**Case Report**

**An Autoimmune Storm Post Covid-19 Vaccine: A Case Presentation**

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**Abstract**

Covid 19 (Corona Disease 2019) is caused by a virus named SARS-CoV-2) first discovered in China. The first reported case in the United States was on January 18, 2020 in Washington State. By March 11th 2021 the World Health Organization declared Covid 19 a pandemic. Covid 19 is an airborne virus that can cause cough, shortness of breath, fever and respiratory compromise. The FDA approved the first Covid vaccine, Pfeizer BioNTech Covid vaccine on August 23rd, 2021 [1]. Side effects initially noted were soreness at the site, pain and redness, but these side effects have expanded to include exacerbations of the autoimmune system [2]. The FDA and Centers for Disease have monitoring systems in place to ensure that all safety concerns continue to identify and evaluate each and every patient who receive the vaccine [3].

**Introduction to the Case Report**

K.L. is a 53 year old female who has a history of hypertension, Non-Insulin Dependent Diabetes (NIDDM) and migraines. She is gravida 4, para 3 with a history of one spontaneous miscarriage. At the age of 27, after the birth of her second child, she was diagnosed with Sjögren's disease, rheumatoid arthritis, protein C and S deficiency, and Hashimoto’s thyroiditis.

**Review**

Sjögren's disease is a systemic, autoimmune disease that can affect many different body systems, affecting the moisture-producing glands. Although dry mouth and dry eyes are the most common symptoms, dryness can also occur in the nose, sinuses, ears, throat, skin, and, in women, the vagina. These problems may interfere with work, social activities, and quality of life. Patients may notice irritation, a gritty feeling, or painful burning in the eyes. Dry eyes increase the risk for infection and susceptibility for corneal damage. Dry mouth can lead to difficulty eating and swallowing dry foods. It can lead to dental cavities, chipping, breaking, and loss of teeth. Dry mouth may increase gingivitis (gum inflammation) and oral yeast infections (candida) that may cause pain and burning. Sjögren's disease frequently causes swelling of the parotid glands (the glands below the ears and run along the jawline). Dryness can increase infections in the eyes, mouth, sinuses, lungs, and vagina [4].

Sjögren's disease can also affect the joints, muscles and nervous system (central nervous system and peripheral nervous system, including the autonomic nervous system), gastrointestinal tract (including the pancreas and liver), skin, blood vessels, lungs, and kidneys. Joint pain and stiffness with mild swelling are common. Rashes may occur, including inflammation of small blood vessels (vasculitis), most commonly on the lower legs. Sun-sensitive rash is more common on the back, chest, face, and arms. Peripheral neuropathy can cause numbness and tingling, especially in the feet. Fatigue, cognitive dysfunction, and sleep abnormalities are frequently reported symptoms. Patients should also be monitored for depression and anxiety. Sjögren's disease can be accompanied by other autoimmune connective tissue disorders, such as rheumatoid arthritis and autoimmune thyroid disease, sarcoidosis, and celiac disease. It can occasionally be misdiagnosed for fibromyalgia and multiple sclerosis [5].

Rheumatoid Arthritis (RA) is a chronic, progressive, and disabling autoimmune disease. It causes inflammation, swelling, and pain in and around the joints and can affect other parts of the body. RA usually affects the hands and feet first, but it can occur in any joint. It usually involves the same joints on both sides of the body. Common symptoms include stiff joints, especially when getting up after sleeping or after sitting down for an extended period of time [6].

RA is an autoimmune disease, commonly occurring with other autoimmune diseases such as Sjögren's disease. This means a person’s immune system mistakes the body’s healthy tissues for foreign invaders. It is also a systemic disease that can affect the whole body. As the immune system responds inflammation occurs in the target tissue or organ. This can include the joints, lungs, eyes, and heart in RA [7].

Hashimoto’s thyroiditis, also known as chronic lymphocytic thyroiditis, is the most common cause of hypothyroidism in the United States. It is an autoimmune disorder involving chronic inflammation of the thyroid. This condition tends to run in families. Over time, the ability of the thyroid gland to produce thyroid hormones often becomes impaired and leads to a gradual decline in function and eventually an underactive thyroid (Hypothyroidism). Hashimoto’s thyroiditis occurs most commonly in middle-aged women, but can be seen at any age [8].

Protein C and S deficiency is the lack of proteins C or S in the plasma. These proteins are natural substances that help prevent blood clots. It is an inherited autoimmune disorder that causes symptoms such as generalized edema, hair loss, weak and brittle nails, thin skin, the sensation of always being hungry, a weakened immunity and a loss of muscle mass. Some patients will have a fatty liver, skin degeneration and an increased susceptibility to infection. While true deficiency is rare in developed countries, low intake of protein may cause muscle wasting and increase the risk of bone fractures [9].

**Patient’s Case Report**

K.L.’s family history includes a father who is alive age 78 years old with a history of protein S deficiency, pulmonary embolism, coronary artery disease, colon cancer; a sister alive 51 years old with a history of autoimmune thyroiditis; a sister who is 43 years old history with a history of protein S deficiency.

K.L. is an elementary school educator who works full-time. When the world was affected by SARS-CoV2, K.L. was teaching full-time in her classroom which soon turned to remote teaching. She was eager to return to the classroom, so when the covid vaccine became available, she wanted to receive it and return to work... She received her first and second Pfeizer vaccine in March 2021. In May 2021, she began to experience symptoms of shortness of breath with and without exertion. Associated symptoms were lower extremity pain and edema. She was admitted to a local community hospital in May 2021 with the diagnosis of bilateral deep vein thrombosis and bilateral pulmonary emboli. She was treated with intravenous heparin and discharged home on apixaban for six months. She worked hard to regain her strength no avail.

In August 2021 she was once again admitted with multiple petechiae (red / purple areas on her lower legs), bruises on her extremities, arms and nosebleeds. She was diagnosed with Immune Thrombocytopenia Purpura (ITP) ITP is a blood disorder characterized by a decrease in the number of platelets in the blood. A decrease in platelets causes easy bruising, bleeding gums, and internal bleeding. In ITP, the immune system is stimulated to attack your body's own platelets. Most often, this is a result of antibody production against platelets [2]. K.L.’s ITP was treated with intravenous heparin and she was discharged on apixaban with close follow up.

In January 2022 K.L. began to have overwhelming complaints of malaise, failure to thrive and shortness of breath, different than her previous symptoms. At this time, she was diagnosed with SARS-CoV2. She was treated with oral corticosteroids and conservative treatment. She states, “I never felt as though I recovered.” Six month later in July 2022, she was admitted to a larger hospital with the diagnosis of acute decompensated Heart Failure with Reduced Ejection fraction (HFrEF) with an ejection fraction of 25%. MRI showed non-ischemic cardiomyopathy complicated by atrial fibrillation and a pericardial effusion, cardio renal acute kidney injury. She was hospitalized for a total of 11 days to address her multiple medical/cardiac conditions. An echocardiogram was performed on 7/5/22 and concluded non ischemic cardiomyopathy with mild non obstructive coronary artery disease. A cardiac catheterization on 7/5 confirmed this diagnosis. Her initial Brain Natriuretic Peptic (BNP) was 30,000 pg/ml (0-100 pg/ml) with a troponin was 33 (0-0.4 ng/ml). It was decided that she was a candidate for an Automated Implantable Cardioverter Defibrillator (AICD) which was placed on 7/10. Chest X-ray showed a pericardial effusion and pulmonary congestion. K.L. was discharged on 7/11 in stable condition on the following medications: albuterol inhaler prn, bumetanide 2 mg every other day, carvedilol 50 mg bid, rosuvastain 40 mg qd, spironolactone 25 mg qd, symbicort 160-45 mcg HFA q am.

Her cardio renal acute kidney injury improved with diuresis; creatinine level initially was 2.69 (0.5 -1-1.04 mg/dl) which decreased to 1.22 at the time of discharge. Her diagnosis of anemia of chronic disease as noted by an iron count of 22 (37-145 ug/dl), TIBC 246 (250-450 ug/dl), Iron sat 9% (15-50%), stools negative for blood and she was given folic acid 1 mg qd with a follow up with hematologist; Hashimoto’s thyroiditis- T4 1.40 (0.8-1.70 ng/dl), TSH 7 which is being treated with levothyroxine 50 mcg every morning with a follow up with endocrinologist; Her Sjögren's and Rheumatoid Arthritis is being treated with prednisone 10 mg every morning; Protein C and S deficiency/ with a history of DVT/PE she will take warfarin 2 mg every day to maintain an INR of 2-2.5); type 2 DM currently on dapaglilozin 10 mg qd.

One day post AICD, K.L. was readmitted (7/12) with a 7.8 cm collection of blood at her AICD site which was determined to be secondary to her anticoagulation and poor renal clearance. She remains to be very weak with a poor intake with complaints of general malaise. Her most recent echocardiogram shows an improved ejection fraction as compared to the beginning of July 26% to 45% (July 12th). She has follow up appointments with her cardiologist, endocrinologist, electrophysiologist, hematologist in August 2022 with the goal of returning to her teaching position in September. The question for all readers is; “Did the Pfeizer vaccine precipitate the autoimmune storm of ITP, protein S and C deficiency that led to bilateral DVT/PE’s, and non-ischemic cardiomyopathy?

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