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CASE REPORT

VITT with inactivated SARS-CoV-2 vaccine – index case

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ABSTRACT

We report a case of vaccine-induced immune thrombotic thrombocytopenia (VITT) in a 73-year-old gentleman who presented with pulmonary embolism and thrombocytopenia, two weeks after receiving inactivated COVID-19 vaccine. He responded well to nonheparin anticoagulation with complete resolution of symptoms and platelet count.

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VITT; COVID-19; inactivated vaccine

Introduction

A number of rare and unusual cases of COVID-19 vaccine-associated thrombotic thrombocytopenia have been observed after one to two weeks of exposure associated with adenovirus vector vaccines[1]. Till date, more than 48% population worldwide has been fully vaccinated. The Ministry of Pakistan has approved five vaccines for its use in the population. These include: Sinopharm, Sinovac, Sputnik V, CanSino, and AstraZeneca. Approximately 90% of the inoculations in Pakistan have been performed with inactivated vaccines Sinopharm and Sinovac. We report an unusual presentation of left leg deep venous thrombosis with extensive bilateral pulmonary embolism along with thrombocytopenia, observed in a-73-year-old male after twelve days of receiving inactivated COVID-19 vaccine.

Case

A-73-year-old male with performance status of ECOG 1, known case of diabetes mellitus, presented in emergency department with history of acute chest pain lasting for few hours. History was significant for receiving COVID-19 vaccine (Sinopharm) two weeks ago. On examination there was left leg swelling along with tenderness. Doppler ultrasound showed deep venous thrombosis of left popliteal vein extending into small saphenous vein inferiorly, and superiorly into distal portion of superficial femoral vein. Subsequently, computed tomography (CT) of the chest was performed to assess the extension of thrombus revealing bilateral thrombosis in pulmonary veins. As part of immediate treatment plan, inferior vena cava (IVC) filter was placed to prevent further worsening of clinical condition.

His complete blood counts (CBC) at presentation showed hemoglobin: 13 gm/dl, hematocrit: 40%, MCV: 83FL, WBC: 16.5×10^9/L, and platelet count: 78×10^9/L. Peripheral film review showed normocytic normochromic red cells and thrombocytopenia. The hematology team was consulted to rule out the possibility of vaccine-induced immune thrombotic thrombocytopenia (VITT). On further inquiry, there was no past history of heparin exposure and his last platelet count (in December 2020), done as part of yearly evaluation was 280×10^9/L. Based on these clinical findings, a probable diagnosis of VITT was made (until proven otherwise). We do not have the facility for testing antibodies to heparin-platelet factor 4 complex by ELISA. However, his 4 T's score indicated high probability of HIT (8 points, 64%).[4] We performed a gel agglutination assay of heparin/PF4 antibody (BIO-RAD) which was negative. Further workup for suspected VITT showed plasma D-dimer levels of more than 30 mg/L FEU (>30 mg/L FEU upper limit), fibrinogen level: 183 mg/dl, fibrinogen degradation product (FDP) more than 20ug/ml, prothrombin time (PT) 14 seconds, and activated partial thromboplastin time (APTT) 27 seconds. He fulfilled the criteria of VITT as per American society of hematology (ASH) recommendations and was treated with nonheparin anticoagulant (rivaroxaban). The patient was discharged in stable condition with platelet counts returning to normal ranges (373×10^9/L) after two weeks of anticoagulation treatment. We plan to continue rivaroxaban for six months.

Discussion

Vaccines against severe acute respiratory syndrome coronavirus 2 (SARS-COV-2) are the most important counter measure to fight the coronavirus 2019 (COVID-2019) pandemic. European medicine agency has approved four vaccines from December 2020 till date, on the basis of randomized blinded controlled trials. These include: RNA-based vaccines BNT162b2 (Pfizer–BioNTech) and mRNA-1273 (Moderna) that encode the spike protein antigen of SARS-CoV-2, encapsulated in lipid nanoparticles; ChAdOx1 nCov-19 (AstraZeneca), a recombinant chimpanzee adenoviral vector encoding the spike glycoprotein of SARS-CoV-2; and Ad26.COV2. S (Johnson & Johnson/

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Janssen), a recombinant adenovirus type 26 vector encoding SARS-CoV-2 spike glycoprotein.[2] In 2021, Vayne et al. reported case series of 11 patients (median age 36 years) who developed postvaccination immune thrombotic thrombocytopenia. All of these patients were exposed to ChAdOx1 nCov-19 in mid of March 2021 with symptoms beginning 5–16 days after vaccination. These patients tested positive for HPF-4 antibody and were managed with non-heparin anticoagulant (apixaban).[3] The vaccine component has been hypothesized to cause acute inflammatory reaction with this interaction resulting in high titer anti-PF4 leading to activation of platelets and neutrophil causing prothrombotic responses.[7]

Recently McDonell et al. have reported left inferior ophthalmic vein thrombosis due to VITT resulting from ChAdOx1 nCoV-19 (AstraZeneca) SARS-Cov-2 vaccine.[5]

To date, there has not been a single case reported of VITT resulting from inactivated COVID-19 vaccine. We report the possible first case of VITT temporarily associated with vaccination Sinopharm (inactivated vaccine). Our patient fulfilled ASH recommendation criteria of thrombosis along with thrombocytopenia of VITT.[6] He presented with venous thrombosis, moderate thrombocytopenia and elevated D-dimer levels. Although his heparin/PF-4 antibody test (gel-based assay) was negative), his clinical presentation and laboratory parameters were pathognomonic for VITT. Given the lack of robust, postvaccination surveillance in most of the countries where the inactivated vaccines have been deployed, the risk of VITT with this class of vaccines is difficult to ascertain. Therefore, a history of recent vaccination for COVID-19 should be elicited in patients presenting with unprovoked VTE.

Conclusion

We report the first case of VITT following inactivated SARS-CoV-2 vaccine8 based on clinical presentation of thrombosis and thrombocytopenia along with laboratory and radiological evidence. The patient responded to nonheparin anticoagulation with complete recovery of symptoms and thrombocytopenia in two weeks.

Disclosure statement

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References

1. Cines DB, and Bussel JB. SARS-CoV-2 vaccine – induced immune thrombotic thrombocytopenia. N Engl J Med. 2021 Apr 16;22: NEJMe2106315.
2. Greinacher A, Thiele T, Warkentin TE, Weisser K, Kyrle PA, and Eichinger S. Thrombotic thrombocytopenia after ChAdOx1 nCov-19 vaccination. N Engl J Med. 2021 Apr 9; 22. NEJMoa2104840.
3. Greinacher A, Selleng K, Wesche J, Handtke S, Palankar R, Aurich K, Lalk M, Methling K, Völker U, Hentschker C, et al. Towards understanding ChAdOx1 nCov-19 vaccine-induced immune thrombotic thrombocytopenia (VITT).
4. Hewings-Martin Y. COVID-19: how do inactivated vaccines work? Published Online January 22, 2021.
5. McDonell T, Cooksley T, Jain S, and McGlynn S . Left inferior ophthalmic vein thrombosis due to VITT (Vaccine Induced Thrombotic Thrombocytopenia): a case report. QJM. 2021. hcab124. doi:10.1093/qjmed/hcab124.
6. Risch L, Bertschmann W, Heijnen IAFM, Huber AR. A differentiated approach to assess the diagnostic usefulness of a rapid particle gel immunoassay for the detection of antibodies against heparin-platelet factor 4 in cardiac surgery patients. Blood Coagul Fibrinolysis. 2003 Jan;14(1):99–106. doi:10.1097/00001721-200301000-00018.
7. Tardy-Poncet B, de Maistre E, Pouplard C, Presles E, Alhenc-Gelas M, Lasne D, Horellou MH, Mouton C, Serre-Sapin A, Bauters A, et al. Heparin-induced thrombocytopenia: construction of a pre-test diagnostic score derived from the analysis of a prospective multinational database, with internal validation. J Thrombosis Haemostasis. 2021 Apr 19;19:1959–72. doi:10.1111/jth.15344.
8. Vayne C, Rollin J, Gruel Y, Pouplard C, Galinat H, Huet O, Mémier V, Geeraerts T, Marlu R, Pernod G, et al. PF4 immunoassays in vaccine-induced thrombotic thrombocytopenia. N Engl J Med. 2021 May 19;385(4):376–78. doi:10.1056/NEJMc2106383.