Vaccine Induced Thrombotic Thrombocytopenia

Ananya Mahesh

Abstract

Vaccine Induced Thrombotic Thrombocytopenia (VITT) is a medical condition caused by the adenovirus-based COVID-19 vaccine that leads to blood clots in unusual areas and lowered platelet count in blood. The condition, which resembles Heparin Induced Thrombotic Thrombocytopenia, is caused by the formation of anti-Platelet Factor 4 antibodies. The current incidence of VITT is very rare. Since there are not very many cases that have been released, it is difficult to determine any particular risk factors that make one more susceptible to VITT. As of right now, treatment methods include anticoagulants (including heparin), antibodies, and cortisone.

Introduction

- Vaccine Induced Thrombotic Thrombocytopenia (VITT) is a condition caused by certain variations of the COVID-19 vaccine that causes blood clots in the veins or arteries.
- The incidence of VITT is extremely rare and the condition is only found in patients who have taken the Johnson & Johnson or AstraZeneca vaccine
- VITT is caused by the activation of platelet factor 4 by antibodies

Methodology

- Key Words: Covid Vaccine, Blood clot, Thrombosis, Thrombotic Thrombocytopenia, Venous, Arterial clot, platelet factor
- Articles found using PubMed

Pathophysiology

- VITT is caused by anti Platelet Factor 4 antibodies in the bloodstream
- VITT leads to blood clots in unusual places and a drastically lowered platelet count
- Some symptoms of VITT include abdominal pain, nausea, vomiting, blood in stools, headaches, visual disturbances, and persistent fever
- Patients with VITT test negative for COVID-19 and thrombophilia

Epidemiology

- The incidence of VITT is currently very low
- As of April 2021, there were around 200 cases of VITT in the EU
- Only occurring in patients taking J&J or AstraZeneca adenovirus-based vaccines

Risk Factors

- Of 11 patients diagnosed with VITT in Germany, 9 were female, with the median age being 36
- The biggest current risk factor is administration of the adenovirus-based COVID-19 vaccine

Mechanisms

- VITT shares similarities with Heparin Induced Thrombotic Thrombocytopenia (HITT)
- HITT occurs when anti-PF4 antibodies are formed after exposure to heparin
- Platelet Factor 4 is a protein that binds to heparin
- VITT occurs spontaneously without exposure to heparin when anti-PF4 antibodies are formed from the adenovirus vaccine
- In HITT and VITT, PF4 is absent, leading to thrombotic complications

Therapeutic Targets

- When testing a group of VITT patients in Germany, it was found that their platelet counts improved after being treated with Low Molecular Weight Heparin
- Administration of antibodies, cortisone, and anticoagulants have all helped treat VITT in patients

Conclusion

- VITT is a very serious and increasingly prevalent condition
- As more and more cases are discovered and announced, it is important to stay informed and take precautions
- If you have taken the J&J or AstraZeneca vaccine and feel any of the symptoms of VITT for over 2 days, consult a doctor
- Further research is needed that would involve detecting what is activating the anti PF4 antibodies and any other potential risk factors that patients may have

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