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POLYMYALGIA RHEUMATICA FOLLOWING RESPIRATORY SYNCYTIAL VIRUS (RSV) VACCINATION

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ABSTRACT

Introduction: Polymyalgia rheumatica (PMR) is a chronic inflammatory disorder that causes stiffness and pain in the proximal joints, including the shoulders, hips and neck. The exact cause of polymyalgia rheumatica is yet to be fully understood, but research suggests that both genetic and environmental factors may contribute to it. Studies have previously linked the onset and relapse of polymyalgia rheumatica symptoms to the influenza and COVID-19 vaccines. The Food and Drug Administration approved the respiratory syncytial virus (RSV) vaccine, which is a recombinant protein vaccine for adults over 60, in May 2023. No previous reports of polymyalgia rheumatica onset or relapse have been linked to the RSV vaccine. The human proteome shares some peptides with the RSV F antigen, suggesting a high risk of cross-reactivity when using that antigen in vaccination formulations.

Case description: A 72-year-old man experienced a new onset of bilateral shoulder pain and stiffness three days after receiving the Abrysvo® RSV vaccine. The symptoms lasted more than an hour (up until noon) and interfered with his activities of daily living. Inflammatory markers such as C-reactive protein were elevated. The patient's symptoms and inflammatory marker levels significantly improved with prednisone therapy.

Conclusion: In patients with typical PMR symptoms, it is important for clinicians to carefully review immunisation history to rule out any potentially related adverse effects.

KEYWORDS

Polymyalgia rheumatica, RSV vaccine, vaccine-related adverse event

LEARNING POINTS

- Vaccines can trigger autoimmune diseases in some individuals.
- This case report suggests respiratory syncytial virus (RSV) vaccine is among the possible triggers for polymyalgia rheumatica.

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INTRODUCTION

Polymyalgia rheumatica (PMR) is a chronic inflammatory disorder characterised by bilateral stiffness and pain in the shoulders, hips and neck[1]. It is often associated with weight loss, fatigue and elevated inflammatory markers. PMR is most common in people of white ethnicity and more prevalent in women than men[1]. The aetiology remains incompletely understood. Some studies have suggested a genetic component, whereas others have linked the development of PMR to environmental factors such as infections[2]. Epstein-Barr virus, mycoplasma pneumonia and parvovirus are among the infections associated with PMR[3]. Autoimmune conditions have been reported after vaccination[4-6]; for instance, COVID-19 vaccines have been associated with rheumatoid arthritis, PMR and systemic lupus erythematosus (SLE)[5,7,8]. Similarly, influenza vaccination was associated with PMR, immune thrombocytopenia and Guillain-Barre syndrome (GBS)[7-9]. The respiratory syncytial virus (RSV) vaccine is a recombinant protein vaccine approved by the FDA in May 2023 for adults over 60. This report presents a case of a 72-year-old male who developed PMR symptoms three days after receiving the Abrysvo® RSV vaccine.

CASE DESCRIPTION

A 72-year-old male patient visited the internal medicine clinic, complaining of muscle and joint pain that had been persisting for two months. The patient mentioned receiving the Abrysvo® RSV vaccine three days before the sudden onset of his symptoms. He reported significant bilateral hip pain that was associated with stiffness. A few days later, he had similar symptoms in both shoulders. The patient experienced significant morning stiffness lasting more than an hour, until around noon; his symptoms improved later in the day. The stiffness greatly limited his ability to move during activities such as rising from a seated position and reaching overhead. The patient denied similar symptoms previously and actively in other joints, such as the hands and feet. The patient reported infrequent chronic headaches described as a band that improves with paracetamol. The character and frequency of headaches had not changed recently. He reported no jaw claudication, tongue pain with mastication or temporal throbbing pain, and denied any visual changes such as blurry vision, floaters, scotomas or transient vision loss. A review of systems was negative for constitutional symptoms (fever, weight loss, night sweats), rash, joint swelling and erythema.

The past medical history was significant for obstructive sleep apnoea, atrial fibrillation, coronary artery disease, benign prostate hyperplasia and dyslipidaemia. The patient had been taking atorvastatin for many years without any side effects or myalgia. The family history was significant for rheumatoid arthritis.

The initial workup results were a C-reactive protein (CRP) of 50 mg/l (normal range <5 mg/l), neutrophilic leukocytosis (leukocytes 13.5 × 10^9/l, neutrophils 75%), rheumatoid factor <10 IU/ml (normal range <15 IU/ml), cyclic citrullinated peptide antibody <15.6 U (negative <20 U), creatine kinase 97 U/l (normal range 39–308 U/l) and a complete metabolic panel within the normal range. A computed tomography (CT) angiogram of the chest and abdomen did not show any radiological evidence of large vessel vasculitis.

The patient was started on a prednisone taper (40 mg daily for seven days, 30 mg daily for seven days, followed by 15 mg daily for 14 days). Prior to the CT scan, the patient was started on a higher dose for concerns of giant cell arteritis. The patient had a dramatic improvement in his symptoms after starting the prednisone. A CRP within the normal range (<3 mg/l) was noted two weeks after starting treatment.

The patient had a follow-up after completing the prednisone taper. He reported that the stiffness initially resolved on the higher prednisone dose; however, the 15 mg dose was associated with increased morning stiffness in bilateral shoulders and hips. On a repeat CRP test, it was elevated to 13.7 mg/l. The patient was evaluated by the rheumatology service, which confirmed the diagnosis of PMR. They recommended a slow taper of prednisone or a trial of tocilizumab, an interleukin-6 inhibitor, to reduce the total steroid requirement. The patient chose to undergo a slow steroid taper and to consider tocilizumab if symptoms were refractory.

DISCUSSION

To our knowledge, this case is the first to display an association between PMR and RSV vaccination. The authors reviewed the existing literature using search strategies on PubMed/MEDLINE and Google Scholar. The Naranjo score was developed to assess the probability of an adverse drug reaction[10]. In this case the score is 3, corresponding to a potential correlation. However, the score is more intended to assess reactions to medications with different dosing and placebo challenges, rather than a one-time reaction from vaccination.

The pathophysiology behind vaccine-associated autoimmunity remains poorly understood. It is postulated that vaccines may trigger immune reactions due to their immunogenic contents, stabilisers, preservatives or adjuvants that are used to enhance the immune response[11]. Examples of immune responses include molecular mimicry (GBS, rheumatic fever), immune complex deposition diseases (serum sickness, toxic epidermal necrolysis), classical autoimmune disease (SLE, autoimmune thyroiditis, autoimmune hepatitis) and immediate hypersensitivity reactions (anaphylaxis).

Bassendine et al. report a case of a 70-year-old woman who had a severe relapse of polymyalgia rheumatica post-influenza vaccine[12]. After receiving the vaccination, patients between the ages of 60 and 80 experienced symptoms typical of PMR, ranging from one day to three months later[4]. All patients had good initial and maintenance responses to corticosteroids. Falsetti et al. reported 58 cases of PMR with environmental triggers. They noted that patients with these subtypes, like our patient, tend to have a shorter time

to normalise inflammatory markers. However, they also face increased difficulties in stopping glucocorticoid therapy[13]. RSV vaccinations and their link to autoimmune conditions, particularly PMR, have not been well studied. However, a paper by Kanduc suggests a potential for autoimmunity with the RSV vaccination[14]. In a February 2024 report, the US Centers for Disease Control and Prevention (CDC) found that the Abrysvo® RSV vaccine caused a significant increase in GBS incidence (25.1 cases per 1 million doses). The Arexvy® RSV vaccine also showed an increase, but lacked statistical significance (10.0 cases per 1 million doses)[15].

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