

Immune Thrombocytopenia Following Moderna COVID-19 Vaccine

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Summary

A previously healthy patient presented ten days after receiving her second dose of the Moderna COVID-19 vaccination with a two-day history of petechia and wet purpura. Patient was refractory to initial immune thrombocytopenia (ITP) treatment, with platelets remaining undetectable for eleven days. The patient's hospital course was complicated by hemoperitoneum treated with tranexamic acid. Patient ultimately recovered and was discharged with a platelet count of 18k/L. In this case report, we review vaccine-related ITP and literature to date on relationship between COVID-19 vaccinations and secondary ITP.

Background

Immune thrombocytopenia (ITP) is a disease process mediated by antibodies which target platelets for destruction and damage megakaryocytes to limit their production [1]. While most cases are idiopathic, vaccines such as the MMR have been noted to be associated with ITP [2]. There have been few reported cases of apparent secondary immune thrombocytopenia following COVID-19 vaccination with both the Moderna and Pfizer vaccinations [2]. Most patients in those case studies responded to treatment with corticosteroids and IVIG [2].

However, ITP secondary to the newly released COVID-19 vaccination is an evolving topic with few cases reported to date. This report demonstrates a rare case of COVID-19 vaccine-induced severe ITP which was without response at eleven days after treatment.

Case Presentation

A 61-year-old Caucasian postmenopausal female with a past medical history of melanoma in situ and obstructive sleep apnea presented ten days after receiving her second dose of the Moderna COVID-19 vaccine for evaluation of scattered, non-tender, non-pruritic red spots on her legs, non-painful blood blisters in her mouth, and light vaginal bleeding. Physical exam was notable for innumerable

petechiae over both legs, wet purpura to the buccal mucosa and tongue, and blood noted in the vaginal canal without bleeding from the cervical os. No splenomegaly or bleeding from elsewhere was noted. She was otherwise healthy, with no personal or family history of autoimmune disease or hematologic disorders. She denied recent illnesses or sick contacts.

The patient was refractory to initial ITP treatment, including IVIG, dexamethasone, NPlate, and platelet infusions, with platelets remaining undetectable for eleven days. Patient was discharged with a platelet count of 18k/L but returned one week later with a platelet count under 5. Vincristine was started and the patient saw rapidly increasing platelet levels within two treatments. This case report demonstrates secondary refractory ITP due to the Moderna COVID-19 vaccination.

Investigations

Labs on admission were significant for an isolated thrombocytopenia of <5K/L, with an otherwise normal CBC with differential. Protime, partial thromboplastin time, total bilirubin, lactate dehydrogenase, fibrinogen, thyroid stimulating hormone, ADAMTS13 activity, chest x-ray, and urinalysis were also within normal limits. H. Pylori IgG antibodies elevated to 2.36, but stool H. pylori antigen was negative. Further work-up was negative including Hepatitis B/C, HIV, Influenza, COVID-19 rapid test, as well as normal antinuclear antibody, C3, C4, and rheumatoid factor excluding many other causes of thrombocytopenia. CT with contrast of chest/abdomen/pelvis was negative for overt malignancy, splenomegaly, or lymphadenopathy. Bone marrow biopsy was without concern for developing lymphoma or leukemia and chromosomal studies were without overt mutation.

Differential Diagnosis

Our patient lacked any symptomatology or laboratory evidence of a recent viral illness and denied sick contacts. Infectious workup was negative for an acute cause.

However, the authors note that it is possible our patient cleared an EBV or CMV infection and remained asymptomatic. We did not test for these. A consumptive coagulopathy is unlikely as coagulations studies were normal. Further, patient lacked evidence of renal or cerebral dysfunction. The patient denied consuming food or medications containing quinines, which has been associated with thrombocytopenia [3]. While theoretically possible, it would be unusual for lymphoproliferative processes such as leukemia or lymphoma to affect a single cell line of platelets while the leukocytes and erythrocytes remain normal in both number and morphology.

Immune thrombocytopenia following COVID-19 vaccination is the most likely diagnosis, given isolated severe thrombocytopenia with otherwise normal cell lines, normal liver function, coagulation studies, and negative rheumatology, infectious, and malignancy workup with most cases of secondary ITP reported occurring within one to two weeks following vaccination [2].

Treatment

The patient was refractory to initial treatment, receiving IVIG, 4 days of dexamethasone, Nplate, and 3 units of platelets with no increase in her platelet counts. On day 11 of hospitalizations, the patients' platelets increased in 18k/L. She was subsequently discharged home, however was readmitted one week later with a platelet count under 5. The patient was started on Vincristine and saw rapidly increasing platelet levels within two treatments (12 days).

Discussion

There have been increasing reports of associated ITP two weeks following COVID-19 vaccinations. Seventeen patients reported were without preexisting thrombocytopenia and fourteen patients had bleeding symptoms prior to admission [2]. While this is a developing area of investigation, it may be exacerbating underlying ITP or further be related to an innate property of the COVID-19 vaccination predisposing patients to develop ITP.

The Vaccine Adverse Event Report System (VAERS) dataset (accessed 4/9/21) with the search terms "idiopathic thrombocytopenia purpura" OR "immune thrombocytopenia" OR "immune thrombocytopenic purpura" AND "COVID-19 vaccine" yielded 67 cases (36 female, 30 male, 1 unknown sex). While this is concerning for being induced by the vaccinations, it is unclear if the association is causative. Analysis of the reports showed that females were more likely to be affected, as expected due to the autoimmune nature of the disease. However, only three individuals were diagnosed with autoimmune diseases prior to their ITP diagnosis. Also, it was found that Moderna was reported to have more associations with ITP than the Pfizer vaccine.

As previously described in the literature, COVID-19 infections are associated with increased coagulation, thrombocytopenia, and thrombosis [3]. Thus, it is important to further investigate any association of hematologic pathologies such as ITP with the COVID-19 vaccines to further understand the depth of the impact on the hematologic system.

Learning Points/Take Home Messages

- ITP has known associations with vaccines. We must be vigilant in monitoring patients post COVID-19 vaccination for signs and symptoms of ITP.
- ITP can be a life-threatening condition. Further investigation is extremely needed to evaluate risk of developing ITP from COVID-19 vaccination specifically.
- COVID-19 infection is associated with many hematologic abnormalities, with increased cases regarding development of ITP, continued reporting of ITP development is necessary to fully understand the scope of this association.

Patient's Perspective

"Overall, I was very thankful. Thankful for the care I received, thankful for friends and family that reached out to me. The scariest part was when I heard that I had the bleed because I know that it could cause me to die. I am a very faithful person and I had to be ok with it was my time to go, I needed to accept it. I do not resent my decision to get the vaccination. That was a risk I took. If it cause my ITP or not that was my decision and I need to move forward with that decision. I am incredibly grateful that I am doing well. I am very thankful for the ways that I grew in my faith.

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