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Sadia Aslam
Department of Medicine, Maimonides Medical Center, Brooklyn, NY USA

Omair Khan
Department of Medicine, Maimonides Medical Center, Brooklyn, NY USA

Joseph Mehrabi
Department of Medicine, Maimonides Medical Center, Brooklyn, NY USA

Fatemeh Mohammadrezaei
Department of Medicine, Maimonides Medical Center, Brooklyn, NY USA

Rita Dennise Moncayo Wilches
Department of Medicine, Maimonides Medical Center, Brooklyn, NY USA

See next page for additional authors

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CASE REPORT

A Rare Case of Toxic Myositis Associated with Influenza Vaccination

Sadia Aslam [a,*], Omair Khan [a], Joseph Mehrabi [a], Fatemeh Mohammadrezaei [a], Rita D.M. Wilches [a], Sehajpreet Singh [a], Muhammad H. Khan [a], Sarita Konka [b]

[a] Department of Medicine, Maimonides Medical Center, Brooklyn, NY, USA
[b] Division of Rheumatology, Maimonides Medical Center, Brooklyn, NY, USA

Abstract

The influenza vaccine is one of the most commonly administered vaccines worldwide, with a high safety profile. However, rare cases of serious adverse events have been reported in the literature. We report a 77-year-old male who presented with progressive weakness in the lower extremities shortly after receiving the Influenza vaccine. He was diagnosed with myositis involving the paraspinal and bilateral lower extremity muscles. He received treatment with high-dose steroids and taper with full recovery of his muscle weakness. Although the exact causal mechanism between the vaccine and the patient's myositis could not be established, surveillance for such rare adverse events can provide data for future vaccine safety improvement. Due to well-known benefits of the Influenza vaccine that far exceed the potential adverse effects, we strongly encourage the readers to continue their vaccine practices as per CDC guidelines.

Keywords: Toxic myositis, Myopathy, Diffuse myositis, Influenza vaccine, Flu shot

1. Introduction

Influenza is one of the most common viral illnesses. In the US, on average 8% of the population contracts symptomatic infection annually.[1] Advanced age is one of the risk factors for severe disease and higher mortality. Worldwide, millions of people receive the influenza vaccination yearly. It is recommended for everyone above the age of 6 months, with a few exceptions. The most commonly known adverse effects of the influenza vaccine are injection site reaction, fatigue, headache, myalgias, and bursitis. Myositis triggered by a flu shot has rarely been reported.[2-5] We report a rare case of progressive paraspinal and proximal lower extremity myositis starting shortly after an influenza vaccine in an adult male.

2. Case presentation

A 77-year-old male with PMH of type II Diabetes mellitus, hypertension, and benign prostatic hyperplasia presented to the emergency department with gradual onset proximal lower extremity weakness leading to a bed-bound status. The patient had no functional limitations prior to symptom onset. There was associated pain in both proximal legs as well as anorexia, fatigue, and a 10-pound unintentional weight loss. The symptoms started one day after receiving his annual inactivated influenza vaccine (Fluad® Quadrivalent) and he subsequently developed progressive weakness over four weeks preceding his hospitalization. Of note, he had taken the flu vaccine without any reaction for years. His review of systems was otherwise unremarkable including no rashes, distal muscle weakness or muscle atrophy, cough or shortness of breath. Vital signs were within normal limits. Pertinent exam findings included normal strength in the upper extremities but 3/5 and 4/5 power with right and left hip flexion, respectively. Reflexes were symmetric and normal. There were no rash, scaling, or signs of arthritis. Lab work including CPK and aldolase were within normal

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* Corresponding author.
E-mail addresses: saaslam@maimonidesmed.org (S. Aslam), omair.khn@outlook.com (O. Khan), Jmehrabi@maimonidesmed.org (J. Mehrabi), FMohammadrezaei@maimonidesmed.org (F. Mohammadrezaei), rmonw@hotmail.com (R.D.M. Wilches), SEsingh@maimonidesmed.org (S. Singh), muhammadhashim412@outlook.com (M.H. Khan), SaKonka@maimonidesmed.org (S. Konka).

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limits. His ESR and CRP were elevated to 100 mm/h and 27 mg/dL, respectively. Extensive autoimmune workup including ANA, Anti Jo1 antibody, anti-HMG-co-A reductase antibody and an extensive myomarker panel for polymyositis, dermatomyositis and anti-synthetase syndrome were all negative. MRI brain, MRI cervical, and thoracic spine with and without contrast were unremarkable. MRI of the thigh and lumbar spine showed myositis with extensive edema involving bilateral thighs, paraspinal, and psoas muscles (Fig. 1). A thigh muscle biopsy revealed nonspecific inflammation showing some myofiber atrophy with scattered myofiber necrosis, endomysial and epimysial inflammation with fat necrosis but no vasculitis or amyloidosis (Fig. 2). No neurogenic pattern of injury was noted. The potential causes of the patient's muscle weakness based on biopsy findings were varied and could include toxic, metabolic, ischemic, or drug-induced myositis. After thorough evaluation, we arrived at the diagnosis of flu-vaccine associated toxic myositis. The patient was started on prednisone 60 mg daily with taper over the next 4 months. At each follow-up he continued to improve and returned to his baseline by last visit. The bilateral muscle weakness resolved completely. ESR and CRP also normalized, and the patient returned to his baseline functional status. Repeat MRI of the thigh showed resolution of previously seen myositis (Fig. 3). In discussion with neurology, it was agreed this was a flu vaccine-triggered myositis event. We have reported this adverse event to US division of the Seqirus UK Limited company who manufactures Fluad® Quadrivalent vaccine.

3. Discussion

Worldwide hundreds of millions of people get the influenza vaccine yearly. It is now universally proven by scientific data that vaccines not only prevent morbidity and hospitalizations but also save lives.[6] Currently, many types of flu vaccines are approved for various patient populations in the US. All of them are quadrivalent, meaning they are active against the four most commonly anticipated

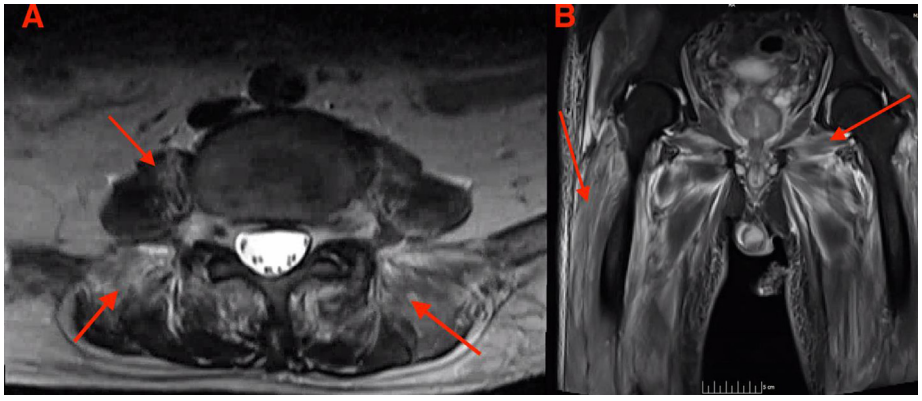

Fig. 1. A (Lumbar spine T2 Axial) & B (Coronal TRIM) - Myositis and edema seen in bilateral paraspinal, thigh and psoas muscles (red arrows).

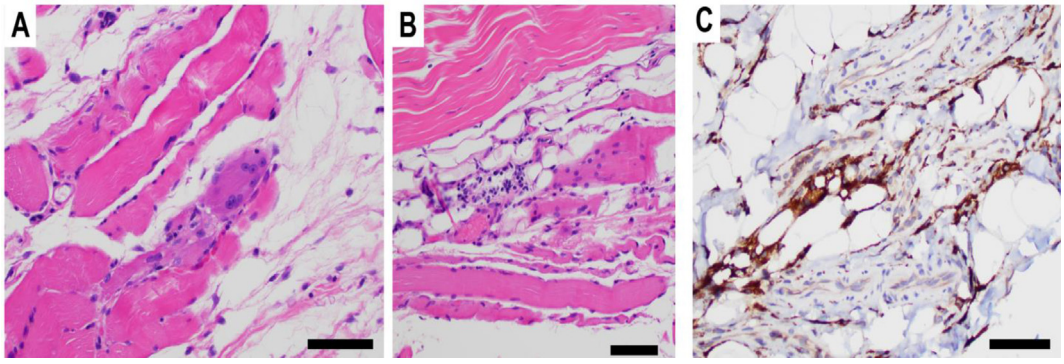

Fig. 2. A-Scattered basophilic myofibers with prominent nucleoli indicative of myofiber fiber regeneration, a histologic feature of active myocyte injury (H&E stain, scale indicates 50 um); B-Subtle chronic-appearing inflammatory infiltrates, composed of monocytes and lymphocytes, in the subfascial and epimysial adipose tissue (H&E stain, scale indicates 50 um); C-Focally prominent histiocytic component in the inflamed adipose tissue (CD68 immunoperoxidase stain, scale indicates 50 um).

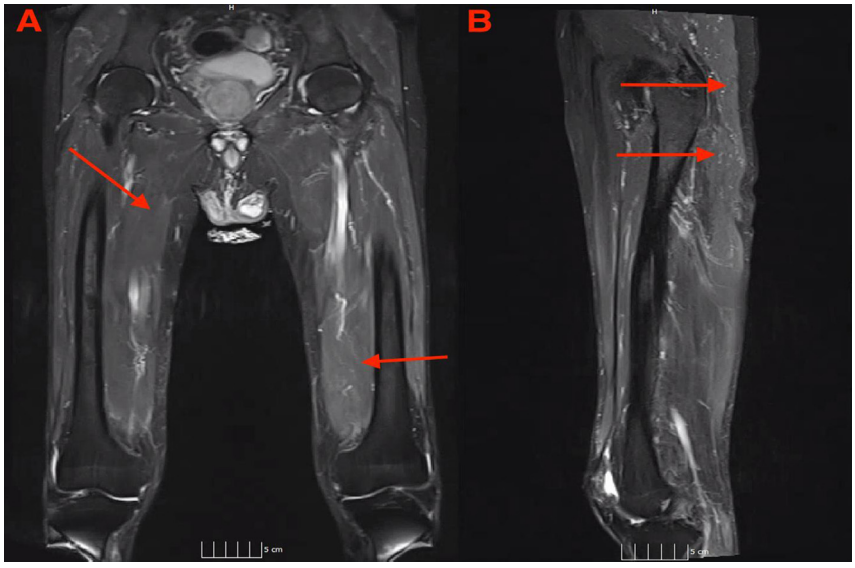

Fig. 3. A (Coronal view) & B (Sagittal view) - Resolution of previously seen myositis in the thigh muscles (red arrows).

viral strains in the coming season. Two for Influenza virus A and two for B. Advisory committee on immunization practices (ACIP) recommends flu vaccine for everyone above the age of 6 months. There are very few exceptions where patients are advised to consult their provider to get either a particular type of vaccine or to potentially avoid it in case of severe allergic reaction or a history of Guillain-Barre Syndrome (GBS) related to vaccines in the past.

Common side effects arise from the expected immunogenic action of the vaccine including mild aches and fever that are mostly self-limited and can be managed with over-the counter medications. Other reported mechanisms of adverse effects include hypersensitivity reactions, serum sickness, serum sickness-like reactions, and severely delayed cutaneous hypersensitivity reactions.[7] These allergic reactions can be against the delivery equipment, excipient or the vaccine component. Type 1 reactions happen as early as 15 min however, delayed hypersensitivity reactions can occur days to weeks after the vaccination. In our literature review, Flu shot-triggered autoimmune poly- and dermatomyositis,[2] and a case report of localized toxic myositis at the site of influenza vaccination have been reported.[3] However, to our knowledge, this is the first reported case of toxic myositis involving the paraspinal muscles occurring in association with the influenza vaccine.

The inflammatory myopathic disorders usually present as symmetric muscle weakness over weeks to months as in polymyositis, and sometimes it is accompanied by skin involvement as in dermatomyositis. It can also occur as a part of other systemic connective tissue disorders like mixed connective tissue disease and overlap syndromes. It is essential to rule out central and peripheral neuropathies to be the cause of muscle weakness. After thorough history and physical exam, various diagnostic tools are used on case to case basis. These include serologies, CNS imaging, EMG, muscle MRI and biopsy in selected cases. Biopsy results may not be precise in all the cases; however, they can point towards the likely causes. For example, the extent of muscle necrosis and the relative paucity of inflammatory infiltrate in our case distinguishes it from poly- or dermatomyositis. Muscle enzymes, including CK and aldolase, are usually elevated in idiopathic inflammatory myositis but may be normal in some cases.[8] Once diagnosed, the first line of treatment for inflammatory myositis is steroids, tapered over weeks to months as guided by the clinical response with close monitoring of side effects.[9]

4. Conclusion

Although our patient had severe myositis resulting in immobility temporally associated with his flu shot without any other identified etiology, we want to acknowledge the limitation of our case to prove the causal relationship between the two. Given the benefits of the influenza vaccine, we encourage ongoing seasonal influenza immunization as per the Center for Disease Control and Prevention (CDC) and Advisory Committee on Immunization Practices (ACIP). However, ongoing surveillance is required to evaluate rare adverse events so that future vaccine production and administration can

be tailored to mitigate patient-specific risks, as it was done in the case of egg allergy. This will not only prevent future adverse events but also be instrumental in winning the public's confidence in vaccines in the background of mythical anti-vaccine campaigns.

Conflict of interest

No conflict of interest statement.

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