International Journal Dental and Medical Sciences Research
Volume 4, Issue 5, Sep-Oct 2022 pp 477-479 www.ijdmsrjournal.com ISSN: 2582-6018

SARS-CoV-2-induced myositis in a vaccinated adolescent

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Submitted: 10-10-2022 Accepted: 22-10-2022

ABSTRACT:
Thispaper brings to attention the very heterogenous face of COVID-19 and its rare manifestations. Acute myositis, complicated or not with rhabdomyolysis is a rare manifestation and it was especially reported in adults.
We present a case of acute myositis due to SARS-CoV-2 infection in a vaccinated adolescent. The clinical, biological, immunological and imagistic findings are detailed. The treatment was promptly started and the evolution was favorable.
KEYWORDS:SARS-CoV-2,teenager, acute myositis, vaccination

I. INTRODUCTION

Since 2019 the entire world was put to the test by the SARS-CoV-2 pandemic.
[1,2].SARS-CoV-2 infection is responsible for over 600 million illnesses worldwide and almost 7 million deaths. In Romania, over 3 million illnesses and almost 70,000 deaths were reported. A wide range of extremely heterogeneous clinical manifestations is attributed to this infection.

[3-11,15].The infection is responsible for acute, subacute, or lingering manifestations that show the complex suffering of diverse organs and systems. The main connecting elements are represented by inflammation anddisimmunity. Therefore, SARS-CoV-2 infection can be linked to several inflammatory and autoimmune rheumatic diseases such as vasculitis,connective tissue disorders, arthritis, both rheumatoid and reactive, systemic lupus, spondyloarthropathies, and myopathy. Many hypotheses try to explain muscle injury in coronavirus disease. Muscle damage can be achieved by direct myocyte invasion and also indirectly through a cytokine storm. A hyper-inflammatory state could be responsible for muscle damage due to an elevated level of cytokines, such as TNF-alpha, IL-1, and IL-6. Autoimmune inflammatory damage is the most accepted mechanism. Muscle inflammation can be generalized or more localized causing mild and local symptoms or more severe ones.

II. CASE PRESENTATION

A 15 years old adolescent was hospitalized in Sibiu Clinical Hospital (Romania) for muscle pain in the upper and lower limbs which started a week ago. One day before he performed laboratory tests that highlight elevated transaminases. The personal history revealed that vaccination was carried out according to the recommendations, including Pfizer Vaccine for SARS-CoV-2.

The objective examination at admission reveals relatively good general condition, G = 70 kg, good nutritional status, preserved consciousness, pallor, no lymphadenopathy, muscular system: normotonic and normokinetic, muscle pain in the upper limbs, no respiratory findings, Heart Rate = 82 beats/min., warm extremities, normal liver and spleen.

Laboratory findings in dynamics are detailed in the following table.

Parameter	Admission	In evolution
WBC (×103/µl)	6.81	12.47
Neutrophils (%)	66.6	95.1
Lymphocytes (%)	19.4	3.7
Monocytes (%)	10.7	1.1
Eosinophils (%)	3.2	0.0
RBC (×106/µL)	5.24	4.71
Hb (g/dl)	15.2	13.7
HCT (%)	44.2	40.2
MCV (fl)	84.4	85.4
MCHC (g/dl)	34.4	34.1

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Plateletcount (×103/µL)	257	197
CRP (mg/dl)	4.77	6.72
Procalcitonin	0.1	1.18
CPK (U/L)	39082 - elevated	1133 - elevated
LDH	1028 - elevated	298 – normal range
Total bilirubin (mg/dl)	0.69	
AST (U/L)	667 - elevated	121
ALT (U/L)	268 - elevated	32
Amylase(U/L)	42	
Urea (mg/dl)	22	30
Creatinine (mg/dl)	0.8	0.79
Uric acid	7.1 - elevated	6.5 – normal range
Ferritin(mg/dl)	50.89	
Proteinogram	Normal	
Immunogram	Normal	
SARS-CoV-2 PCR	Positive	
IgM SARS-CoV-2	Negative	
IgG SARS-CoV-2	Positive	
Urinalysis	Normal	Normal
Ultrasound of the abdomen and pelvis	Normal	
Cardiac ultrasound and EKG	Normal	
Chest X-ray	Normal	

Table 1 – Laboratory findings at admission and in evolution

AST: aspartate aminotransferase; ALT: alanine aminotransferase; CPK: creatinine phosphokinase; CRP: C-reactive protein; LDH: Lactate Dehydrogenase SARS-CoV-2: severe acute respiratory syndrome coronavirus 2; PCR: polymerase chain reaction;

Immunological findings - extensive myositis profile - Blot (Mi-2α, Mi-2β, TIF-1γ, MDA5, NXP2, SAE1, Ku, PM-Scl100, PM-Scl70, Jo-1, SRP, PL-7, PL-12, EJ, OJ), immunogram, complement, serology for Epstein-Barr virus, cytomegalic virus and Toxoplasma gondii were all negative. The nasal culture was negative, the pharyngeal culture was positive for Group G Streptococcus.
Based on all clinical and laboratory findings the final diagnosis were COVID-19 antibody-associated myositis and pharingeaşl group G streptococcal infection.

Treatment started immediately after the collection of biological samples and cultures. Corticotherapy with Dexamethasone 0.5 mg/kg/day divided into 2 doses was initiated and it was well tolerated for all 10 days of treatment. Intravenous antibiotics – Cefuroxime and Gentamicin, antiviral – Isoprinosine, B1, B6 and D vitamins, hepatoprotective supplements, and Coenzyme Q10 were added and well tolerated.
A good evolution was noted both clinically and biologically – the muscle pain disappeared on the 4 day of treatment, and the enzymes (AST, ALT, LDH, CPK) decreased significantly after seven days of treatment. The patient was discharged from the hospital after 8 days and advised to avoid infections, physical exercise, and excessive effort. The vitamin and Coenzyme Q10 continued to be

III. DISCUSSION

The myositis-associated SARS-CoV-2 infection is rare in general and even more so in children. In this case, the vaccinated patient presented with myositis due to acute COVID-19. This case suggests the heterogeneity of SARS-CoV-2 manifestations from mild to severe even for vaccinated patients.

[7-10,15].The pathophysiology of this condition is still unclear.The main question that needed answer was if the myositis was associated with acute SARS-CoV-2 infection or was a late-onset myositis, mimicking the autoimmune myositis.

More studies dedicated to understanding the pathogenesis of SARS-CoV-2-induced myositis are needed. Another question that needs an answer

is why some children are prone to these conditions. And why the vaccine did not protect the patient even though it was correctly administered.

IV. CONCLUSION

This teenager presented with myositis and acute COVID-19 after the correct vaccination. This case suggests that there are aspects that need to be studied to find those individuals that are at risk of developing severe diseases after vaccination. The treatment was effective and led to the full recovery of our patient.

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