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Case Report / Olgu sunumu

Multisystem Inflammatory Syndrome in a Male Adolescent After His Second Pfizer-Biontech Covid-19 Vaccine: A Report from Turkey

Bir Erkek Ergende İkinci Doz Pfizer-Biontech COVID-19 Aşısı Sonrası Multisistem İnflamatuar Sendrom: Türkiye'den Bir Rapor

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Abstract

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), continues to spread rapidly through human populations, presenting across a continuum of severity from a symptomatic carriage to multi-organ failure and death. Multisystem inflammatory syndrome in children (MIS-C) is a new phenomenon reported worldwide with temporal association with SARS-CoV-2. Multisystem inflammatory syndrome in children is a complication of the SARS-CoV-2 infection, while myocarditis is a rare adverse effect to messenger ribonucleic acid (mRNA) SARS-CoV-2 vaccines, especially in males aged 12–17 years . On the other hand, postimmunization myocarditis is a known rare adverse event after other vaccinations, such as smallpox . Today, rare cases of MIS-C and myocarditis after mRNA SARS-CoV-2 vaccinations have been reported in children or adolescents. We present details on a 15-year-old previously healthy Turkish male adolescent who fulfilled the diagnostic criteria for MIS-C after the Pfizer-BioNTech vaccine.

Keywords: Adolescent, COVID-19, multisystem inflammatory syndrome

Öz

Koronavirüs 2 (SARS-CoV-2), semptomatik bir taşıyıcılıktan çoklu organ yetmezliğine ve mortaliteye neden olarak insanlar arasında hızla yayılmaya devam ediyor. Çocuklarda multisistem inflamatuar sendrom (MIS-C), SARS-CoV-2 ile giderek artan oranda dünya çapında bildirilen yeni bir fenomendir. Çocuklarda multisistem inflamatuar sendrom, SARS-CoV-2 enfeksiyonunun bir komplikasyonu iken miyokardit, haberci ribonükleik asit (mRNA) SARS-CoV-2 aşılarının, özellikle 12-17 yaş arası erkeklerde nadir görülen bir yan etkisidir. Diğer taraftan, bağışıklama sonrası miyokardit, çiçek hastalığı gibi diğer aşılardan sonra bilinen nadir bir advers olaydır. Günümüzde çocuklarda veya adolesanlarda mRNA SARS-CoV-2 aşıları sonrası nadir olarak MIS-C ve miyokardit vakaları bildirilmiştir. Pfizer-BioNTech aşısı sonrası MIS-C tanı kriterlerini karşılayan, daha önce sağlıklı olan 15 yaşında bir Türk erkek Adolesanın klinik bulgularını sunuyoruz.

Anahtar Kelimeler: Adolesan, COVID-19, multisistem inflamatuar sendrom

INTRODUCTION

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), continues to spread rapidly through human populations, presenting across a continuum of severity from a symptomatic carriage to multi-organ failure and death. Multisystem inflammatory syndrome in children (MIS-C) is a new phenomenon reported worldwide with temporal association with SARS-CoV-2. Multisystem inflammatory syndrome in children is a complication of the SARS-CoV-2 infection, while myocarditis is a rare adverse effect to messenger ribonucleic acid (mRNA) SARS-CoV-2 vaccines, especially in males aged 12–17 years.[1-4] On the other hand, postimmunization myocarditis is a known rare adverse event after other vaccinations, such as smallpox.[5] Today, rare cases of MIS-C and myocarditis after mRNA SARS-CoV-2 vaccinations have been reported in children or adolescents.[6,7]

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We present details on a 15-year-old previously healthy Turkish male adolescent who fulfilled the diagnostic criteria for MIS-C after the Pfizer-BioNTech vaccine.

CASE

A previously well 15-year-old male individual presented to our pediatric emergency department with fatigue, myalgia, fever of 38.3°C, and pain in the chest 5 days after his second Pfizer-BioNTech COVID-19 vaccine dose. He had no history of recent viral illness symptoms and no known COVID-19 exposures. Evaluation included an electrocardiogram (ECG) that revealed ST elevation (**Figure 1a** and **b**) and an elevated troponin I (1410 ng/L, normal range for this hospital: <14 ng/L). He was transferred to the pediatric clinic of a tertiary hospital for suspected myocarditis. Inflammatory markers were severely elevated, with D-dimer 0.78 mg/L (normal range for this hospital: <0.55 mg/L), aspartate trasfaminase (AST, 111 U/L, normal range for this hospital:<40 U/L) and alanine transaminase (ALT, 54 U/L, normal range for this hospital:<41 U/L) (**Table 1**). Echocardiogram was normal with an ejection fraction of 68% and a fractional shortening of 33%. A nasopharyngeal swab for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) polymerase chain reaction (PCR) was negative, as was the patient's serum SARS-CoV-2 spike antibody. All other viral diagnostic studies were negative. He received 150 g (2 g/kg) of intravenous immunoglobulin (IVIg), then 10 mg/kg of methylprednisolone intravenously on 3 consecutive days, followed by a planned 2-week oral prednisone taper. Also, subcutaneous low molecular weight heparin was started twice daily. On the 3rd day of hospitalization, he remained well appearing, hemodynamically stable, and ST elevation on EKG disappeared (**Figure 1c**). Also, troponin I and other elevated laboratory markers' levels were all normal on the 9th day of hospitalization.

Table 1. Laboratory data of the patient during hospitalization

Hospitalization status	Day 1	Day 2	Day 3	Day 4	Day 5	Day 9
Aspartate transaminase (U/L)	111		29			
Alanine transaminase (U/L)	54		31			
Creatine kinase (µg/L)	1179				21	
Troponin I (ng/L)	1410	703	551	428	234	11.6
Procalcitonine (µg/L)	0.16				0.08	
C-reactive protein (mg/L)	103.2		51.2		19.1	3.2
Sedimentation rate (mm/h)	51				17	
Ferritine (µg/L)	530				213	
Leukocyte count (10^3/µL)	6.41				6.38	
Hemoglobin (g/dl)	14.7				14.3	
Platelets (10^3/µL)	181				201	
INR	1.2		1.2		1.2	
APTT (s)	24.4		25.3		26.1	
Fibrinogen (g/L)	5.3			2.5		
D-dimer (mg/L)	0.78			0.35		
SARS-CoV-2 PCR result	Negative					
SARS-CoV-2 spike antibody (COI)	Negative (0.67)					

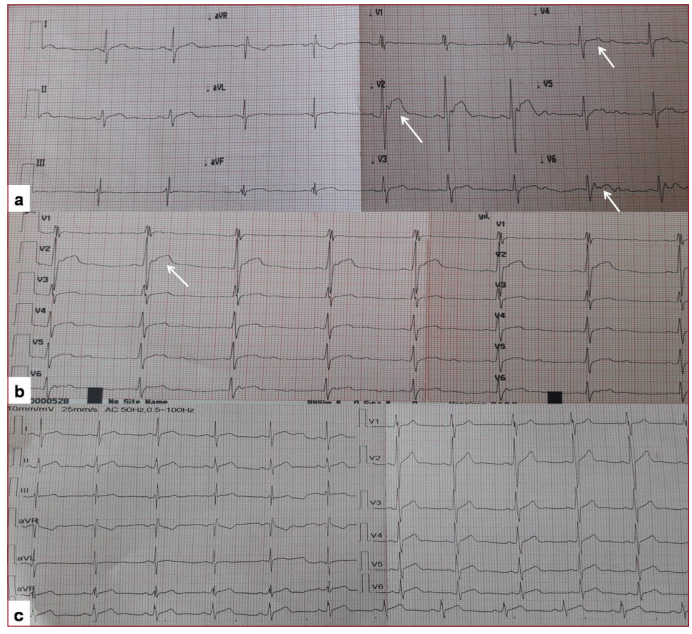

Figure 1a, b, c: Electrocardiogram shows diffuse ST elevation on chest electrodes **(a,,b).** Sinus rhythm on the normal electrocardiogram of the patient after treatment **(c).**

DISCUSSION

Multisystem inflammatory syndrome (MIS) is a new systemic inflammatory acute onset disease that mainly affects children and, at a lesser frequency adults; it typically occurs 3–6 weeks after acute SARS-CoV infection.[1,2] Also, it has been postulated and shown in children and adults that MIS may occur after SARS-CoV-2 vaccination.[6-8]

The Pfizer-BioNTech clinical trials revealed an increased systemic reactogenicity and immunogenicity in younger study participants after mRNA vaccine.[9] Adverse events often occurred more frequently after dose 2 and within 2 days after vaccination and included injection site pain, fatigue, myalgia, chills, arthralgia, fever, injection site swelling or redness, nausea, malaise, and lymphadenopathy.[9] Buchhorn et al. suggested autoantibody release theory for explaining the impact of SARS-CoV-2 infections on myocarditis and they reported that different autoantibodies uniformly shift to enhanced blood levels after the immunological response to the vaccine.[7] They showed that anti-angiotensin 1 receptor, anti-endothelin receptor, anti-α1 adrenergic receptor, anti-β1 adrenergic receptor, anti-β2 adrenergic receptor, and anti-muscarinic cholinergic receptor-2/3/4 autoantibodies were significantly elevated after the SARS-CoV-2 vaccination in the patients.[7] At least, it seems not to be the whole virus but the spike protein that induces autoimmunity. Also, it was speculated that the spike protein effects on multiple autoantibody pathways which may be related to the cholinergic anti-inflammatory pathway.[10] On the other hand, a negative nucleocapsid antibody test result does not conclusively rule out the possibility of natural infection.[4,10]

CONCLUSION

The publication of the current case is very important, in order to make doctors aware vaccination complications, such as MIS-C, if therapy with intravenous immunoglobulins can be initiated at an early stage. Primary care, physicians and health care providers should consider myocarditis an etiology of chest pain in patients with recent COVID-19 mRNA vaccination.

ETHICAL CONSIDERATIONS

Informed Consent: Written informed consent was obtained from all participants who participated in this study.

Status of Peer-review: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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