

# Moderna COVID-19 vaccine: a new player in vaccine-induced thrombosis without thrombocytopenia

Harmehar Kohli, BA\*, Ankita Gore, MD\*, Maaz Sheikh, MD, Tejas Karawadia, MD, Imran Baig, MD, Viraj Modi, DO

Renaissance School of Medicine Stony Brook University, Stony Brook, NY



## Background

- The mRNA-1273 vaccine against COVID-19 was disseminated to the US public under emergency use authorization beginning December 2020, and the extent of its side effects are still being closely monitored.
- Numerous cases reported detailing thrombotic complications after the AstroZeneca<sup>1</sup> and Johnson & Johnson/Janssen vaccinations.
- To date, very few cases of extensive thrombosis without thrombocytopenia post Moderna vaccine have been reported, and as such, this remains an extremely rare adverse effect of this vaccine

## Purpose

To document a possible rare side effect of the Moderna vaccine.

## Patient Presentation

- 31-year-old male who developed extensive pulmonary embolism (PE) and deep venous thrombosis (DVT) three days after administration of the 2<sup>nd</sup> dose of the Moderna vaccine
- No prior medical or family history of thromboembolic events or sequelae of such
- Denied recent travel, trauma, illness, or recent heparin administration
- Had tolerated the 1<sup>st</sup> dose of the Moderna vaccine without symptoms one month prior
- Presented to the emergency department with left calf swelling, left knee pain, and mild shortness of breath
- Afebrile and hemodynamically stable

## Clinical Course

- Imaging:**
  - Doppler ultrasound of the left lower extremity: thrombus in the common femoral, superior, mid and distal femoral, popliteal, and likely posterior tibial vein.
  - CT chest Angiogram: extensive pulmonary emboli in the bilateral main pulmonary, lobar, and segmental arteries.
  - Cardiac echocardiogram: mild right heart enlargement.
- Initial treatment:** enoxaparin initiated in emergency room as patient was deemed hemodynamically stable
- Further workup:** Extensive testing for hypercoagulable disorders, including hereditary and acquired hypercoagulable etiologies, were obtained. Hypercoagulable workup had been negative to date, including heparin-induced thrombocytopenia (HIT) Elisa and serotonin-release assay.
- Leading diagnosis:** Vaccine induced thrombosis
- Further treatment/interventions:** Due to the diagnosis of bilateral sub-massive PE, patient will be continued on direct acting oral anticoagulation for at least 1 year and re-evaluated for further anticoagulation in the future.



Figure 1: Pulmonary emboli seen in bilateral main pulmonary arteries

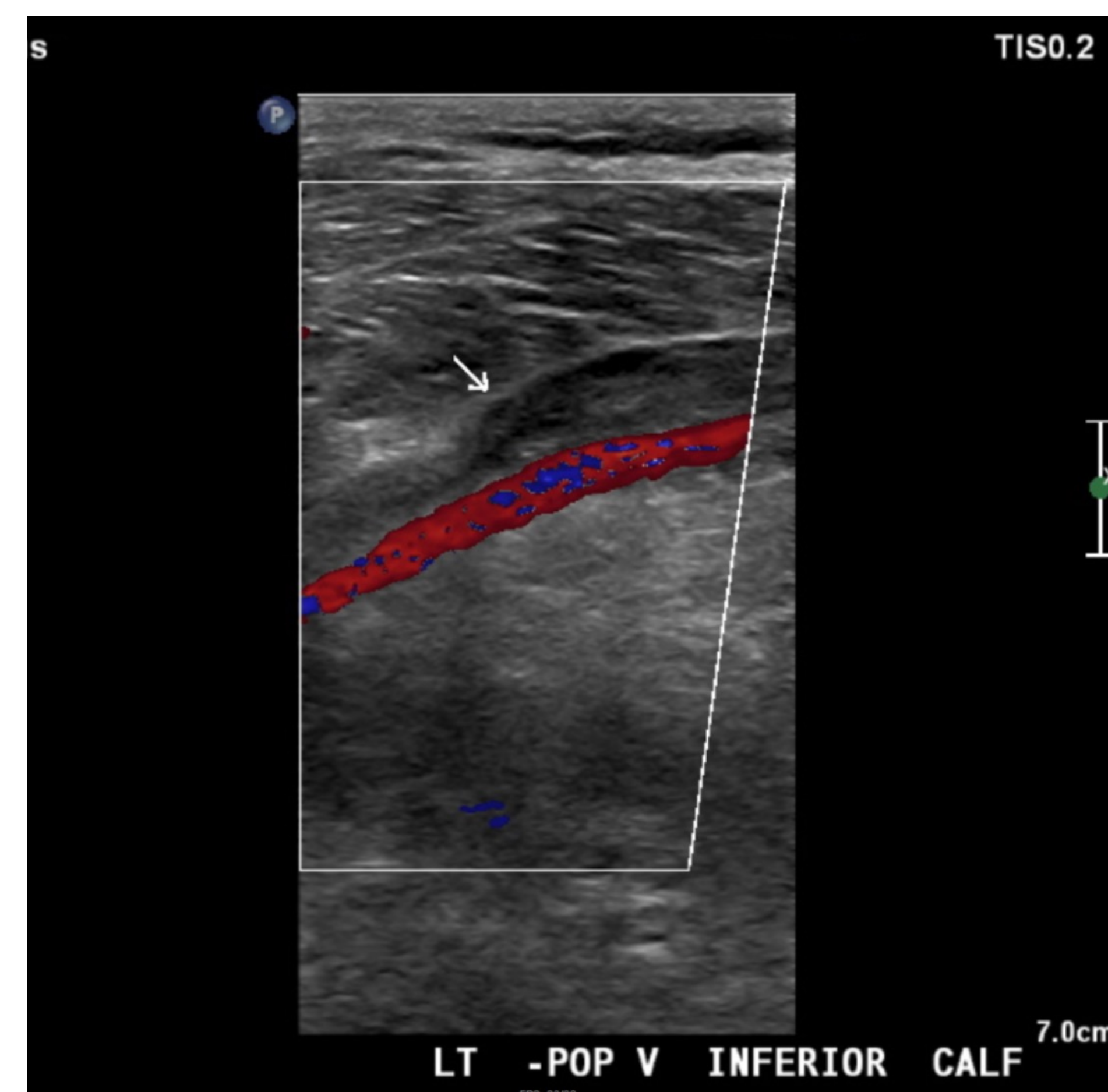


Figure 2: Lower extremity Doppler imaging demonstrating extensive thrombosis

## Conclusion

- The leading mechanistic theory resembles that of autoimmune HIT due to high prevalence of antiplatelet-factor-4 (PF4) antibodies in patients that developed thrombosis post vaccine<sup>2</sup>.
- No definitive correlation has been made yet with the mRNA based vaccines (Moderna and Pfizer-BioNTech), however post-vaccine cases of immune thrombocytopenia and bleeding without thrombosis have been documented<sup>3</sup>.
- Although the mechanisms behind the mRNA and dsDNA vaccines are different, the possibility of vaccine induced thrombosis after Moderna vaccine is highly probable.
- Our report showcases a **plausible link between the Moderna vaccine and thrombosis due to the extensive and unprovoked nature of DVT/PE in this patient in the setting of a negative hypercoagulable state and workup.**
- While this correlation warrants further analysis, this is not evidence to dissuade use of the Moderna vaccine given its potential benefits in preventing COVID-19.

## References

- Parums, D. V. (2021). SARS-CoV-2 mRNA Vaccines and the Possible Mechanism of Vaccine-Induced Immune Thrombotic Thrombocytopenia (VITT). *Medical science monitor: international medical journal of experimental and clinical research*, 27, e932899-1.
- Vayne, C., et al. (2021). PF4 Immunoassays in Vaccine-Induced Thrombotic Thrombocytopenia. *New England Journal of Medicine*.
- Lee, E. J., et al. (2021). Thrombocytopenia following Pfizer and Moderna SARS-CoV-2 vaccination. *American Journal of Hematology*.