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【 CASE REPORT 】

Polymyalgia Rheumatica Following COVID-19 Vaccination

Akira Yokote, Shinsuke Fujioka, Nobutaka Takahashi, Takayasu Mishima and Yoshio Tsuboi

Abstract:
We herein report a 71-year-old woman presented with a fever, arthralgia, general malaise and leg muscle stiffness following administration of the COVID-19 mRNA vaccine (Comirnaty, Pfizer-BioNTech). Laboratory findings showed an elevated C-reactive protein level and erythrocyte sedimentation rate. In addition, Gallium-67 scintigraphy demonstrated an increased uptake in multiple joints. Typing of human leukocyte antigen (HLA) revealed the presence of the DRB1*0404/*0803 allele. These findings met the diagnostic criteria for polymyalgia rheumatica (PMR), and when we started steroid treatment, her symptoms improved rapidly. This patient developed PMR after receiving a COVID-19 mRNA vaccine (Comirnaty, Pfizer-BioNTech). This case is considered to be valuable, as the HLA-DRB1 allele was also confirmed.

Key words: polymyalgia rheumatica, COVID-19, vaccination

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Introduction

Polymyalgia rheumatica (PMR) is an inflammatory rheumatic disorder of the elderly that is characterized by aching and morning stiffness in the neck, shoulders, and pelvic girdle (1). It is more common in women than men (1). Although the etiology and pathogenesis of PMR remain unknown, environmental triggers such as infection and vaccination are thought to play a role (2, 3).

In December 2020, the United States Food and Drug Administration approved two messenger ribonucleic acid (mRNA)-based vaccines developed by Pfizer-BioNTech and Moderna for the prevention of coronavirus disease 2019 (COVID-19). Large clinical studies have shown that this vaccine is safe and effective in preventing infection (4). However, there are reports of immune-mediated adverse events following COVID-19 vaccination (5, 6).

We herein report a patient who developed PMR after administration of a COVID-19 mRNA vaccine (Comirnaty, Pfizer-BioNTech).

Case Report

A 71-year-old Japanese woman with a history of hypothyroidism and dyslipidemia that were well-controlled received the first COVID-19 mRNA vaccine (Comirnaty, Pfizer-BioNTech). After the vaccination, she developed left shoulder pain that resolved within two days. After 10 days, she felt tiredness in the jaw when eating, and general malaise and leg muscle stiffness, especially in the midmorning. She would then spend the rest of the day sitting in a chair. Three weeks after the first vaccination, she received the second vaccine dose, after which she had a fever >37 °C and arthralgia, and was unable stand unaided. Five weeks after the first vaccination, she was admitted to our hospital.

The patient's vital signs were a body temperature of 36.7 °C, blood pressure of 109/67 mmHg and pulse rate of 108 beats per minute. She presented with stiffness and pain proximal upper and lower extremities muscles and neck, shoulder, girdle, and knees joints. Morning stiffness and jaw claudication was also observed.

Laboratory tests revealed an elevated white blood cell count of 8.9×10^3/μL with 70% neutrophils, erythrocyte sedimentation of 99 mm/h (normal <15 mm/h), and C-reactive protein of 18.8 mg/dL as well as a decreased hemoglobin level of 10.4 g/dL, albumin level of 2.4 g/dL, and creatinine kinase level of 19 U/L (normal range, 41-153). Negative results were obtained for rheumatoid factor, anti-cyclic citrullinated peptide antibody and antinuclear antibody. Doppler ultrasound of the temporal arteries showed no sign of hypoechoic wall thickening. Whole-body computed tomogra-

Department of Neurology, Fukuoka University School of Medicine, Japan
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Correspondence to Dr. Yoshio Tsuboi, tsuboi@cis.fukuoka-u.ac.jp

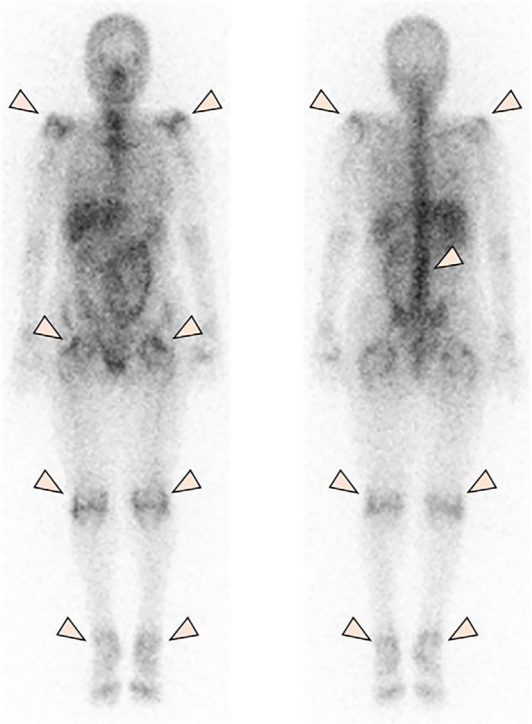

Figure. Gallium-67 scintigraphy performed 72 hours after intravenous injection shows an increased uptake in multiple joints (arrows).

phy (CT) was performed to exclude infection and neoplasm. Gallium-67 scintigraphy demonstrated an increased uptake in multiple joints (Figure). Typing of human leukocyte antigen (HLA) revealed the presence of DRB1*0404/*0803 allele.

Based on these findings, the patient had >3 points in the previously reported diagnostic criteria (7). Therefore, we diagnosed her with PMR.

The patient was treated with prednisone, 20 mg/day. Her symptoms and laboratory data improved gradually over the following two weeks.

Discussion

The most common minor adverse effects of COVID-19 vaccine include pain at the injection site, allergic skin reactions, myalgia/arthralgia, headache, fatigue, and a fever/chills (4). Several immune-mediated cases [thrombotic thrombocytopenia (5), ANCA-associated vasculitis (8), and Still's disease (9), among others] have also been reported, but the true incidence rate of these is unknown. One case of PMR relapse after COVID-19 infection (10) and two cases of PMR that developed after receiving a COVID-19 vaccine (6, 11) have been reported. These two patients had no marked medical history, and they developed PMR within three days following the first dose of the COVID-19 vaccine. Their symptoms quickly improved after taking prednisone. The second dose of the COVID-19 vaccine was not administered, and an HLA-DRB1 analysis was not performed in either of these patients. Most recently, several studies have reported that PMR and giant cell arteritis (GCA) onset after COVID-19 vaccination is very common (12-14).

The present patient showed jaw claudication, but only vascular ultrasound was performed to rule out GCA. Contrast CT, magnetic resonance imaging, fluorodeoxyglucose-positron emission tomography-CT and a temporal artery biopsy were not performed in order to avoid delays in starting treatment as much as possible.

Several clinical studies have reported an association between PMR and influenza vaccination and/or infection (2, 3). Genetic factors also play an important role in the pathogenesis of PMR. Haworth et al. reported an association of PMR with HLA-DRB1*0401 (38.2% vs 22.1%, odds ratio 2.2, 95% confidence interval 1.0-4.3) and DRB1*0404 (16.2% vs 5.0%, odds ratio 3.7, 95% confidence interval 1.2-11.1) (15). However, these alleles are only a risk factor for PMR and are not directly related to the diagnosis. Although the mechanism by which vaccination and infection trigger PMR remains unknown, preexisting genetic polymorphisms in immune-mediated genes (including HLA) may increase the deregulated inflammatory response.

This was a case of PMR that developed after administration of the COVID-19 mRNA vaccine (Comirnaty, Pfizer-BioNTech) and is considered to be valuable in that the HLA-DRB1 allele was able to be confirmed.

However, we cannot exclude the possibility that the patient developed PMR coincidentally. This case cannot conclusively determine whether or not there is a causal relationship between COVID-19 vaccination and PMR, so further studies involving surveillance of similar complications are needed.

The authors state that they have no Conflict of Interest (COI).

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