSSION

Long COVID-19 symptoms in children and young people resemble those described in adults, although they are less common, possibly owing to a lower frequency of SARS-CoV-2 infection and a lower impact of the infection itself in these age groups.[1,5] Some hypotheses for this long-term symptomatology include SARS-CoV-2 tropism to the brainstem with infiltration of the central nervous system, and chronic immune activation from the acute phase of COVID-19 that remains unresolved.[4,5,8] Neuropsychiatric symptoms are among the most prevalent symptoms of long COVID-19. Fatigue is one of the most commonly reported symptoms in children and adolescents, often leading to physical impairment that limits participation in school, extracurricular activities, and exercise. Sleep disturbances (insomnia, hypersomnia, and poor sleep quality) often accompany fatigue.[1,4] Cognitive impairment is also commonly reported, manifesting as difficulties with attention, concentration, and memory loss.

These symptoms have an obvious detrimental effect on childhood and adolescence, since these are delicate and fundamental periods in life, critical for the acquisition of social and behavioral skills, as well as educational development[9]. In fact, this decrease in mental ability was one important factor contributing to the anxiety and depressive symptoms experienced by the adolescent in this report, as she reported a decrease in academic performance.

Post-exertional malaise (PEM) is also common in long COVID-19. It refers to an exacerbation of fatigue frequently accompanied by a constellation of other symptoms, including light-headedness, headaches and muscle and joint pain occurring after a relative increase in physical activity or cognitive demands.[1,4] Normal daily life routines, for example, a full day at school can lead to substantial PEM, thereby contributing to functional impairment and distress in patients. This adolescent also met the criteria for myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS), a condition characterized by profound fatigue, worsening of PEM and cognitive impairment, with substantial impairment in the ability to engage in pre-illness levels of occupational, educational or social activities that persisted for more than 6 months and was not completely explained by any other medical condition.

Even though the pathogenesis for both conditions remains uncertain, preliminary hypotheses suggest that SARS-CoV-2 is a common trigger for the development of ME/CFS. There are several risk factors for pediatric ME/CFS that concur with long COVID-19, namely being an adolescent and of female gender.[10] Mental health and behavioral symptoms are also prominent in this population, with anxiety and depression being the most prevalent, and there is no evidence of differences in these symptoms with the varying degrees of infection severity.[9,11]

There were multiple predisposing and perpetuating factors for psychological symptoms in the general population during the COVID-19 pandemic, including social isolation, lock-downs, closure of sports and leisure activities, and increased screen time.[8] Furthermore, there is increasing scientific evidence indicating that a significant proportion of people experienced a range of psychiatric symptoms related to the COVID-19 infection, persisting or even presenting months after the initial infection. Whether this is directly related to the effects of the virus, the effects of physical symptoms of long COVID-19 or the effects of the pandemic in general is not completely clear. The overlap between physical symptoms of long COVID-19 and emotional distress can make it challenging to differentiate between a direct consequence of the viral infection and the psychological impact of the pandemic. However, the presence of both prolonged physical symptoms and significant emotional distress suggests that this adolescent was experiencing a combination of long COVID-19 and pandemic-related psychological stress.

Also, the fact that symptoms of long COVID-19 are not specific to the condition and may be present in the general population in absence of previous infection contribute to the vague definition of the condition.[12] In addition, there are differences in the timing of the studies conducting assessments of long COVID-19. However, recent studies in both adults and children suggest that mood and cognitive functioning after SARS-CoV-2 infection are impaired when compared to controls with similar pandemic-related experiences.[4] A recent systematic review and meta-analysis revealed increased mental health problems in pediatric long COVID-19. Children with previous COVID-19 infection were more than two times likely to have anxiety and depression, with estimates of pooled prevalence for mental health problems of 5% for appetite problems, 6% for difficulties in concentration, 9% for sleep problems and anxiety and 15% for depression, and a greater contribution from long COVID-19 for depression compared to anxiety. This underscores the importance of timely assessments for mental health problems

and early interventions in children with long COVID-19.

Moreover, it should be noted that mental and physical health symptoms are closely related. Stress might manifest as somatic symptoms, and persisting physical symptoms with a major impact on daily functioning contribute to prolonged stress and, consequently, to the development of mental health symptoms. Exposure to severe or prolonged stressors has long been shown to affect the body's physiological system and increase cortisol release, causing an impairment in glucocorticoid receptors, reducing the body's capacity to control inflammation, and exacerbating production of pro-inflammatory cytokines.[12] An Italian study following up COVID-19 patients for 1–3 months found that those with physical symptoms of long COVID-19 had a 4.5 times higher chance of having anxiety or depression.[13]

Besides the pathogenesis of long COVID-19 that may be associated with an increased risk of neuropsychiatric symptoms, and which may explain the symptoms of this adolescent, she met criteria for an adjustment disorder according to the DSM-5. Reactive to the onset of a debilitating condition with fatigue, adynamia, and persistent cough with considerable impairment at a social and academic level, this girl developed a depressed mood that possibly aggravated the physical symptoms.

To date, there is no uniform treatment approach for all variations of long COVID-19 symptoms, so its management focuses primarily on addressing symptoms. Most studies have reported that symptoms could be improved within several months. However, others reported persistence of symptoms for 12 months, with depression and anxiety as less likely to improve.[14] To address fatigue, it is essential to implement a gradual return to previous activities, modified as necessary to accommodate the severity of each patient's condition. Cognitive impairment can be approached by dividing work into smaller sections, having regular breaks, and reducing stressors. In addition, a gradual transition back to school is recommended, with educational accommodations as needed. Referral to a mental health specialist is helpful for those who are struggling to cope with the effects of the illness or who have depressive or anxiety symptoms. Antidepressants may have a dual purpose in treating psychological symptoms and alleviating long COVID-19 symptoms by reducing peripheral inflammatory markers.[15]

CONCLUSION

There is a need to create awareness among parents, physicians as well as researchers on the afflictions following COVID-19 infection due to the impact that they can have on the child's or adolescent's development and health status. Interdisciplinary cooperation is crucial for the early identification of high-risk patients with a persistent neuropsychiatric presentation, beyond COVID-19. Specialized long COVID-19 units with multidisciplinary teams are essential to provide integrated physical and mental health support, reducing the long-term risks of disability.

The current body of research on long COVID-19 in children and adolescents is still limited, with relatively few studies exploring the long-term effects of the condition and treatments in this population. Additionally, the variability in symptoms and the subjective nature of their reporting can complicate diagnosis and treatment. The lack of standardized protocols for managing long COVID-19 further exacerbates these challenges. As such, ongoing research is vital to fill in these gaps, develop comprehensive treatment guidelines, and ensure that interventions are tailored to the unique needs of younger patients.

AUTHORSHIP

Maria do Rosário Monteiro – Research and elaboration of the manuscript; Revision of the manuscript

Inês Guerra Aguiar - Clinical evaluation of the patient and drafting of the manuscript; Revision of the manuscript

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